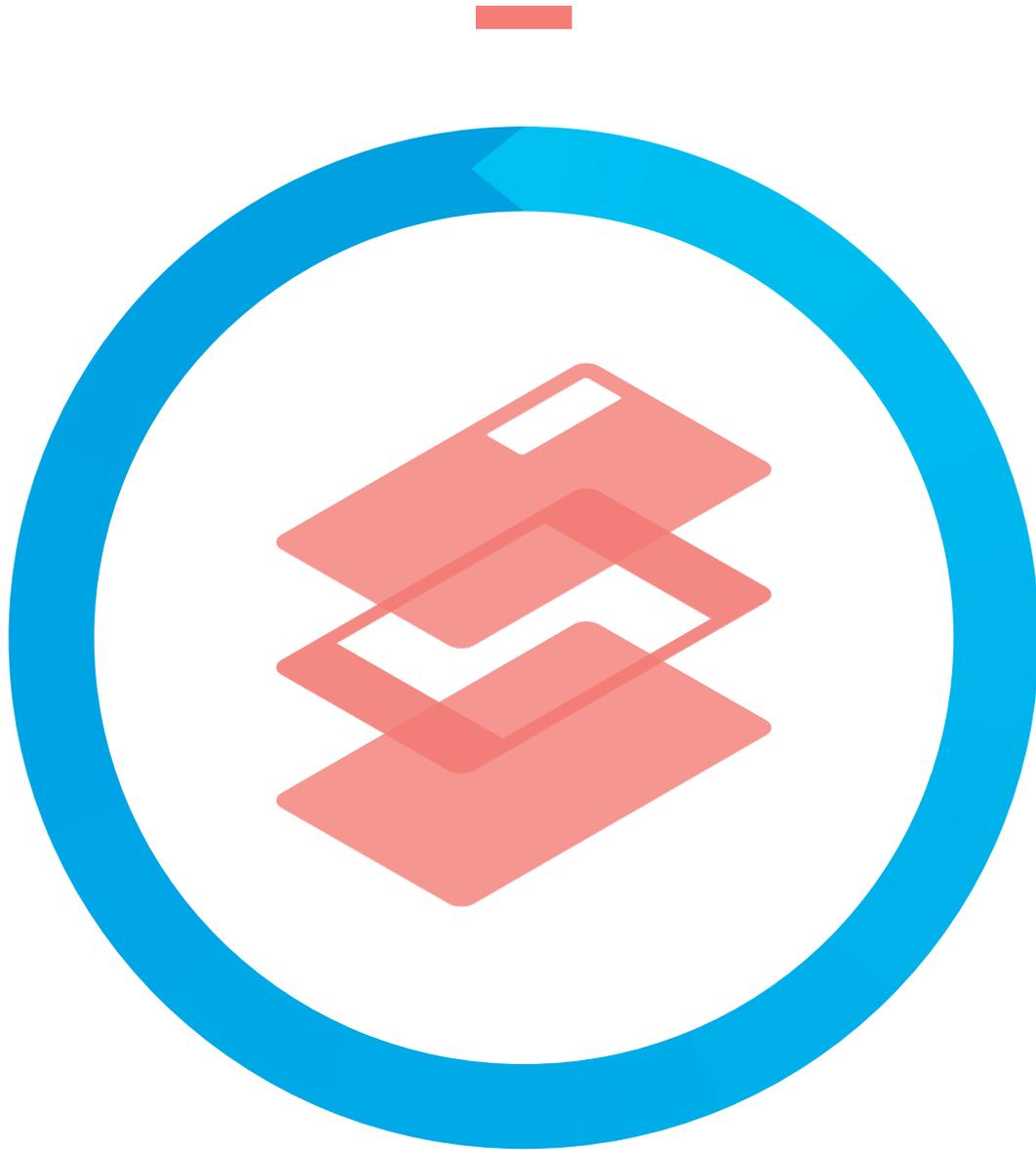


THE CIRCULAR PHONE

Legal, operational and financial solutions to unlock the potential of the 'Fairphone-as-a-Service' model



A report by:



With the support of the Community of Practice:



EXECUTIVE SUMMARY

THE COMMUNITY OF PRACTICE

The transition to the Circular Economy requires innovative business models such as Product-as-a-Service models that focus on the performance of products rather than on ownership. A Community of Practice was established in which experts from different fields collaborated to create a financially viable Product-as-a-Service business model for Fairphone. This report retraces the 'learning-by-doing' trajectory of this Community of Practice. It provides tools needed to unlock the potential of Product-as-a-Service business models and have positive, circular impact.

FAIRPHONE-AS-A-SERVICE AND MODULARITY

In Product-as-a-Service models service providers retain ownership of products and are incentivised to create value by offering high-quality, durable products that can be easily upgraded, repaired, refurbished and taken back at the end of their useful life. Product modularity allows Fairphone to this logic further by optimising value creation based on the economic life of individual modules rather than of entire devices. The modular design of Fairphone 2 is therefore central to the Fairphone-as-a-Service proposition.

THE CIRCULAR SERVICE CONTRACT

Product-as-a-Service radically transforms customer relationships from a one-off transaction to an ongoing engagement. Service specifications must be clearly delineated and translated into a contractual agreement that reflects needs for flexibility and continuity. For Fairphone, it is key to offer an appropriate level of technology while taking into account circular economy considerations. A template circular service contract is provided in this report.

KEY IMPLICATIONS FOR FAIRPHONE

In order to fully unlock circular value, new operational processes must be implemented. For Fairphone, state-of-the-art hardware management is critical to optimise the use of individual modules, ensure high quality services and maximise circular value. Additionally, the access to and use of user data is critical, for example to enable Fairphone to conduct preventive maintenance, yet has to be carefully balanced with privacy considerations.

FINANCING FAIRPHONE-AS-A-SERVICE

Modelling financial statements on module level is valuable but difficult. This exercise led to a 5 year cash flow projection and balance sheet on module level. Product-as-a-Service requires steering on different securities. For Fairphone, key considerations are client quality (diverse and predictable portfolio), asset quality (good quality phone with modularity) and the contract (incentivising a long-term responsible relationship). The solution for financing Fairphone-as-a-Service lies in combining the flexibility of a current account with the long-term financial relationship of lease structures.

KEY LEARNINGS

- Overcoming barriers to circular business models requires open collaboration and transparency to create synergies between different fields of expertise (business, legal, operational, financial).
- Fairphone is ideally suited to implement Product-as-a-Service models because of the modularity of Fairphone devices and the company's sustainability mission.
- The development of circular PaaS contract requires careful delineation of service specifications and fair allocation of risks to parties best able to handle them.
- Unlocking the potential of Product-as-a-Service requires new operational processes: track & trace, maintenance, repair and replacement processes and balancing access to and use of data.
- PaaS models can successfully be financed by blending existing financial instruments on the basis of detailed financial modelling and by leveraging key strengths of the service as securities.
- The approach taken for Fairphone can easily be adapted and replicated for other businesses.

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1 - THE COMMUNITY OF PRACTICE

PRODUCT-AS-A-SERVICE: BUSINESS INNOVATION FOR THE CIRCULAR ECONOMY

New business models such as product-service systems¹ are essential to enable the transition to a circular economy. In circular Product-as-a-Service (PaaS) business models, the focus of the value proposition is not the ownership of the product itself, but on the performance of the product, enabled by tailored services.

In PaaS models, the service provider retains ownership of and responsibility for the product, which incentivises the design of high quality, low maintenance and durable products. Moreover, retaining ownership of the product facilitates take-back and the reuse or recycling of materials and components, which leads to improved resource efficiency. PaaS models can also trigger collaboration within the value chain to align processes for maintenance, repair, refurbishing and recycling.

THE COMMUNITY OF PRACTICE: A COLLABORATIVE AND TRANSPARENT APPROACH

PaaS models require innovative thinking and their implementation is not a simple exercise. Indeed, they imply a radical change in the relationship with customers, which becomes a long-term contractual agreement that needs to be managed carefully.² Additionally, PaaS models can present significant operational challenges, and attracting funding can be difficult due to changing revenue structures and the need for upfront investments.

Developing practical and scalable solutions requires a collaborative and transparent approach and a focus on a clearly defined business opportunity. To meet the challenge, a 'Community of Practice' (CoP) was formed and involved the following members: Nederland Circulair! and the Dutch Ministry of Infrastructure & Water Management (co-funders), Circle Economy & Sustainable Finance Lab (initiators and coordinators); Fairphone (service provider); PGGM (intended launching customer), ING and ABN AMRO (financial experts), NBA (accounting experts), Allen & Overy (legal experts, and Circularise (data experts).

CoP members engaged in a 'learning-by-doing' trajectory to co-create workable legal, operational and

financial solutions to successfully launch 'Fairphone-as-a-service' (FaaS). Moreover, the aim was also to share the learnings for others to use in their journey to creating PaaS business models and, by doing so, to accelerate the transition to a circular economy in line with the impact missions of Circle Economy, Sustainable Finance Lab and Fairphone.

ABOUT THE REPORT

This report retraces how, in an open learning environment which involved several workshops and thematic deep dives, CoP members developed the FaaS business model. It provides and an in-depth example that other businesses can use as a reference to implement PaaS models. Reading this report you will learn about:

- Fairphone and the role that modularity plays in the FaaS business model (Chapter 2);
- Solutions to capture opportunities that surface from long-term customer relationships in a tailored Circular Service Contract (Chapter 3 and Annex A);
- Selected operational challenges for implementation, including module management maintenance and data use (Chapter 4);
- Cash flow implications of PaaS models, investment requirements and means to secure financing (Chapter 5 and Annex B); and
- Key learnings and next steps to accelerate the launch of FaaS and scale the adoption of circular business models (Chapter 6).

1. For more information on Product Service Systems, see Tukker, 2004.

2. See for example FinanCE working group, 2016; Fischer & Achterberg, 2016

2 - FAIRPHONE-AS-A-SERVICE AND MODULARITY

FAIRPHONE: A SOCIAL ENTERPRISE IN THE ELECTRONICS INDUSTRY

Fairphone³ is a renowned social enterprise that is often used as an example by circular entrepreneurs and organisations worldwide. The company designs and produces smartphones with minimal harm to society and the environment by focusing on four main issues: fair materials, good working conditions, long-lasting design, and reuse & recycling.

Having set up sustainable and responsible material sourcing and assembly processes, Fairphone turned to the development of a modular phone. However, Fairphone's business model remains based on product sales, which means the company loses control of the devices after sale. Fairphone now wants to develop a business model whereby it can not only be sustainable in its sourcing, but also at use and end-of-use stages.

THE FAIRPHONE-AS-A-SERVICE VALUE PROPOSITION

Fairphone intends to take the next step by offering Fairphone-as-a-Service (FaaS) for businesses and by starting a pilot in 2018.⁴ The idea for FaaS is to offer an innovative business-to-business proposition based on:

- Access to functioning Fairphone devices for the customer's employees;
- Services around the maintenance and updates of devices;
- Guaranteed end-of-use take-back of devices; and
- One fixed monthly fee.

The FaaS proposition is about the performance of Fairphone devices. Therefore it is not the physical device that is the most important for this value proposition, but more so the associated services. An important reason for making this distinction explicit is to deliberately move away from the concept of lease, as detailed in the following table.

MODULARITY AS A KEY ENABLER FOR THE FAIRPHONE-AS-A-SERVICE MODEL

An important characteristic of the FaaS proposition is that Fairphone will retain ownership of the devices. This brings significant opportunities to increase the value created as Fairphone can deploy circular strategies such as maintenance, repairs, refurbishment and recycling to prolong the lifetime of devices and optimise value creation.

Furthermore, the latest Fairphone device - Fairphone 2 - consists of seven modules, as illustrated in Figure 1. Each of these modules can be taken out and repaired or replaced without the need to return the entire device. Replacing a screen for instance can be done within 30 seconds and costs about € 87,- (the price of a display module), which is significantly cheaper than screen repairs for non-modular phones.

The modular nature of the Fairphone 2 is a unique strength for the financial viability of the FaaS proposition as circular value creation can be structured around the individual characteristics of modules, rather than on the aggregate performance of the whole device. Furthermore, the ability to target individual modules can result in material savings and have positive environmental impacts. These com-

Table 1: Fairphone-as-a-Service vs Lease

Fairphone-as-a-Service	Lease
Focus on the service and experience	Focus on the product
Cash flow based financing (i.e. portfolio of contracts is key)	Asset based financing (i.e. collateral value of asset is key)
Possible for assets of medium to low value (e.g. like phones, consumer appliances, jeans)	Typically for assets of high value (e.g. cars, ships, heavy machinery)
Reuse opportunity (i.e. multiple uses and incentive to add value for successive use cycles)	Resale opportunity (i.e. single use and resale of assets on the 2nd hand market with no incentive for circular activities)

3. Please visit www.fairphone.com for more information.

4. Please contact Fairphone at research@fairphone.com if your organization wants to take part in this pilot

bined economic and environmental considerations are uniquely aligned with Fairphone's mission and with the principles of the circular economy. This does, however, imply a radical shift in thinking and requires legal, operational and financial innovation as will be described in following chapters.

UNDERSTANDING THE ECONOMIC LIFE EXPECTANCY OF MODULES

In order to understand circular value creation, it is important to differentiate between economic and physical (or technical) lifetimes. Economic lifetime refers to the expected period of time an average user considers an asset to be useful, and is affected by both technology and user preferences. Physical lifetime refers to the actual durability of these assets and is affected by wear and tear, depreciation and improper use. Better aligning economic and physical lives, illustrated in Figure 2 is a critical aspect of circular value creation.

In the case of the Fairphone 2, modularity allows for the alignment of economic and physical lifetimes at the module level, considering wear & tear and market drivers for obsolescence that are specific to each module, as detailed in Table 2.

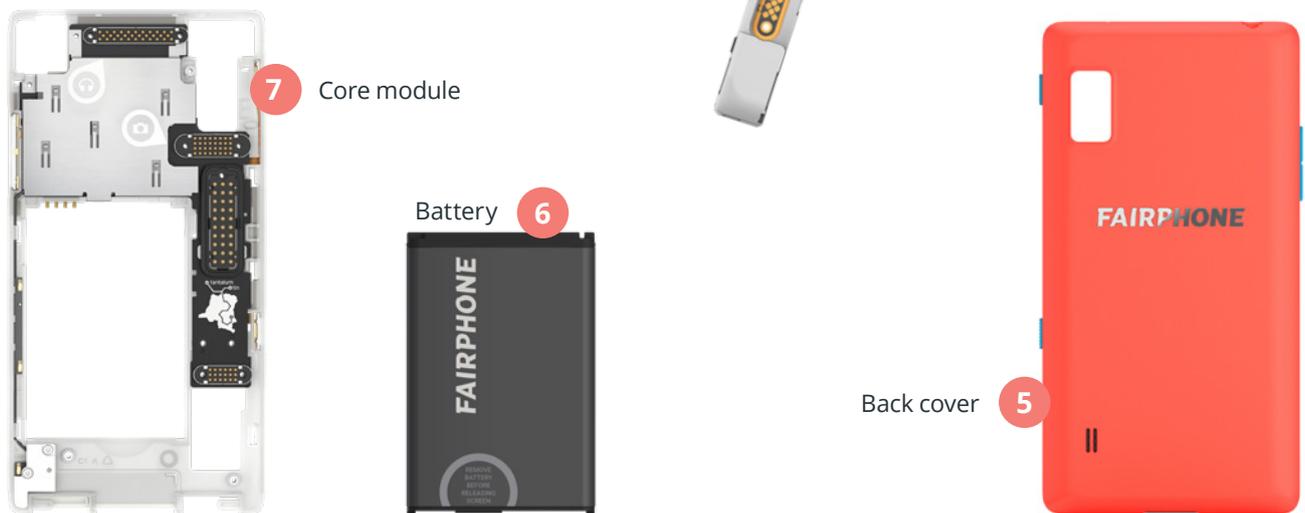


Figure 1: The seven modules of Fairphone⁵

Figure 2: Economic vs physical lifetime



5. Note that these seven modules can themselves be divided into hundreds of other components. Following the Bill of Materials (BOM), a smartphone usually consists of 80 main components and 700 subcomponents (Proске et al., 2016; Güvendik, 2014; Armstrong, Mueller and Syrett, 2015).

An important consideration for FaaS is that external modules, such as the display and back cover, typically have shorter economic lives due to wear and tear and may therefore need to be replaced more frequently than internal modules. Additionally, it is important to recognise that modularity can prolong the economic lifespan of the device but will not make it indefinite. The core module provides all basic functionalities and is the one module that all other modules are designed around. The core module will therefore affect obsolescence factors for other modules and it is particularly critical in the FaaS proposition.

THINK FOR YOURSELF!

Is your product modular? What are/ could be the modules that can be treated as separate entities? Can you use modularity to extend the overall product lifespan?

Table 2 Fairphone 2 Modules Life Expectancy Considerations

Modules ⁶	Main Subparts	Obsolescence drivers	
		Wear & Tear	Market
Top Module	Earpiece speaker, proximity sensor, front camera, audio port and connection to core module	Audio connector is subject to mechanical forces when used	Camera technology advances at fast pace but depends on the target users
Bottom Module	Charging port, loudspeaker, the vibration mechanism and connection to core module	Charging connector is subject to mechanical forces when used	New charging port USB type C is becoming the norm.
Display Module	Display, closing mechanism, connection to core module	Glass on display may break due to impact when dropping and scratches may appear in time	A plateau has been reached on actual improvement of image quality.
Camera Module	Main Camera and connection to the core module	The camera module is not heavily affected by wear and tear	Camera technology advances at a fast pace
Battery	Li-ion battery and connection to the core module	Loses capacity with every charging cycle	Not relevant, technology in batteries is not changing substantially
Core Module	Chipset, antennas, battery connector, multiple other electronic components, connectors to all the modules	Wear and tear is not significant for this module	Main driver is the development of new chipset technologies
Back Cover	Composed of two elements: back and front rim	External parts of the device suffer most of wear & tear	Not relevant, only if Fairphone releases new covers

6. The top, bottom, camera and battery modules contain boards with landing pads that connect with the pin connectors in the core module.

3 - THE CIRCULAR SERVICE CONTRACT

A TRANSFORMED RELATIONSHIP WITH CUSTOMERS

The FaaS proposition requires a shift from a one-off transaction to an ongoing service. This requires a contractual agreement to be established between the service provider and customer. One objective of the project was to delineate services included in the FaaS proposition and to prepare a contract template to frame these.

This chapter presents the service specifications which were collaboratively defined by CoP members considering the specific requirement of the intended launching customer, PGGM, which, at the time of writing, intended to be part of the pilot in 2018.⁷ Moreover, this chapter discusses contract robustness and risk mitigation.

DEFINING SERVICE SPECIFICATIONS

The FaaS proposition is not only about the services included but also about the nature of FaaS being a circular service for businesses. It therefore strives to meet the dual aims of satisfying customer needs and of delivering circular impact. For this reason, CoP members selected the term 'Circular Service Contract' (CSC). The following subsections provide an overview of key aspects of the CSC, including hardware, software and customer support services. For more detailed legal information, a CSC template is provided in Annex A.

Fairphone devices

The first aspect of the CSC concerns the provision of Fairphone devices and Fairphone is responsible for the handling costs of the devices it provides.

Due to the ongoing nature of the FaaS proposition and the fast-moving nature of the smartphone market, a key challenge is to provide and service devices at an appropriate technology level. Following extensive discussion, hardware provision was framed as '*the generally accepted technological level*',⁸ which does not require that Fairphone provides state-of-the-art or latest generation devices and means the CSC does not become outdated when new hardware becomes available. Additionally, it was decided that the CSC should specify that devices provided may include refurbished modules and may show some minimal signs of use.

7. A final deal will depend on some unknowns at the point of writing this paper. The template of the Circular Service Contract will be used to advance the conversation.

8. In the CSC template (Annex A, part 2), this is phrased as '*the functionality and usability of the Product(s) shall be at least equal to what is generally accepted to be the functionality and usability of products of the type of the Product(s) in the market taking into account the circular objectives that are being pursued with this Contract by the Service Provider*'.

By providing a 'generally accepted level of technology' and allowing for the use of refurbished modules, Fairphone retains the right and responsibility to take both functionality and circularity into account. The key from a customer relationship perspective lies in providing first-class services with the right level of utility at a price that the customer is willing to accept.

Reserve pool

Business customers are accustomed to very low downtime, and it is not rare in the industry to have units replaced in a few hours when something breaks. For the purpose of meeting service performance requirements and to align with the norm in the market, it was decided that a pool of devices should be kept at the customer's premises, and be used to replace defective devices and modules. CoP members agreed the reserve pool should account for 2 percent of the total amount of devices in the contract and that Fairphone should be responsible for replenishing it anytime the stock drops below 50 percent.

Hardware Maintenance & Updates

A unique selling point for FaaS is that many repairs can easily be performed by the customer using the modules from the reserve pool. As expected for PaaS models, handling costs for repairs and replacements are however the responsibility of Fairphone. Additionally, the CSC establishes that Fairphone can decide to perform preventive maintenance in the interest of delivering a good service.

Software Maintenance & Updates

Software services concern the operating system, support for mobile apps, compatibility support for Mobile Device Management software (MDM), and security updates. The CoP partners delineated software services as follows:

- The operating system running on the Fairphone 2 is Android 6. Fairphone may, however, decide to upgrade this operating system when necessary, balancing costs and utility for customers.
- Besides pre-installed apps, no maintenance or guidance is provided for 3rd party applications that are not crucial for the functioning of the device.

- Functions related to MDM, which are generally used by companies to facilitate the management of software used in devices, are supported.
- Security updates will be performed once a month to implement the latest security patches and stability fixes. The user is responsible for allowing these.

Other service specifications

In addition to the above hardware and software services, CoP members agreed to offer insurance against theft and loss for an extra fee. Customer support is also to be provided via email and phone during regular office hours.

Obligations of the Customer

In exchange for the services offered, the customer must commit to the following obligations:

- Payment of the monthly fee;
- Ensuring individual users use Fairphones carefully;
- Updating Fairphones with the latest available Software (provided by Fairphone);
- Replacing the Display Module, Battery and Back-Cover using modules from the Reserve Pool in case of failure of these modules (no tools are needed);
- Returning broken devices that cannot be repaired using modules from the Reserve Pool to Fairphone; and
- Returning devices after termination of the contract.

TRANSLATING SERVICES INTO A CONTRACTUAL FRAMEWORK

Besides creating clarity on the service specifications, the CSC fulfils the role of allocating risks to the party that can best take responsibility and is therefore closely connected to the financeability of

THINK FOR YOURSELF!

- If a service for your product would contain previously used modules or devices, would your customers be willing to accept light traces of use for a discount on the price? Could you provide the right level of utility and escape market demand that dictates faster product cycles?
- How can you assure a swift service when something goes wrong? We decided to use a reserve pool, because the device is pretty easy to service by swapping modules. For other types of products, servicing may involve a technician visiting the client to solve the issue at the premises.

FaaS (see Chapter 5). This is called robustness of the contract and refers to the ability of the contract to absorb potential downside risks.

Additionally, the CSC is set up as a flexible contract in the sense that businesses can opt in- and out quite easily. This flexibility should be balanced with re-marketing risk. This is the risk that it takes time to set out devices to new clients in the case of a contract exit. This risk is high in the beginning when there are not many clients, but reduces as the client portfolio grows.

The above services and considerations are detailed in the CSC template provided in Annex A. This template can also be used for other Product-as-a-Service initiatives. To facilitate adaptation of the contract, it is short and structured in general parts while specifications are detailed in the annexes of the contract.

DON'T BE GENTLE, IT'S A RENTAL

People tend to treat their own stuff with more care than the stuff they rent (Durgee & O'Connor, 1995; Schaefer et al, 2015). In a service contract this is a risk to deal with. However, the issue can be solved by creating incentives for users to treat the devices carefully. Providing a service does not mean service providers must pay for all the damage done by the user, and this requires clear guidelines in the agreement. For instance, monitoring breakages and gamification elements can help PaaS providers to create the right incentives.

9. See Clause 7.2 in Annex A

4 - KEY IMPLICATIONS FOR FAIRPHONE

A NEW BUSINESS MODEL MEANS NEW OPERATIONAL CHALLENGES

Launching FaaS requires that tailored operational processes be implemented by Fairphone. Indeed, service models require a different business mentality to ensure services meet the expectations of the customer. As a result, FaaS brings new operational challenges that Fairphone will have to tackle.

Two key issues were identified by CoP members. The first concerns hardware management and in particular the development of preventative maintenance solutions and of cost-effective module management solutions. The second issue concerns data. Retaining ownership of devices indeed offers interesting opportunities to access user data, but the use of such data is subject to strict privacy considerations.

HARDWARE MANAGEMENT

A key consideration for FaaS is that Fairphone - not customers - is best placed to optimise circular value creation for its devices. This however presupposes state-of-the-art hardware management.

Preventive maintenance

In a traditional sales transaction, only corrective maintenance is performed, i.e. when something breaks down. Since Fairphone benefits from certain predictability about the functioning of the devices, preventive maintenance activities can bring significant economic benefits. By performing maintenance or updates on modules before they are likely to malfunction Fairphone can prevent unforeseen circumstances and keep control over the performance of the devices. Moreover, planning corrective maintenance can reduce shipping and handling costs, increase customer trust in the brand and keep service performance high.

The fact that Fairphone 2 has only been on the market for two years limits the availability of historical data about the lifetime of the different modules. Better information about lifetime will allow Fairphone to decide when and how preventive maintenance is needed.

Module management

FaaS implies that modules are used more than once where possible. A process must be created for devices returned to Fairphone. They have to be checked, modules may be taken apart for maintenance or repair and external modules have to be graded depending on wear traces. Older modules can potentially still be used for clients that are willing to use them for a lower fee. Otherwise, modules are recycled and become resources for creating new devices.

DATA: A BALANCING ACT BETWEEN USE AND PRIVACY

Data collection can serve several purposes like asset tracking, collecting failure information and creating incentives for user behaviour to elicit lifetime extension. The FaaS proposition creates a long-term relationship between Fairphone and its customers and provides a unique opportunity to generate and use a range of useful data. Using this data however requires a careful balancing act with user privacy.

Tracking devices, components, resources

For the purposes of stock management, it is important for Fairphone to keep track of the whereabouts of devices, whether they are in use by customers, in stock at Fairphone or somewhere in the supply chain ready for repair, refurbishment or recycling. The better this 'flow' of devices and modules is monitored, the more insights can be generated as to the means of optimising value creation. In the future, a tailored IT system could make (part of) the data accessible to supply chain partners in need of specific parts in order to optimise their products or processes.

Failure data

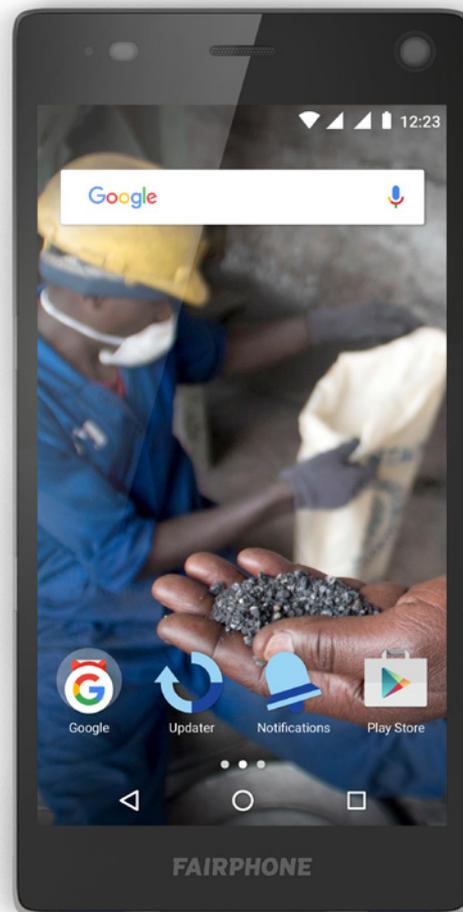
Data on technical failures of modules is highly valuable. Failure data provides insight in the frequency of breakages of different modules and allows more precise estimation of the resources that must be allocated for repair or replacement of failing modules. Moreover, these data can be used for improving the design of products and processes in the future.

Behavioural data

Behavioural data can be used to understand the relationship between usage and device performance. For example, the state of the top module of Fairphone 2 depends heavily on the use of the audio port. Fairphone could for instance use this behavioural data to diagnose the state of devices and modules at the end-of-use stage, to introduce incentives for better use or to redesign products. However, collecting and using such data poses several challenges.

First and foremost, the collection of behavioural data can conflict with privacy rights and ethical considerations must be carefully considered. Moreover, there are reputational risks in using these data. The FaaS business model will only succeed if a good relationship is established between the service provider and the user. To create mutual trust, service providers should be transparent in what data they aim to collect and for what purpose and to ask consent for collecting these data.

More practically, legislation is in place that limits the use of behavioural data. For example, European data protection laws protect the personal data of individuals and safeguard their fair treatment. Any information relating to an identified or identifiable individual – including unique device data – qualifies as ‘personal data’. Only if an individual is in no way (re-) identifiable based on certain data, is it considered to be anonymous data. The data on the frequency of one individual dropping his or her device is for example considered as personal data, and cannot be gathered without asking for consent. However, when these data are collected and analysed for many users on an aggregate level (e.g. aggregated after collection) it may be used for business intelligence purposes.



THINK FOR YOURSELF!

- **Designing and manufacturing a product is a different skill than offering an ongoing service that fulfils customer expectations. Are you ready to become a service provider?**
- **What data would you collect and for what purposes?**

10. In Europe, the currently applicable Data Protection Directive (95/46/EC) will be replaced with the General Data Protection Regulation as of 25 May 2018

5 - FINANCING FAIRPHONE-AS-A-SERVICE

FINANCIAL MODELLING FOR INFORMED DECISION-MAKING

Having examined business, legal and operational aspects, the next objective of the project was to develop financial solutions for FaaS. To that end, the following steps were taken:

- **Estimate the service fee** that will represent the bulk of expected revenue;
- **Define a realistic scenario** for the use of devices and modules over a five year period;
- **Model cash flows** in line with key parameters defined in the realistic scenario;
- **Identify financing solutions** that reflect financing needs, risks and returns;
- **Model Profit & Loss (P&L) statement** given revenues and costs providing the service; and
- **Model Balance sheet** activating asset value of modules with unique depreciation schemes.

This chapter presents key outcomes of the financial exercise. More in depth information and insights on the steps followed are provided in Annex B.

STEP 1: ESTIMATE THE SERVICE FEE

In order to estimate a monthly fee, a long list of potential services and corresponding costs was first established. Subsequently, corresponding responsibilities for incurred costs were assigned to different parties to clarify who bears the financial risk. As a result of this discussion, three cost categories were identified and included in the service fee:

1. Asset handling;
2. Finance & insurance; and
3. Service & operational costs.

This resulted in a monthly fee of around €25,- per device per month. In the context of the CoP, only one service option was considered (i.e. full service), but it is worth noting that in reality different service levels can be considered. Additionally, the service fee used in the financial exercise remains subject to discussion. More details on the cost categories are provided in Annex B1.

STEP 2: DEFINE A REALISTIC SCENARIO

Given the scope of the project, it was not feasible to carry out in-depth scenario and sensitivity analyses. Therefore, one 'as-realistic-as-possible' scenario was defined treating the FaaS pilot as a separate entity from Fairphone's current operations. This scenario was used to estimate costs and, combined with the service fee as the main source of revenue, to model cash flows (see step 3). In order to project reasonable net cash flows, two key scenario components - growth and cycle scenarios - were considered and are described below. More information is provided in Annex B2.

Growth scenario

The growth scenario defines the numbers of clients and devices to service. Developing growth scenarios typically requires an understanding of 'contract events', which reflect the growth of the customer base, the volume of contracts and the possible termination of existing contracts. In the case of the FaaS pilot, the growth scenario was kept simple and based on the following key assumptions:

- 1 creditworthy client (i.e. a large firm with a high credit rating);
- 200 devices provided to the customer;
- 5 spare Fairphones and a batch of spare modules (batteries, back covers and displays) for the reserve pool; and
- The scenario has a future horizon of 5 years.

Cycle scenario

The cycle scenario defines the usage of devices and the need for services. Developing a realistic cycle scenario was more complex as this requires in-depth understanding of usage patterns and service needs, which Fairphone does not yet have for FaaS. Important considerations to take into account included economic and physical lifetime considerations, returns due to malfunction, breakage patterns, upgrades, psychological obsolescence, etc. Key assumptions used in the scenario were:

- Modules can be returned in four possible states: as good as new, repairable and unrepairable
- Displays, Covers & Batteries are assumed to be unrepairable.

- There are always infinite new modules available.
- Refurbished parts are always used first: if the stock of refurbished parts is empty, only then new modules are purchased.

STEP 3: MODEL CASH FLOWS

With an estimated service fee and realistic scenario at hand, the next step was to model cash flows for the FaaS pilot. The development of a financial cash flow model was essential to gain quantitative financial insights based on which financing solutions could be devised (see Step 4).

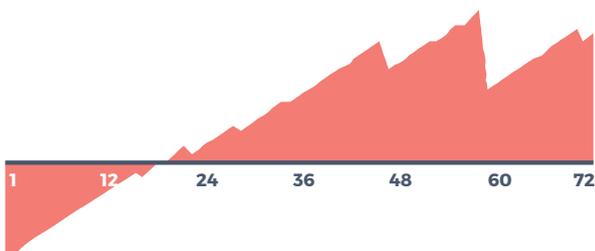
The modular nature of Fairphone devices being an essential characteristic for FaaS, it was essential to structure cash flow modelling at the level of modules. Indeed the cash flow can, for example, be affected by: the use, return and replacement of modules which have associated service costs; or by the refurbishment or recycling of modules recovering embedded value.

The cumulative cash flow projection is presented in Figure 3 and additional detail on net cash flows and cash outflows are provided in Annex B3. Key observations include:

- Initial investment needs are required to acquire devices, which means the cumulative cash flow is negative at the beginning of the pilot;
- The cost/revenue balance (i.e. the gradient) is positive, which indicates profitability and suggests it may be possible to lower the service fee;
- The cumulative cash flow becomes positive after 21 months after which FaaS requires no external financing anymore; and
- The failure of modules at the end of their expected lifetimes results in significant periodic costs.



Figure 3: Cumulative cash flows based on 'best estimate' scenario. X-axis = months



STEP 4: IDENTIFY FINANCING NEEDS AND SOLUTIONS

The financial model was required to get out of the deadlock, whereby businesses lack quantitative data about circular business models and financiers are reluctant to invest. Practically, it provided insights into the expected investment need for FaaS, and in turn opened the possibility of examining securities and appropriate financing solutions.

Funding need

A major share of the investment for FaaS concerns the production and acquisition of devices. As revenues are spread over the duration of the contract, the cumulative cash flow is initially negative. Attracting external funding for such investment need can be done in different ways such as equity out of existing Fairphone business lines, or through debt financing.

In the case of this pilot, investment needs for a pilot of 200 devices were relatively small. However, with a growing portfolio of contracts, investment needs would grow significantly. This requires financial flexibility, with new financing being available as soon as a new contract enters into force, as well as standardisation of contracts to reduce transaction costs. With the need for flexibility in mind, debt financing was assumed for the FaaS pilot.

Value-at-risk & securities

In order for Fairphone to secure favourable financing conditions, it is essential to consider the 'value-at-risk' of the FaaS proposition and to offer appropriate securities to financiers. CoP members identified three main securities - client quality, asset quality and contract robustness - to mitigate the financial risk, briefly described below.

- **Client quality:** the quality of clients in the FaaS portfolio is a key factor influencing the proposition's risk profile. For this pilot, the intended launching customer (PGGM) was considered to be a high-quality customer with low credit and debtor risk. Consolidating a strong portfolio in the future will depend on a combination of the number and diversity of clients.
- **Asset quality:** Fairphone devices provide another important security as value can be extracted from the sale of the phones in case of default. Currently, the Fairphone has a high residual value in the market. For more information on collateral value and value at risk see Annex B4.
- **Contract robustness:** various options exist to improve the robustness of the contract and

mitigate risk for Fairphone and financiers. First, re-marketing risk can be mitigated with a termination fee covering the residual value-at-risk of the assets. Such fee would incentivise customers not to terminate their contract. Given the high value of second-hand Fairphones in the market, a termination fee was seen as redundant. Second, an instalment fee (e.g. €50 per device) can be introduced. This can be seen as a co-investment by the customer, and would significantly influence the investment need and corresponding value-at-risk. Finally, an open pricing calculation or other price reviewing mechanism could be implemented. In practice, this allows the service provider to share outcomes after a predetermined period (for instance one year) and to accordingly adjust the service fee.

Circular financing solutions

Different financing structures were discussed based on the above considerations, as detailed in Appendix B4. Based on the cash flow, contractual considerations, and financing need the preferred structure was to work with a current account credit. The amount of credit decreases depending on the payments received from the customer. A current account structure provides financial flexibility, with credit being exactly as high as the investment need. There are also drawbacks from this flexible type of financing: interest rates can be volatile, which can affect the profitability of the proposition, and the bank technically has the right to terminate the current account on very short notice. While the preferred option in the short-term, it may not be a sustainable funding source for the long-term obligations FaaS implies, unless these risks are specifically accounted for.

In the future, the financing structure would ideally be a combination of several lending structures. For example, combining the flexibility of current account structures with the robustness of a lease structure could be an effective way to finance the FaaS proposition. Lease structures indeed complement current account structure with longer-term fixed interest rates and lower termination risk. CoP members expressed willingness to tweak existing financing structures for this pilot.

STEP 5: BALANCE SHEET AND ACCOUNTING CONSIDERATIONS

The profit and loss statement (P&L) is a financial statement that summarizes the revenues, costs and expenses incurred during a specific period of time. In the FaaS business, revenues are generated by the periodic fee, instalment fee and recycling benefits. Deducting cost of sales, operating costs and interest expenses, taxes, depreciation and amortization leads to *net profit*. Net profit is positive throughout the 5-year scenario. For more details, the reader is referred to Annex B5.

STEP 6: PROJECTED BALANCE SHEET AND ACCOUNTING CONSIDERATIONS

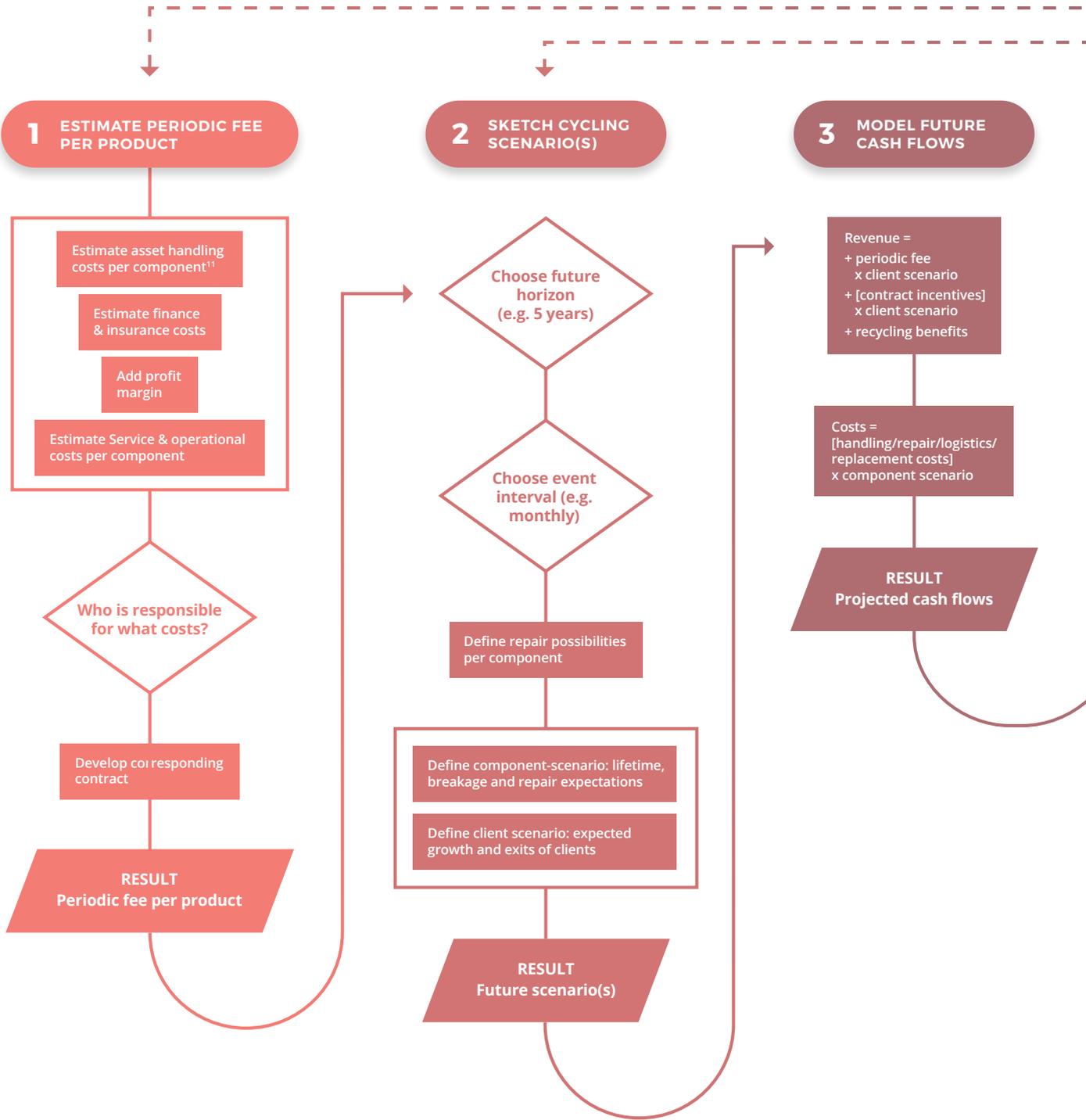
From the cash flows and the profit and loss statement the balance sheet could be projected. The biggest challenge was to activate the different modules on the balance sheet, given that all seven modules have different lifetime expectations. To accurately estimate book value on module level with different cycles, it is essential to have a data management infrastructure in place that can track and trace modules with their cycling behaviour, lifetimes, generated revenues and handling costs. Without this, it is impossible to record asset value on a module level on the balance sheet. Moreover, accounting regulations are not clear yet on how to deal with lifetime calculations within a circular model for depreciation purposes. Detailed balance sheet elements are provided in Annex B6.

No equity financing was introduced at the start but was gradually build up through cumulative net profit. The need for internal or external equity can be established through balancing solvency and leverage. The solvency ratio is an indicator of a business' ability to meet its financial obligations. The debt-equity (leverage) ratio is the ratio of debt to equity. Without additional equity, solvency grows to a stable 0,7 after two years and debt-equity ratio decreases to a converging 0,5 after two years. Please find the detailed results of leverage and solvency in Annex B6.



GUIDE TO DEVELOPING FOR PRODUCT-

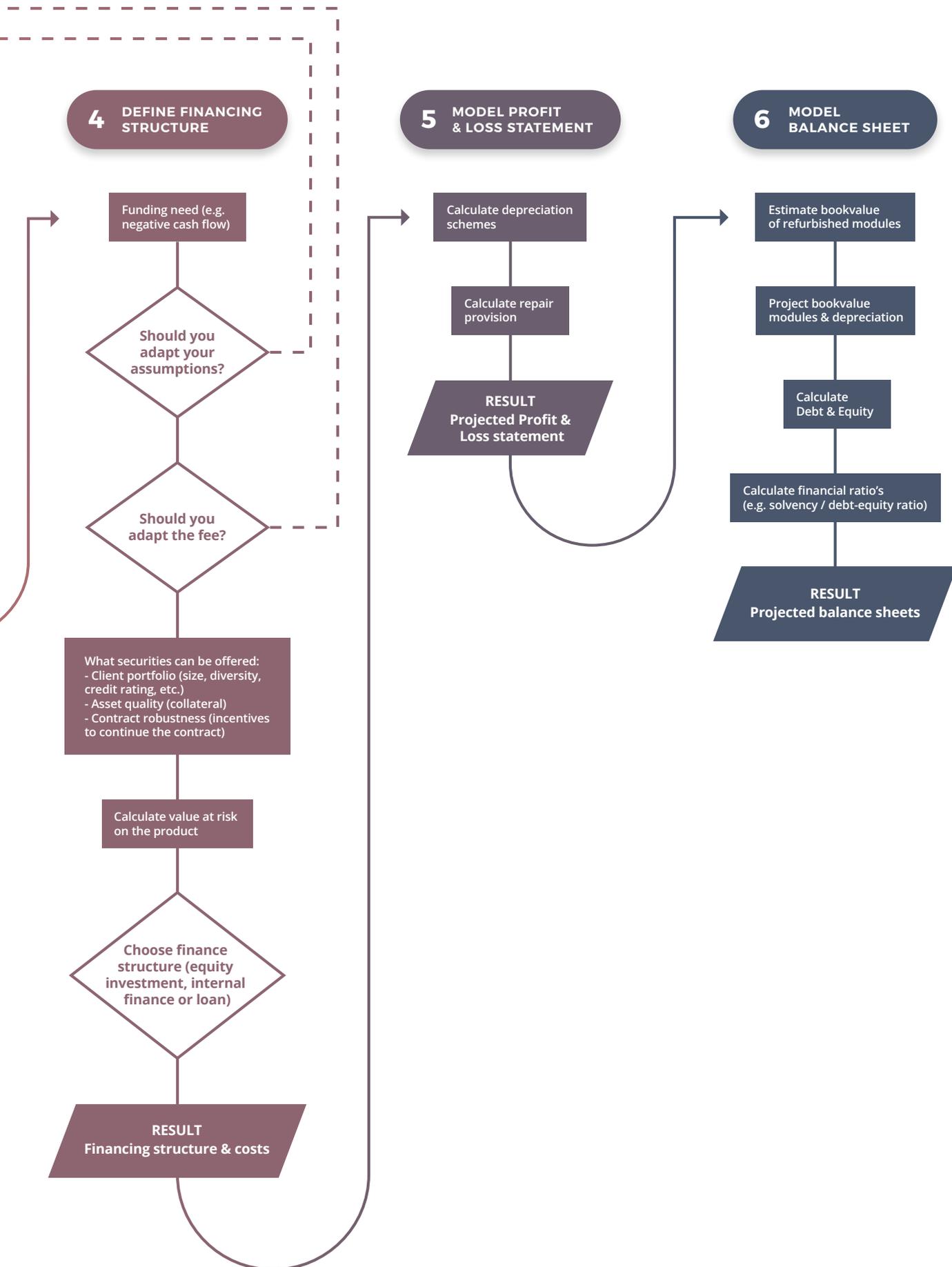
For a more detailed explanation
download the 'Guide to th



11. A circular product is assumed to be able to be dis- and re-assembled into components or materials

CREATING A CASH FLOW TOOL AS-A-SERVICE

Continuation of this flowchart please see 'The Service Cash Flow Tool' ↗



6 - KEY LEARNINGS & WAY FORWARD

The CoP trajectory allowed participants to overcome several barriers that Product-as-a-Service models pose. It provided insights into modularity, a Circular Service Contract template, a model of the revenue structure and a suitable financing structure. Moreover, the approach taken for Fairphone can be adapted and replicated for other businesses. To conclude, key learnings are highlighted below.

Overcoming barriers to circular business models requires open collaboration and transparency to create synergies between different fields of expertise (business, legal, operational, financial).

Challenges that lie ahead in the transition towards the circular economy demand for experimentation with new business models. Interdisciplinary 'learning by doing' trajectories can advance the development of new business models and unlock the potential value of the circular economy. The collaborative approach taken for this project stressed the value of combining different fields of expertise as the most difficult questions were answered in multidisciplinary discussions among CoP partners. Zooming in on specific questions (value proposition, contract, operations, cash flow, financing) also allowed CoP members to explore PaaS models in much more detail than has been done before.

Fairphone is ideally suited to implement Product-as-a-Service models because of the modularity of Fairphone devices and due to the company's sustainability mission.

A central aspect of PaaS models is that service providers retain ownership of their assets, which enables them to leverage circular economy strategies to create value. Furthermore, by servicing modular products that can be upgraded, repaired, refurbished and recycled, value creation can be based on the economic life of individual modules rather than of entire devices. Optimising value creation through modularity will play a pivotal role in the success of FaaS. Fairphone's experience will further contribute to better understanding the effects of modularity on PaaS models and help unlock the potential for other types of products. In turn, these experiences will contribute to a better understanding of incentives for responsible businesses and will advance the transition to a circular economy.

The development of circular PaaS contract requires careful delineation of service specifications and fair allocation of risks to parties best able to handle them.

Product-as-a-Service radically transforms customer relationships from a one-off transaction to an ongoing engagement. Service specifications must be clearly delineated and translated into a contractual agreement that reflects needs for flexibility and continuity. For Fairphone, it is key to offer an appropriate level of technology while taking into account circular economy considerations. Extending this principle to other businesses implies careful consideration and specification of what the service contains. The Circular Service Contract template provided in Annex A can serve as a starting point.

Unlocking the potential of Product-as-a-Service requires new operational processes: track & trace, maintenance, repair and replacement processes and balancing access to and use of data.

Designing and manufacturing a product is a different challenge than offering an ongoing service that fulfils customer expectations. Businesses shifting to Product-as-a-Service have to create operational processes that match the value proposition. For Fairphone, state-of-the-art hardware management is critical to optimise the use of devices and individual modules, ensure high-quality services and maximise circular value. Additionally, the access to and use of user data is critical, for example, to enable Fairphone to conduct preventive maintenance, yet this has to be carefully balanced with privacy considerations. Operational processes should be reconsidered, depending on the core capabilities of the business, the type of product and the level of service that is offered.

PaaS models can successfully be financed by blending existing financial instruments on the basis of detailed financial modelling and by leveraging key strengths of the service as securities.

The development of financial solutions for PaaS systems suffers from a relative lack of experience with these business models. The development of detailed financial models is key to addressing this. For FaaS, a 5-year cash flow projection was carried

out on module level. This exercise evidenced relatively modest investment needs, significant potential value of the proposition, and the need to steer financing on different securities. For Fairphone, client quality (diverse and predictable portfolio), asset quality (good quality, modular phone) and the contract (incentivising a long-term responsible relationship) were considered to be key securities. Based on this, a financial structure combining the flexibility of a current account with the long-term financial relationship of lease structures was preferred and CoP partners expressed dedication to adapt existing instruments to meet this need. While insightful, the model developed for this CoP remains limited and more in-depth scenario and sensitivity analysis is desirable to consider the impact of changing variables like the fee, service (endogenous) and resource prices, interest rates etc. (exogenous).

CALL TO ACTION

We wish to invite anyone who is committed to the transition to a circular economy to:

1. Dare to envision new business models that can truly transform our economic rationale;
2. Have a critical look at circular business models such as PaaS, as these may not be easy to implement nor applicable to all product types or market segments;
3. Contact Circle Economy to explore opportunities to establish a Community of Practice around other circular economy products and services; and
4. Contact Fairphone to explore opportunities to become a piloting customer of the FaaS proposition.

By publishing the learnings and results of our journey we aim to provide the necessary tools and inspiration to create sound Product-as-a-Service business models. The knowledge we gained is for sharing, modifying and experimenting. Enjoy!

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ANNEX A - CIRCULAR SERVICE CONTRACT TEMPLATE

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CIRCULAR SERVICE CONTRACT

[DATE]

between

[Ø]

as Customer

and

[Ø]

as Service Provider

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THIS CONTRACT is dated [∅]

BETWEEN:

1. [Name Customer] (the **Customer**); and
2. [Name Service Provider] (the **Service Provider**).

The Customer and the Service Provider are individually referred to as a “**Party**” and jointly referred to as the “**Parties**”.

WHEREAS:

- A. [∅]; and
- B. [∅].

Note: the ‘whereas’ clause can, for example, include:

- the background of this circular service contract (from linear sale to circular service model);
- the circular objectives that are being pursued with this circular service contract (to ensure the re-use and/or recycling of the respective product at the end of its technical or economic life or that of any of its components and that the responsibility for that re-use and recycling remains with the producer and is not, upon the sale of the product, passed on to the end consumer who is least equipped to know what to do with the product at the end of such technical or economic life and/or to reduce the energy consumption of the respective product over its lifecycle since the producer is best equipped to achieve that);
- the background of the parties and their interest in this circular service contract.

These considerations give ‘colour’ to the contract and can assist with the explanation of the further contractual provisions.

In consideration of the agreements herein contained, the Parties hereto agree as follows:

1. DEFINITIONS

The following definitions apply to this Contract.

Additional Service Fee has the meaning given to it in Clause 3.1.

Base Service Fee has the meaning given to it in Clause 3.1.

Corrective Maintenance means the corrective maintenance services to be performed by the Service Provider in respect of the Product(s) in accordance with the specifications set out in Annex 1, Part 2.

Preventive Maintenance means the preventive maintenance services to be performed by the Service Provider in respect of the Product(s) in accordance with the specifications set out in Annex 1, Part 2.

Scheduled Maintenance means the scheduled maintenance services to be performed by the Service Provider in respect of the Product(s) in accordance with the specifications set out in Annex 1, Part 2.

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Product(s) means [Ø].

Service Fee has the meaning given to it in Clause 3.1.

Services means the services to be performed by the Service Provider set out in Annex 1.

Note: definitions may be added dependant on the type of circular services that are being provided.

2. THE SCOPE OF SERVICES

The Customer and the Service Provider hereby agree that the Service Provider shall perform the Services in connection with the Product in accordance with the terms and conditions set out in this Contract. The scope of the Services is described in Annex 1.

3. PRICING AND PAYMENT TERMS

3.1 In consideration for the Services provided by the Service Provider, the Customer agrees to pay to the Service Provider:

- a. a base service fee of EUR [Ø] per [month][quarter][year] (the **Base Service Fee**); and
- b. any additional fee as set out in Annex 1, Part 1 (the **Additional Service Fee(s)** and together with the Base Service Fee, the **Service Fee(s)**); and
- c. any correction of the Service Fee pursuant to Clause 4 in respect of the energy consumption of the Product(s).

3.2 The Service Fee will be increased by the value added tax applicable.

3.3 The Service Fee is subject to annual indexation in accordance with [the CPI All Households [Ø]=100 (CPI Alle Huishoudens)][or insert any other appropriate price indexation], starting for the first time 12 months after the date of [this Contract][the commencement date of the Services].

3.4 The Service Provider shall establish a detailed [monthly][quarterly][yearly] invoice [in advance][in arrear], in accordance with the specifications and agreed Service Fee addressed at the Customer, with an indication of the Services [to be carried out][carried out] in this period, not later than five (5) working days after the [start][end] of the [month][quarter][year]. The Customer shall pay any amounts due within [one (1) month] of receipt of the invoice.

Note: parties may also opt for automatic collection of the service fee. Parties may also include any further specifics in relation to the service fee, such as volume discounts and/or loyalty discounts. This will highly depend on the type of circular services that are being provided.

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4. ENERGY CONSUMPTION

4.1 This clause applies if it is agreed between Parties that the Service Provider shall be responsible for the energy consumption of the Product(s).

4.2 The Product(s) will measure its energy consumption in [*watts, joules, litres of fuel*] (the **Unit of Energy**). Both Parties will be able to check, in respect of any period, the number of Units of Energy that is consumed by the Products in that period.

4.3 If the consumption of energy of the Product(s) as measured in accordance with clause 4.2 above in any [month][quarter][year] is more than [[ϕ] per cent. of] [*insert number of assumed base or maximum energy consumption of the respective product*] Units of Energy, the Base Service Fee shall be decreased with EUR [ϕ] per Unit of Energy that is in excess of [*insert such number of assumed base or maximum energy consumption of the respective product*] in respect of that period.

4.4 If the consumption of energy of the Product(s) as measured in accordance with clause 4.2 above in any [month][quarter][year] is less than [[ϕ] per cent. of] [*insert number of assumed base or maximum energy consumption of the respective product*] Units of Energy, the Base Service Fee shall be increased with EUR [ϕ] per Unit of Energy that is less than [*insert such number of assumed base or maximum energy consumption of the respective product*] in respect of that period.]

Note: one of the circular objectives that can be achieved with this new type of circular service model is to reduce or minimise the energy consumption of the respective product over its lifecycle, if appropriate. The producer is best equipped to achieve that by way of (technical) innovations (even during the lifetime of the product) and/or correct maintenance. The end consumer is in any event least equipped to know how to achieve that. The above clause provides for an incentive on the service provider to use all (technical) experience and expertise available to it to reduce the energy consumption of the respective product as much as possible during the term of the contract. This is either by way of a penalty (clause 4.3)(since the service provider has a disadvantage compared to the assumed base or maximum energy consumption of the respective product) or by way of a bonus (clause 4.3)(since the service provider has an advantage compared to the assumed base or maximum energy consumption of the respective product) or both. Any other bonus or penalty arrangement may be included which would be more appropriate for the type of products and circular services that are being provided.

5. OBLIGATIONS OF THE SERVICE PROVIDER

The Service Provider shall:

- a. perform the Services in connection with the Product in accordance with the terms and conditions set out in this Contract;
- b. ensure that the Services comply with the specifications set out in Annex 1, Part 2;
- c. timely notify the Customer of any intended Scheduled Maintenance or Preventive Maintenance to be performed at reasonable times and with a minimum period of interrupted use of the Product(s); and
- d. ensure that any representative of the Service Provider is available at reasonable times during the term of the Contract in order for the Customer to report any incident or make any requests with respect to a Service.

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Note: any further obligations of the service provider as applicable for the type of circular services that are being provided may be included.

6. OBLIGATIONS OF THE CUSTOMER

The Customer shall:

- a. in consideration for the Services, pay the Service Fee in accordance with the terms and conditions set out in this Contract;
- b. ensure that [any representative of] the Customer is available at reasonable times during the term of the Contract in order for the Service Provider to resolve any incident or reflect on any requests made by the Customer with respect to a Service;
- c. allow the Service Provider to perform (i) any timely notified Scheduled Maintenance or Preventive Maintenance or (ii) any Corrective Maintenance, either at the premises of the Customer or any other premises where the Product(s) are located or by taking the Product(s) temporarily away from those premises or by replacing the Products(s);
- d. at all times ensure that it [or any of its employees] will make careful use of the Product(s) that have been made available to the Customer as part of the Services; and
- e. [return the Product(s) to the Service Provider][allow the Service Provider to reclaim the possession of the Product(s)] upon a termination of this Contract in accordance with its terms.

Note: any further obligations of the customer as applicable for the type of circular services that are being provided may be included.

7. OWNERSHIP

The Customer agrees and acknowledges (zal dulden):

- a. that the legal title to the Product(s) shall remain with the Service Provider and shall at no time pass to the Customer; and
- b. that in the event such legal ownership would, by operation of law or otherwise, unintentionally pass to the Customer:
 - i. the economic and beneficial title to the Product(s) shall remain with the Service Provider and that, as between the Parties, the Service Provider shall continue to be treated as if it is the exclusive holder of the legal title to the Product(s); and
 - ii. the Customer shall refrain from taking (zal niet doen) any action that could adversely affect the economic and beneficial title of the Service Provider to the Product(s) as referred to in paragraph (i) above.

7.2 The Customer shall upon request of the Service Provider cooperate with the registration of its obligations set out in Clause 7.1 and Clause 9.2 as a qualitative obligation (kwalitatieve verplichting) within the meaning of clause

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3:251 of the Dutch Civil Code in the land registry (kadaster) in respect of the premises where the Product(s) are located and/or the Product(s) itself to the extent these qualify as a registered property.

Note: to be added if required or advisable for the type of circular services that are being provided. The qualitative obligation will enhance the beneficial ownership rights set out in clause 7.1 and the right to take back the products (the *wegneemrecht*) set out in clause 9.2, if available in respect of property registered with the land registry (which is the case for real estate and (larger) ships). This makes these rights bankruptcy proof which especially for the right to take back the products (the *wegneemrecht*) is key to mitigate any loss of legal ownership as a result of accretion (*natrekking*) of the products by the premises where they are located.

8. TERM AND TERMINATION

8.1 This Contract shall be effective from the date of this Contract and shall be valid for an indefinite period of time.

Note: other term options are also possible, such as one year, with consecutive extension of one year or any other variation as the parties deem appropriate and feasible for the type of circular services that are being provided.

8.2 Each Party shall have the right, without prejudice to its other rights or remedies, to terminate the Contract with immediate effect by giving a [◇] days' written notice to the other Party.

Note: the notice period should be reasonable taken into consideration the type of circular services and products that are being provided and the time of taking back the product(s) and to terminate the contract.

Note: contracts generally contain a provision on termination. Common reasons for terminating a contract include unsatisfactory or late performance of the contract by a party, or that a party has breached other provisions of the contract. This is set out in clause 8. This circular model contract provides also for a two-sided 'termination for convenience' clause, allowing each party to terminate without having to demonstrate that some event has occurred or breach has been committed by the counterparty. This ensures maximum flexibility for each party but has been inserted on the basis that the products that form part of the services can easily be taken back, used by and serviced to another party. More generally, the contract may also provide what will happen if a termination right is exercised. Often the service provider is entitled to be paid for services performed and less often entitled to a payment compensating him for loss of profits.

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9. REMEDIES

9.1 Each Party shall have the right, without prejudice to its other rights or remedies that it has available under Dutch law in these events, to suspend performance of its obligations under, or to terminate, this Contract with immediate effect by serving a notice on the other Party:

- a. if the other Party is in material breach of any of its obligations under this Contract and that breach is incapable of remedying or the other Party shall have failed to remedy that breach within [Ø] working days after receiving a notice requiring it to remedy that breach; or
- b. if any corporate action or any steps have been taken or legal proceedings have been instituted against the other Party for the granting of a suspension of payments or for the bankruptcy or any analogous insolvency proceedings under any applicable law or for the appointment of a receiver or a similar officer of it or its assets.

9.2 Upon a suspension of the performance of the obligations of the Service Provider or the termination of this Contract in accordance with Clause 9.1 above:

- a. the Customer shall [return the Product(s) to the Service Provider][allow the Service Provider to reclaim the possession of the Product(s)];
- b. if required, the Service Provider shall have access to the premises where the Product(s) are located for the purpose of reclaiming the possession of any of the Products (and for that purpose only); and
- c. the Customer shall allow (zal dulden) the Service Provider to have such access and shall refrain from taking (zal niet doen) any action that prevents the Service Provider from having such access or from reclaiming the possession of any of the Products or from exercising any of the other rights and remedies that are available to the Service Provider under Dutch law and this Contract in this event.

10. LIMITATION OF LIABILITY

The liability of the Service Provider towards the Customer in connection with this Contract shall at all times:

- a. be limited to [Ø]

Note: various caps can be applied, for instance a limitation to the amount of service fees depending on the type of circular services that are being provided and types of loss that can be incurred.

- b. shall at all times exclude indirect, consequential, incidental or punitive damages or losses whether arising under contract, in tort (including negligence), at law or in equity, loss of actual or anticipated profits, loss of revenue, loss of use, loss of goodwill, cost of capital or any consequential loss including losses in respect of business interruption.

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Note: the most relevant types of liability are breach of contract (for example non-performance or late performance of the services) and tort (negligence, breach of statutory duty, misrepresentation). As a general rule, damages for breach of contract compensate for the benefit that would have been received had the contract been performed. Provided there is no statutory or contractual provision, the claimant is entitled to damages that reasonably may be considered to compensate for (a) direct loss (i.e. damage which is an immediate consequence of a breach) or (b) indirect/consequential loss (i.e. damage which is not the immediate consequence of a breach, such as a loss of profit).

11. INDEMNITY

11.1 The Service Provider shall indemnify and hold harmless the Customer against any and all damages except any consequential damages incurred by the Customer relating to any claim of a third party or the Customer arising out of gross negligence or wilful misconduct by the Service Provider in connection with the performance of the Services. The Service Provider shall not enter into any settlement of a third party claim for which the Customer is seeking indemnification hereunder without its prior written consent.

11.2 The Customer shall indemnify and hold harmless the Service Provider against any and all damages except any consequential damages incurred by the Service Provider relating to any claim of a third party or the Service Provider arising out of gross negligence or wilful misconduct by the Customer. The Customer shall not enter into any settlement of a third party claim for which the Service Provider is seeking indemnification hereunder without its prior written consent.

12. INSURANCE

[The Service Provider shall effect and maintain insurance against:

- a. such risks as a prudent company carrying on the same or substantially similar business as the Service Provider would affect]; and
- b. [upon request of the Customer,] insurance in respect of the Product(s) against loss or damage by fire, storm, tempest, flood, earthquake, subsidence, lightning, explosion, impact, aircraft and other aerial devices and articles dropped from them, riot, civil commotion and malicious damage, bursting or overflowing of water tanks, apparatus or pipes and such other risks and contingencies as are insured in accordance with sound commercial practice for products of the type of the Product(s) to the full reinstatement value thereof including without limitation, the costs of demolition and site clearance, shoring and propping up, any professional fees and VAT where applicable relating thereto (together with provision for forward inflation).]

13. CONFIDENTIALITY

Note: to be inserted if applicable or appropriate for the type of circular services that are being provided.

Each Party shall treat as confidential and shall not disclose all information received or obtained as a result of entering into or performing this Contract which relates to:

- a. the provisions of this Contract;

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- b. the negotiations relating to this Contract;
- c. the performance of this Contract; or
- d. the other Party or any aspect of its business or operatio

14. COMMUNICATIONS

All communications and notices between the Customer and the Service Provider, pursuant to or in connection with this Contract, shall be communicated in writing to the following addresses:

Customer:

[◇]

Service Provider:

[◇]

15. MISCELLANEOUS

15.1 Each Party [may]/[may not] assign its rights and obligations under this Contract or any part thereof or any benefit or interest under it without the other Party's prior written approval [*insert if it is agreed that parties may not assign without the other party's consent*: provided that each Party's rights, benefit or interest under this Contract may be pledged by that Party for the benefit of any financier of that Party].

Note: a contract may in certain circumstances be assigned, meaning that the rights and obligations under it are transferred by one party to the contract (the assignor) to a third party (the assignee). Normally, each party should be able to negotiate that the approval of the counterparty to an assignment will not be unreasonably withheld or delayed. It is customary that an assignment provision will include the other party's prior approval, which may not be unreasonably withheld. From a financing perspective, in any event service providers will want to have the right to pledge their rights under the contract.

15.2 Changes to this Contract can only be made in writing upon mutual consent of the Parties.

15.3 This Contract contains the entire Contract between the Parties with respect to the subject matter hereof supersedes all previous Contracts and understandings between the Parties with respect thereto an may not be modified except by an instrument in writing signed by the duly authorised representative of the Parties.

15.4 This Contract may be executed in any number of counterparts, all of which, taken together, shall constitute one and the same agreement and any party may enter into this Contract by executing a counterpart.

15.5 If a provision of this Contract is or becomes illegal, invalid or unenforceable in any jurisdiction that shall not affect the legality, validity or enforceability of any other provision of this Contract and the legality, validity or enforceability in other jurisdictions of that or of any other provision of this Contract. Any illegal, invalid or unenforceable provision shall have the effect of a provision that would be valid, the purpose of which conforms to the first mentioned provision to such an extent that it must be assumed that such provision would have been included in this Contract if the first mentioned provision had been omitted in view of its illegality, invalidity or unenforceability.

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16. DISPUTES AND APPLICABLE LAW

16.1 This Contract and any non-contractual obligations arising out of or in connection with them shall exclusively be governed by and interpreted in accordance with the law of the Netherlands.

16.2 Any disputes arising out of or in connection with this Contract including, without limitation, disputes relating to any non-contractual obligations arising out of or in connection with this Contract, shall be submitted to the competent court in Amsterdam, the Netherlands.

SIGNATORIES

IN WITNESS WHEREOF, the parties hereto have executed this Contract in duplicate, intending each duplicate to serve as an original, on the day and year below written, but effective as of the day and year first set forth above.

[INSERT NAME CUSTOMER]

Name:

Title:

Signature:

Date:

[INSERT NAME SERVICE PROVIDER]

Name:

Title:

Signature:

Date:

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Annex 1 - SERVICES

Part 1 - SCOPE OF THE SERVICES AND SERVICE FEE

SCOPE OF SERVICES	SERVICE FEE
Use of Product(s)	Part of Base Service Fee
Scheduled Maintenance	[EUR [◇] per event][Part of Base Service Fee]
Preventive Maintenance	[EUR [◇] per event][Part of Base Service Fee]
Corrective Maintenance caused by "machine breakdown" (<i>van binnen komende oorzaak</i>)	Part of Base Service Fee
Corrective Maintenance caused by "physical damage" (<i>van buiten komende oorzaak</i>)	[EUR [◇] [per event][, unless this is insured against in accordance with Clause 12(b)]
Insurance	EUR [◇] per [month][quarter][year]
[Replacement of the Product(s)]	[EUR [◇] per event][Part of Base Service Fee]
[Reclaim of the Product(s) after suspension of the Services or termination of the Contract]	[EUR [◇]][Part of Base Service Fee]

Note: This schedule sets out the pricing for the services and which part of the services is covered by the base service fee and for which part of the services an additional fee will be required to be paid. Please note, that if any service is covered by the base service fee, any possible higher costs associated with the performance of that service will be for the account of the service provider. If a separate price (by way of an additional service fee) is agreed for such services this is of course less so and if the price is at costs, then this price risk is taken by the customer. This schedule is of course of particular importance for the viability of this new type of circular service model compared to the linear sales model.

Part 2 - FURTHER DESCRIPTION OF THE SERVICES

1. Service level

The Service Provider shall ensure that during the term of the Contract the functionality and usability of the Product(s) shall be at least equal to what is generally accepted to be the functionality and usability of products of the type of the Product(s) in the market taking into account the circular objectives that are being pursued with this Contract by the Service Provider.

Note: It will depend on the type of circular services that are being provided and the term of the contract whether:

- a specific (technical) level of functionality is guaranteed that during the term of the contract will not change. This would under a contract for an indefinite period of time be less acceptable to the customer, since the product as provided will become very soon outdated];
- a level of functionality is guaranteed as proposed above. This would in our view to be most appropriate for this new type of circular service model where a longer term contractual relationship with the customer is pursued; or
- the best available (technical) level functionality is guaranteed. This would be most acceptable to the customer, albeit that this is in our view less consistent with the circular objectives that are being pursued with this new type of circular service model.

2. Scheduled Maintenance

The scheduled maintenance services to be performed by the Service Provider in respect of the Product(s) consist of:

[insert details].

3. Preventive Maintenance

The preventive maintenance services to be performed by the Service Provider in respect of the Product(s) consist of:

[insert details].

4. Corrective Maintenance

The corrective maintenance services to be performed by the Service Provider in respect of the Product(s) consist of:

- a. if caused by a "machine breakdown" of the Product(s)(*van binnen komende oorzaak*): [insert details]; and
- b. if caused by "physical damage" of the Product(s)(*van buiten komende oorzaak*): [insert details].

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ANNEX B – FINANCIAL CONSIDERATIONS

B1. ESTIMATE THE MONTHLY FEE

The fee was build up by the following cost categories: 1) Asset handling, 2) Finance & insurance and 3) Service & operational costs. These will be elaborated here.

1. Asset handling

Asset handling costs per module are based on the price of a new module (including profit margin), the expected replacement and repair costs, and an estimation of economic and physical lifetimes per component. These costs cover the expected replacement and repair costs due to breakages or malfunctioning, and corresponding logistics and operational (handling) costs.

IN A CIRCULAR BUSINESS MODEL, ECONOMIC LIFETIME AND PHYSICAL LIFETIME CONVERGE

Modelling FaaS on the level of modules instead of the whole device enabled bringing the economic lifetime of most modules closer to their physical lifetime. This is an important result of circularity; by modelling on module level, many modules are mainly judged by their functionality. Only items that are fashion sensitive (i.e. with a shorter economic lifetime than physical lifetime), such as the back cover and software related modules, are sensitive to trends in the market. In a linear business model, the lifetime of the product is often equal to the module with the shortest economic lifetime due to irreparability, i.e. a very short life!

2. Finance & insurance

As is typically the case for PaaS models, there is a need for pre-financing the acquisition costs of assets. Based on workshops and deep dives, financing costs per device were based on a fixed rate (6%)

loan with a linear repayment structure for a duration of 24 months, which is likely a conservative assumption. In addition, part of the fee accounts for insurance for theft and loss.

3. Service & operational costs

The fee covers also for standard customer support service in the form of help desk service in case of failures or breakages. In addition, an extra self-repair service was offered to the customer, consisting of an extra batch of spare parts and spare Fairphones that are always present at the client's premises.

B2. DEFINE A REALISTIC SCENARIO

Next to defining a realistic scenario regarding the flow of clients, as described in Chapter 5, a scenario was defined regarding the flow of modules. A module can be returned in three possible states: as good as new, repairable or unrepairable. Note that in "real life" there are more nuances in the states of the modules, for example, repairs can vary in severity and costliness. In addition, for purposes of modelling, the following assumptions were made:

- Displays, Covers & Batteries are always unrepairable
- There are always infinite new modules available
- Repaired parts are always used first. If the stock of repaired parts is empty, new modules are purchased.
- For all modules, a fictive threshold volume for cost-effective recycling of modules is set to 50.

B3. MODEL CASH FLOWS

The results of the net cash flow are presented below (Figure B1: Net Cash Flow). The modules that are returning (all at the same time) due to ending economic lifetime or physical lifetime are clearly reflected in periodic negative peaks.

Net cash outflows

In a similar way, cash outflows (Figure B2 cash out), show the three main outflow categories. Asset purchases are irregular and account for a relatively large cash outflow due to modules returning after physical lifetime. Quarterly VAT payments are regular and equal due to the scenario of one client, with an equal number of devices in use. Repair and handling costs are relatively low compared to the other cash outflows.

EXAMPLE: THE STOCK AND FLOW OF BATTERIES

To illustrate this, consider Table B1. The first column (Q), represents the stocks of batteries in September. The number of needed batteries at that moment is 2. The stock of repaired batteries is 0 (note that this stock is always 0, because batteries are assumed impossible to be repaired), so 2 new batteries need to be purchased. Accordingly, the stock of unrepairable batteries is increased with 2 units in the next month (October). Now take a look at column U, January. At that time, an extreme event takes place in which 202 unrepairable batteries are returned. Leading to a purchase of 202 new batteries, and a corresponding stock of unrepairable batteries of 238. Because the minimum threshold of 50 is now reached (the fictive threshold for cost-effective battery recycling), the next month all 238 unrepairable batteries are moved to recycled.

Table B1: The stock of battery modules for six months:

Event projections	Unit	Sep 18	Okt 18	Nov 18	Dec 18	Jan 18	Feb 18
SCENARIO 1: REALISTIC		14	15	16	17	18	19
STOCKS							
Recycle Module 6. Battery	units	0	0	0	0	0	238
Need Module 6. Battery	units	2	2	2	3	202	2
Stock repaired @FP Module 6. Battery	units	0	0	0	0	0	0
Stock unrepairable @FP Module 6. Battery	units	29	31	33	36	238	2
Purchase New Module 6. Battery	units	2	2	2	3	202	2

Figure B1: Net cash flows based on 'best estimate' scenario. X-axis = months

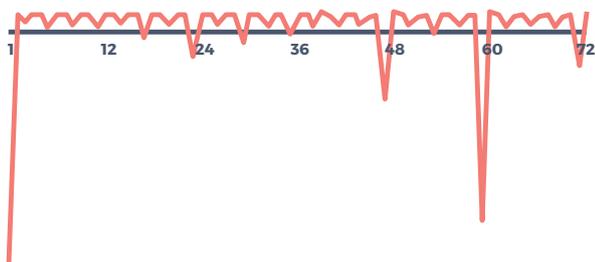
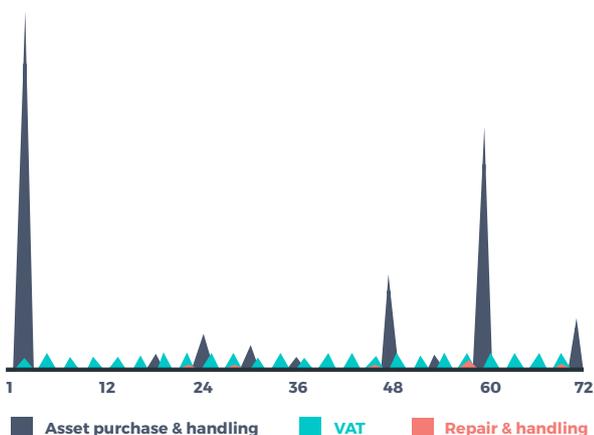


Figure B2: Net cash flows based on 'best estimate' scenario. X-axis = months



B4. EXPLORE THE FINANCING STRUCTURE

Value at risk & securities

The Fairphone devices have a high residual value. However, if market conditions change the assets could become worth their scrap value only (i.e. worst-case scenario), equal to the value of their raw materials. For the Fairphone, its scrap value is estimated to be between 3 and 5 euros according to recycling literature consulted and Fairphone's experience. For modelling purposes, the scrap value is fixed at €4,00 per device. The best case (high residual value) and worst case (scrap value) scenario of collateral value - in the case of liquidation of a contract - are presented below.

Also, an instalment fee of €50 per device is introduced, which can be seen as a co-investment in the devices from the client. This highly influences the investment need and corresponding value at risk. A termination fee could be introduced, but given the high residual value for second-hand Fairphones in the market, this was seen as redundant.

In table B2, the securities for this pilot are summarized.

Table B2: Summary of securities

Securities	Assumptions
Security A: Installment fee	€50,- per device
Security B: Residual value assets	Two scenarios: (1) High residual value: linear depreciation scheme from 100% at point zero to 20% after 3 years (2) Scrap value: €4,00 per device
Security C: Termination fee	Termination fee can be established from remaining value at risk in time.

The Value at Risk, i.e. the risk that cannot be covered by the value of securities in case of default is illustrated in the graphs below. In Figure B3, there is positive value at risk in case of high residual value. Because this high residual value of the assets is likely in the current market, the termination fee is currently set to zero. In Figure B4, there is still a considerable remaining value at risk, due to the low assumed residual value. In this case, it might be wise to introduce a termination fee, to cover for part of this risk, until the remaining risk is zero. Note that, as soon as the client portfolio grows, and the corresponding number of circulating devices grows, total value at risk will decrease due to spread of value at risk on devices.

Figure B3: Value at Risk with assumed high residual value. X-axis = months

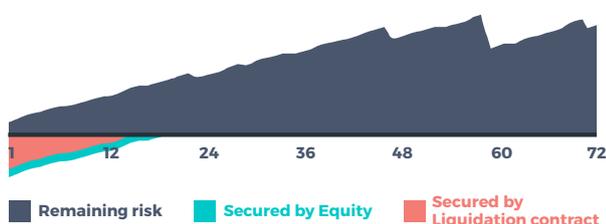
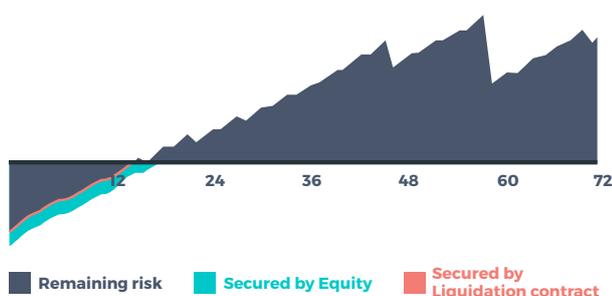


Figure B4: Value at Risk with assumed low residual value (i.e. scrap value). X-axis = months



Alternative financing structures

Three other financing structures were discussed in light of financing FaaS, and will shortly be discussed here. Of the many existing lease constructions, two were indicated to be appropriate for the FaaS model, and are discussed below.

1. Two-step approach

The two-step approach that was introduced consists of two types of financing. The first is the short-term pre-financing of the phones (assets). The second step consists of paying out the present value of future cash flows, in other words, the upfront one-off payment of the expected cash flows. The contracts are then transferred to the financier. The collecting and billing of the rental fees can be either done by Fairphone or by the financier.

2. Lease: loan based on book value and underwritten by the assets

In this lease construction, the financier finances 80%-100% of the book value of the portfolio of assets (i.e. Fairphones) and the assets serve as collateral. Legal ownership stays with Fairphone, the duration of the lease is equal to the economic lifetime of the Fairphone and a fixed interest rate. Note that, in the FaaS proposition, an alternative duration should be chosen as the lifetime can become very long due to the circularity of modules. If the book value of the assets (i.e. modules) increases, for example due to upgrades or repairs, finance can be added. Vice versa, lower book value can result in interim repayments. This structure is similar to a loan underwritten by collateral (i.e. the assets). However, underwriting needs to be adapted to the securities and characteristics of the circular service.

3. Lease: financier owns the assets and leases the assets back to Fairphone

In the lease-construction, the financier buys the assets, in this case the Fairphones, and becomes

their legal owner. The financier leases (in a financial lease) the assets back to Fairphone, that adds value to it with providing the services and offers this to their (B2B) clients. Fairphone has the obligation to re-acquire legal ownership of the assets in the end of the lease duration (which is typically equal to the economic lifetime). Risk assessment in this construction is based on cash flows and underlying asset.

B5. PROJECTED PROFIT AND LOSS (P&L) STATEMENT

The profit and loss statement (P&L) is a financial statement that summarizes the revenues, costs and expenses incurred during a specific period of time. The elements of the profit and loss (P&L) statement for the Fairphone-as-a-Service business model is detailed in Table B3. In the Fairphone-as-a-Service business, revenues are generated by the periodic fee, instalment fee and recycling benefits. Deducting cost of sales, operating costs and interest expenses, taxes, depreciation and amortization from the revenues leads to net profit.

Net profit is positive from the start, as illustrated in Figure B5. Note, that the peak in the first month is due to the installment fee that is received for every device in the first month. Net profit is based on the fact that assets are financed upfront and that only interest is paid.

The impact of repairs and replacements are spread over time through the use of a repair provision. An amount is reserved for repairs and replacements every month, and any repair/replacement is paid out of this reserve.

Figure B5 Cumulative net profit. X-axis = months

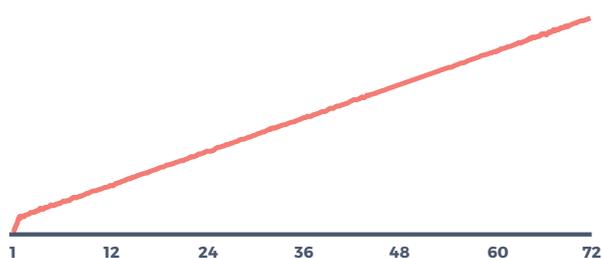


Table B3: Elements of Profit and Loss statement for the PaaS model

Profit and Loss Statement	
Revenue out of periodic fees	+
Instalment fee	+
Module recycling benefits	+
TOTAL REVENUE	SUM
Cost of Sales	
Logistics	-
Repair provision	-
Insurance	-
GROSS PROFIT	SUM
Operating costs	
Personnel	-
Overhead	-
EBITDA	SUM
Depreciation Tangibles	-
EBIT	SUM
Interest expenses	-
EBT	SUM
Corporate income tax (20% of EBT)	-
NET PROFIT	SUM

B6. PROJECTED BALANCE SHEET

The elements of the **balance sheet** for the Product-as-a-Service business models are detailed in table B4.

Leverage and Solvency

No equity financing was introduced at the start but was gradually build up through cumulative net profit. The investment need for internal or external equity can be established through balancing solvency and leverage. Please find the calculated solvency ratio and debt-equity (leverage) ratio for the FaaS model in Figure B6 and Figure B7.

The solvency ratio is the ratio of equity to total assets. Solvency is an indicator of a business' ability to meet its financial obligations. The solvency ratio is always in between 0 and 1. In the first month the solvency ratio is quite low, because the cumulative results of the first periods growing over time, but grows towards a steady 0,7.

The debt-equity ratio is the ratio of total liabilities minus equity (i.e. "debt") to equity. The debt-equity ratio shows a decreasing pattern converging to 0,5 after two years, as debt is reduced in the first two years, and at the same time equity grows.

Both the solvency ratio and debt-equity ratio should be balanced, so that Fairphone can meet its financial obligations, while at the same time not making the business fiscally vulnerable. An investor will be reluctant to invest in a highly-leveraged business (i.e. lots of debt) because equity investment is subordinate in priority to the payment of debt. On the other

hand, a business that is financed largely through equity loses fiscal opportunities. Additionally, a credit provider may require these ratios to be of a specific balance to grant a loan. This way the required height of corresponding equity (either from investors or from Fairphone) can be extracted.

Figure B6: Solvency ratio FAAS. X-axis = years

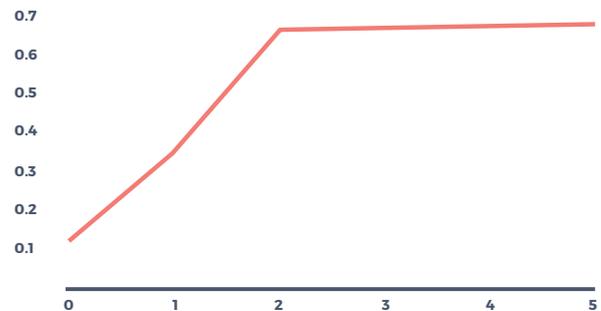


Figure B7: Debt-equity ratio FAAS. X-axis = years

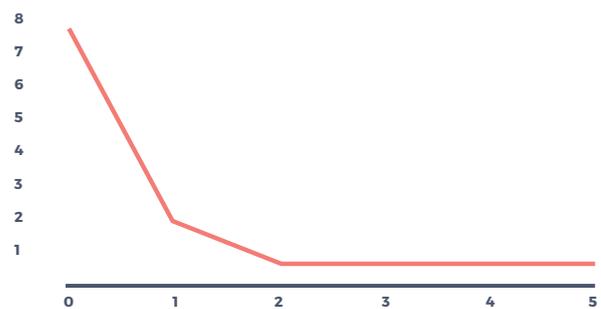


Table B4: Elements of the balance sheet for the PaaS model

Assets		Liabilities
Intangible assets Top module Bottom module Camera module Core module Plastic back cover Battery Display		Paid in Additional paid in Other reserves Result Period
Tangible assets Cash		Total equity Current account bank Provision for repairs Taxes and social security
TOTAL ASSETS		TOTAL LIABILITIES

COLOPHON

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