SITRA

SITRAN STUDIES 244

SEPTEMBER 2024

DATA-DRIVEN COMPETITIVENESS

A handbook for ecosystems to utilise data

Heikki Aura, Naomi Wuori, Liisa Paavilainen, Mika Ruokonen

Sitra studies 244

Data-driven competitiveness
A handbook for ecosystems to utilise data

Authors: Heikki Aura (Sitra), Naomi Wuori (Sitra), Liisa Paavilainen (Futurice Oy), Mika Ruokonen (Futurice Oy)

Working group: Jenna Kiljunen (Sitra), Pinja Heimala (Sitra), Katri Korhonen (Sitra), Timo Hämäläinen (Sitra), Jyri Arponen (Sitra), Kaj Pyyhtiä (Futurice Oy), Ninja Fedy (Futurice Oy), Ida Rainio (Futurice Oy), Sari Kola (Sarilainen Oy)

Pictures: Aino Aittasalo
Layout: Grano Oy

ISBN 978-952-347-390-4 (PDF) www.sitra.fi
ISSN 1796-7112 (electronic publication)

The **SITRA STUDIES** publication series features the results of Sitra's future-oriented work and experiments.

Sitra studies 244
Data-driven competitiveness
A handbook for ecosystems to utilise data
September 2024

Contents

Foreword

In recent years, digitalisation and the development of the data economy have brought about a transformation that will fundamentally change the way we operate in the economy and society. This change requires the adoption of new operating models that place greater emphasis on networked cooperation. With this handbook, we want to support companies that are interested in developing their business with data in cooperation with other organisations.

Data-driven solutions can help solve many of the challenges facing modern society. In healthcare, for example, data can be used to improve the quality and effectiveness of care by anticipating health risks or tailoring more personalised treatment plans. In logistics, data enables optimisation of supply chains and reduces costs, while improving the speed and reliability of deliveries. Data can also be used to promote sustainable energy production by optimising energy consumption.

Diverse societal challenges require diverse competence. Solutions can be sought by combining the capabilities of different organisations. Cooperation networks formed by different actors are commonly referred to as ecosystems. They are made up of businesses, research institutes, public administrations, stakeholders and citizens. The aim of these networks is to find solutions to problems that are too broad for individual actors alone to solve. Cooperation pays off because it enables the utilisation of expertise and data sources and resources from different fields, which also leads to more comprehensive solutions.

The handbook introduces the reader to how ecosystems can develop their own collaboration and produce sustainable and fair data-based solutions. We provide an overview of what it takes to operate in ecosystems and describe the stages of ecosystem cooperation. Additionally, we consider the means by which the ecosystem can plan, pilot and implement the goals and solutions it has chosen.

We have written the handbook in collaboration with several Finnish ecosystems. In addition, we offer a toolkit with practical templates for different stages of co-creation. The tools should be utilised in collaboration with other ecosystem actors. The tools, shared as a separate attachment, are made under a Creative Commons license, which means that they can be downloaded for personal use and shared and used publicly.

The publication is part of Sitra's work for a fair data economy. In a fair data economy, data is used ethically for the benefit of people, the society and the environment. Our goal is that people and companies can trust that their data is used responsibly and that they themselves have the opportunity to influence how and where their data is used. Cooperation, openness and trust play a key role in building a sustainable and fair data economy.

We hope that the content will provide readers with inspiration and concrete ways to develop ecosystems and seize new business opportunities!

Helsinki, 16.1.2024

Kristo Lehtonen

Director, Fair Data Economy

Summary

Many of the digital and data-driven business opportunities that lie ahead will only open up through collaboration with other organisations. This handbook brings together best practices, lessons learned and examples from pioneers who have developed new data-driven solutions by working in ecosystems.

At the start of an ecosystem activity between different organisations, the members jointly define the purpose and objectives of the ecosystem's joint activities. These define the solutions that the collaboration aims to develop. Successful solution design is based on identifying client needs.

In addition to clear objectives, the ecosystem needs an organisational model that supports collaboration. A carefully chosen organisational model will ensure that the activities are carried out effectively. To strengthen trust between ecosystem members and to support their activities, it is advisable to draw up the necessary agreements defining the responsibilities, roles and obligations of the actors involved.

An ecosystem may comprise a variety of different organisations and therefore needs a working culture that fosters cooperation and trust. A shared culture is created through the interaction between those involved. In a culture of trust and openness, the different organisations learn about each other's strengths and are able to use them effectively to develop the solution the ecosystem is seeking. A shared culture is strengthened by agreeing on clear ways of working, operating models and ground rules.

Once the foundations for collaboration are in place, the ecosystem starts to develop an implementation plan. This will include use cases for data-driven solutions that provide a structured description of how the product or service will be used in practice. In addition to the use cases, a business plan is also required, including market and client analysis, a revenue model, a roadmap to support implementation, and the necessary risk analyses.

The transition to the implementation phase often takes place through a pilot, where the solution is tested with the target group. The pilot should be carried out in stages, testing hypotheses about client needs, commercial potential and technical implementation.
The success of the pilot is evaluated through quantitative and qualitative means. Stakeholders in the ecosystem can then jointly assess the performance of the solution and decide on its wider deployment. Finally, the results will be clearly communicated to all participants and stakeholders. From a successful pilot, the ecosystem can move towards commercialising the solution.

It is important to remember that ecosystem collaboration does not always happen in the same order. It is worthwhile to continually assess critical aspects of the operation and make changes where necessary. Flexibility and adaptability are the strengths of an ecosystem, as new situations and changes in the world around us may require rapid and unplanned ways of working.

Tiivistelmä

Monet tulevaisuuden digitaaliset ja dataa hyödyntävät liiketoimintamahdollisuudet avautuvat ainoastaan muiden organisaatioiden kanssa tehtävän yhteistyön kautta. Tähän käsikirjaan on koottu parhaita käytäntöjä, oppeja ja esimerkkejä edelläkävijöiltä, jotka ovat kehittäneet uusia datapohjaisia ratkaisuja toimimalla ekosysteemeissä.

Eri organisaatioiden välistä ekosysteemitoimintaa käynnistäessä jäsenet määrittävät yhdessä ekosysteemin yhteisen toiminnan tarkoituksen sekä tavoitteet. Nämä määrittävät sen, millaisia ratkaisuja yhteistoiminnalla halutaan kehittää. Onnistunut ratkaisujen suunnittelu perustuu asiakkaiden tarpeiden tunnistamiseen.

Selkeiden tavoitteiden lisäksi ekosysteemi tarvitsee yhteistyötä tukevan organisoitumismallin. Huolellisesti valitun organisoitumismallin avulla varmistetaan toiminnan tuloksellinen eteneminen. Ekosysteemin jäsenten välisen luottamuksen vahvistamiseksi ja toiminnan tueksi kannattaa laatia tarvittavat sopimukset, joissa määritellään toimijoiden vastuut, roolit ja velvollisuudet.

Ekosysteemi voi koostua hyvin erilaisista organisaatioista ja siksi se tarvitsee yhteistyötä ja luottamusta vahvistavan toimintakulttuurin. Yhteinen kulttuuri syntyy toimijoiden välisessä vuorovaikutuksessa. Luottamukseen ja avoimuuteen pohjautuvassa toimintakulttuurissa eri organisaatiot oppivat tuntemaan toistensa vahvuudet ja pystyvät hyödyntämään niitä tehokkaasti ekosysteemin tavoitteleman ratkaisun kehittämisessä. Yhteistä kulttuuria vahvistetaan sopimalla selkeät työtavat, toimintamallit ja pelisäännöt.

Kun yhteistyön perustukset on rakennettu, ekosysteemi aloittaa toteuttamissuunnitelman laatimisen. Suunnitelmassa datapohjaisille ratkaisuille tehdään käyttötapauskuvaukset, jotka tarjoavat jäsennellyn kuvauksen tuotteen tai palvelun käytäntöön soveltamisesta. Käyttötapausten lisäksi tarvitaan myös liiketoimintasuunnitelma, joka sisältää markkina- ja asiakasanalyysin, ansaintamallin, toteuttamista tukevan tiekartan sekä tarvittavat riskianalyysit.

Toteutusvaiheeseen siirtyminen tapahtuu usein pilotoinnin kautta, jossa ratkaisua testataan sen kohderyhmän kanssa. Pilotti kannattaa toteuttaa vaiheittain testaamalla hypoteeseja asiakastarpeesta, kaupallisesta potentiaalista ja teknisestä toteutuksesta. Pilotin onnistumista arvioidaan määrällisin sekä laadullisin keinoin. Sen jälkeen ekosysteemitoimijat voivat yhdessä arvioida ratkaisun toimivuutta ja päättää sen laajemmasta käyttöönotosta. Lopuksi tulokset viestitään selkeästi kaikille osallistujille ja sidosryhmille. Onnistuneesta pilotista ekosysteemi voi edetä kohti ratkaisun kaupallistamista.

On hyvä muistaa, että yhteistyö ekosysteemeissä ei etene aina samassa järjestyksessä. Toiminnan kannalta kriittisiä osa-alueita kannattaa arvioida jatkuvasti ja tehdä niihin muutoksia tarvittaessa. Joustavuus ja mukautumiskyky ovat ekosysteemin vahvuus, sillä uudet tilanteet ja muutokset ympäröivässä maailmassa voivat vaatia nopeastikin suunnitellusta poikkeavia etenemistapoja.

Sammanfattning

Framtidens digitala och datadrivna affärsmöjligheter kommer i stor utsträckning att realiseras genom samarbete mellan olika organisationer. I denna handbok har vi sammanställt bästa praxis, insikter och exempel från framstående pionjärer som har utvecklat innovativa datadrivna lösningar genom effektivt samarbete inom ekosystem.

När ett samarbete initieras genom en ekosystemsmodell bör de deltagande organisationerna först gemensamt definiera syftet och målen för den gemensamma verksamheten. Dessa avgör hurdana lösningar ekosystemet kommer att utveckla. Då ekosystemet planerar olika lösningar, är det viktigt att identifiera kundernas behov för att säkerställa att lösningen kommer att vara framgångsrik.

Förutom tydliga mål behöver ekosystemet en organisationsmodell som stöder samarbetet. En noggrant vald organisationsmodell säkerställer att aktiviteterna genomförs på ett effektivt sätt. För att stärka förtroendet mellan medlemmarna i ekosystemet och stödja deras verksamhet lönar det sig att vid behov upprätta avtal som definierar aktörernas ansvar, roller och skyldigheter.

Ett ekosystem kan bestå av olika sorters organisationer och behöver därför en kultur som bygger på samarbete och förtroende. En gemensam kultur skapas genom interaktion. I en kultur som bygger på förtroende och öppenhet lär sig de olika organisationerna om varandras styrkor och förstår hur de kan använda dessa för att utveckla lösningar. En gemensam kultur stärks genom att de olika aktörerna i ekosystemet kommer överens om tydliga arbetssätt, verksamhetsmodeller och spelregler.

När ekosystemet har lagt en grund för samarbetet kan dess medlemmar utveckla en genomförandeplan. Ett användningsfall ger en strukturerad beskrivning av den praktiska tillämpningen av den datadrivna produkten eller tjänsten som ekosystemet tillsammans utvecklar och är därför en viktig del av planen. Utöver användningsfallen krävs också en affärsplan, som inkluderar en marknads- och kundanalys, en intäktsmodell och en vägkarta som stöder genomförandet av lösningen eller tjänsten. Dessutom är det bra att vid behov göra olika riskanalyser.

Då ekosystemet övergår till att genomföra lösningen eller tjänsten inleder det ett pilotprojekt, där lösningen testas med målgruppen. Pilotprojektet bör genomföras stegvis och testa hypoteser som berör kundbehov, kommersiellt potential och tekniskt genomförande. Pilotprojektet utvärderas med kvantitativa och kvalitativa metoder. Ekosystemets intressenter kan sedan gemensamt bedöma lösningens prestanda och besluta om den bör tas i bruk i bredare skala. Slutligen kommuniceras resultaten tydligt till alla deltagare och intressenter. Efter ett framgångsrikt pilotprojekt kan ekosystemet gå vidare mot kommersialisering av lösningen.

Det är viktigt att komma ihåg att samarbete i ekosystem inte alltid framskrider i samma ordning. Det lönar sig att kontinuerligt utvärdera kritiska aspekter av verksamheten och vid behov göra ändringar. Flexibilitet och anpassningsförmåga utgör styrkor för ekosystemet, eftersom förändringar i omvärlden kan kräva snabba och oförutsedda vägval framåt.

Ecosystems are at the heart of a fair data economy

Cooperation networks, also known as ecosystems, open opportunities for companies to develop new products, services, solutions and processes. In this handbook, we have compiled the best lessons learned and examples that will help European companies seize data-driven business opportunities in cooperation with other organisations.

Digitalisation has brought a wealth of data-based services and products to the market. At the same time, it has changed companies' business models, internal processes and interaction with clients. Organisations have access to continuously generated data and digital information from diverse sources, such as files, devices, information systems, databases, social media platforms, cloud services, sensors and IoT devices connected to the Internet. Data is a continuously renewable and unconsumed raw material that offers organisations unprecedented opportunities for business development. However, businesses should not simply keep all their data solely for their own use, but rather think of the benefits of sharing data and collaborating with other actors.

The basic idea of a fair data economy is simple: utilising and sharing data with other actors increases the value of data and enables the creation of new value. The aim is to improve the competitiveness of the companies involved so that the benefits of cooperation are evenly distributed between all actors. Fair rules are needed for cooperation that guide behaviour and activities in the ecosystem. These rules are general guidelines and practices that promote cooperation and mutual understanding. Contracts provide a legal framework and security for business. In ecosystem operations, understanding and applying the rules and agreements is essential for sustainable cooperation.

What is an ecosystem?

When companies want to cooperate by sharing and utilising data, it is best done through an ecosystem, i.e. a networked structure that brings together different actors.

Finland has several ecosystems operating in different fields. The ecosystems consist of networks of companies, higher education institutions, research institutes and third sector actors. In this handbook, we refer to these participants in collaborative networks *as ecosystem actors* or *ecosystem members*.

Ecosystem actors playing by common rules can share their knowledge and expertise and strengthen their own capabilities by learning from others. Ecosystems also seek to innovate and usually try to solve a broader problem for which the capabilities of individual actors alone are not sufficient.

Many ecosystems operating in Finland already utilise data in their own operations in some way. In this handbook, we discuss two types of ecosystems related to data. Firstly, a *data-guided ecosystem* uses data as part of its larger operations, but data is not the centre of its operations. Data is used to enhance ecosystem functioning, find new business opportunities or improve client experience. In the second alternative, *the data ecosystem*, data plays a key role. In this case, the entire ecosystem is built around sharing, analysing and utilising data, which lays the foundation for the data-based solutions sought by the ecosystem.

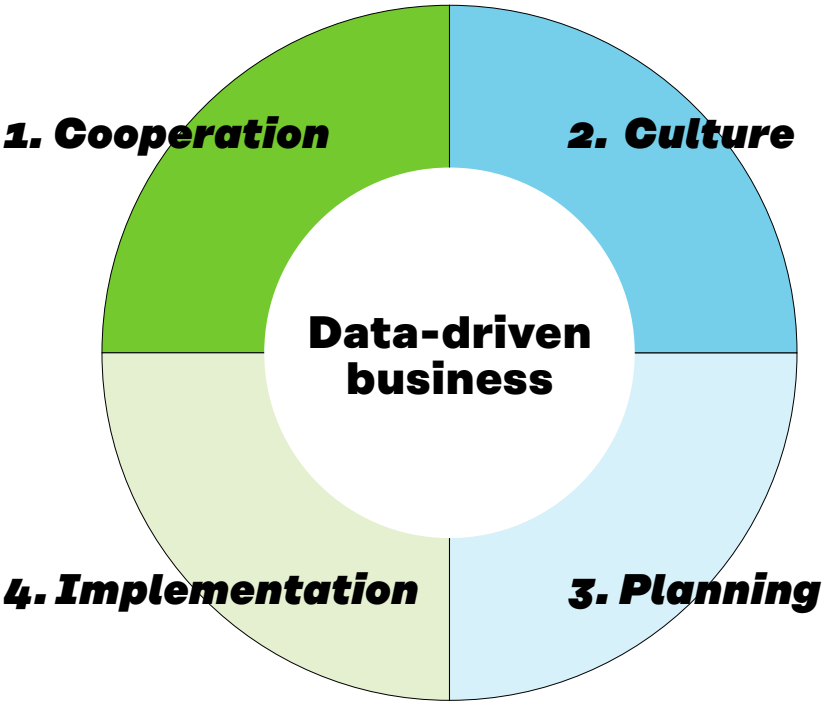
Sharing data in the ecosystem

Combining the expertise and data of different actors is particularly useful for complex challenges that individual actors cannot solve alone. Similarly, cooperation is also worthwhile when combining data from different actors has the potential to increase the value of data. In this case, the data of different actors is combined into a single entity, such as a database. This entity can be further enriched with external data.

So far, ecosystem activities and the utilisation of data by several actors have still been at an early stage of development, even though we know that it can generate benefits and create new opportunities. In a survey commissioned by Sitra for Finnish ecosystems, approximately 70 per cent of the respondents estimated that sharing data has brought them concrete benefits. The biggest benefits were finding new clients and partners, providing opportunities to create new services and new business, and improved process efficiency.

Despite the benefits identified, companies are hesitant about sharing data with other actors. Therefore, it is common that data is not shared and utilised in ecosystems as much as it could be. In this handbook, we aim to concretise the value of data as a commodity and offer companies operating models that make it easy to engage in cooperation with other actors.

Picture 1. The handbook is divided into four sections, the themes of which are: 1. Cooperation 2. Culture 3. Planning, and 4. Implementation. Through following the operating model, the ecosystem can create data-driven business.



The handbook is divided into four sections, the themes of which are:
1. Cooperation within the ecosystem,
2. Creating an operating culture, 3. Planning the operations and 4. Implementing the proposed business solution.

The utilisation of data requires building trust between actors. In addition, new kinds of expertise and cooperation practices are needed, as well as common rules and processes. Clearly agreed common practices promote trust and fairness in the digital environment. At the same time, these agreed practices ensure that all members of the ecosystem act responsibly and respect the rights of individuals and communities.

Networked operations in an ecosystem differ from traditional business, where other players in the industry are most often seen as competitors. Joining the ecosystem requires the organisation to re-evaluate its mindset and business models, and initially, this can be challenging. For this reason, it is important that ecosystem practices are continuously developed and that the lessons learned from them are also shared more widely among other actors. In this handbook, we share real-life examples of different ecosystems.

In the handbook, we focus especially on solutions developed in collaboration where the utilisation of data plays a key role. The solution can be, for example, a new service or product in which the data plays a key role. Ecosystem actors can also use data to improve their own products and services.

DID YOU KNOW
that there is a traffic data ecosystem consisting of more than 170 actors operating in Finland?

CHECK OUT THE ECOSYSTEM

Why should data be utilised in a networked manner? An open and equal transport data ecosystem will build future transport services in Finland

Fintraffic, a government-owned company in charge of Finnish traffic management, is leading a traffic data ecosystem which includes more than 170 Finnish transport operators. Sustainable transport systems and new transport services of the future will require cooperation between different actors and efficient use of data.

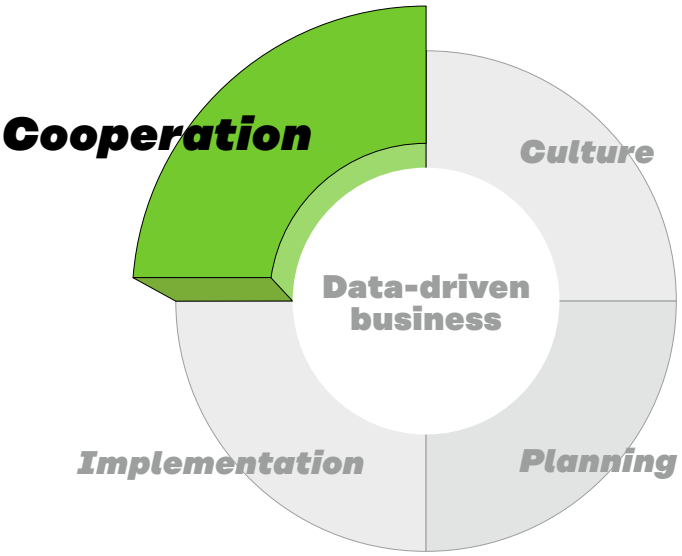
The aim of the traffic data ecosystem is to create a fair digital business environment that promotes both domestic and international markets with easily adaptable and competitive transport and mobility services. The aim is to enable safe, low-emission and user-oriented travel and transport chains that combine different modes of transport.

The cornerstone of the ecosystem is a culture of collaboration and data sharing. All actors have been invited to participate in developing the data ecosystem on an equal footing. Promoting common goals and measures, sharing data and co-creation are key themes aimed at increasing the value of the Finnish transport market. This has been made possible by releasing a large part of the data for use in a jointly agreed format, either free of charge or for a fee.

The success of the ecosystem is based on shared rules and clear operating models. Cooperation between different actors has been facilitated through common data models, technical interfaces and international standards. This has laid the foundation for building and creating new solutions and innovations that utilise traffic data for both international and domestic markets.

Joining the data ecosystem coordinated by Fintraffic requires members to commit to the rulebook. The rulebook creates a contractual framework for data sharing in the transport sector, which facilitates the creation of trust between actors. The content of the traffic data ecosystem rulebook is based on Sitra's Fair Data Economy Rulebook, which contains general tools and templates to facilitate data network building.

1 Utilising data for collaboration in the ecosystem



Ecosystems are usually created when one organisation's own capabilities and resources are not enough to solve a problem which has been identified, or when organisations realise that by combining their capabilities, they could bring a completely new solution to the market. Cooperation between actors is both one of the enablers of the ecosystem and one of the most important factors for increasing competitiveness.

Defining the purpose and objectives of the ecosystem

When companies and other actors decide to tackle a societal problem together and start collaborating to solve it, their first task is to jointly define the purpose of the ecosystem and the objectives of cooperation.

The purpose encapsulates what problem or problems the ecosystem solves, what the aims are, and what added value it offers to its clients. Identifying a common purpose is an important step towards starting ecosystem collaboration. Cooperation can only get off to a good start when the purpose has been defined together. It should be concise and concrete so that it is easy to understand and communicate. Without a clear purpose, it can be challenging for an ecosystem to establish efficient operating models and therefore not get off to a good start.

Questions to help define the purpose of the ecosystem

- What societal problem(s) does the ecosystem respond to?

- Why can an ecosystem solve a problem better than a single actor?
- What is the significance of data utilisation and how can it help the ecosystem achieve its goals?

For example, the purpose of an ecosystem may be to promote a twin transition, in which case it aims to move towards a digital, green and carbon-neutral society. This could mean, for example, building solutions that support sustainable development.

Another purpose could be, for example, to enhance the efficiency of the circular economy. This would allow the ecosystem to focus on sharing data between different actors to enable more efficient use of resources, waste reduction and the creation of new, sustainable business models. Such an ecosystem could, for example, aim to optimise the recycling of materials or develop new, environmentally friendly products.

When the common purpose of the ecosystem is known, it is easier to start defining concrete goals for cooperation. These goals can be both short-term and long-term. Short-term goals can focus on immediate needs, such as developing new solutions or meeting client needs. Long-term goals, on the other hand, may focus on broader changes, such as establishing sustainable business models or creating a new operating culture.

CHECK OUT THE ECOSYSTEM

Problems with the current car recycling system led to the creation of a new data-driven solution

The Finnish car recycling system has long been plagued by so-called missing vehicles that are not included in official registers. Every year, end-of-life vehicles that are not recycled cause significant economic, social and environmental problems. In monetary terms, the size of the problem is estimated at more than one hundred million euros per year.

Car recycling operators decided to tackle the problem together. All key parties from companies to public authorities were brought together in the ecosystem. The cooperation was initiated under the leadership of Finnish Car Recycling Ltd (Suomen Autokierrätys Oy), a producer association, which coordinates the collection, treatment and recycling of end-of-life vehicles in Finland. As the orchestrator of the ecosystem, Finnish Car Recycling Ltd gave the initial push for the development of an industry-wide data platform. The platform enables more accurate monitoring of cars in the recycling system and helps to identify vehicles that are at risk of being excluded from the recycling system. In addition, the platform improves the sharing, evaluation and filtering of data on recyclable cars and automotive parts between different actors, creating a digital marketplace within the ecosystem.

The platform not only helps to increase recycling rates, but also enables more efficient reuse of recyclable car parts. The data platform created for the ecosystem brings new business efficiency and productivity to all parties from companies to government actors. In order to develop a solution, it was essential that all actors joined the cooperation. This provided the widest possible understanding of the problems of the car recycling system and ensured that all aspects were taken into account.

The collaboration helped define a clear purpose for the ecosystem's existence – to prevent vehicles going missing and to ensure that all vehicles end up being properly recycled. A clearly defined purpose strengthened the environmental and economic objectives of the ecosystem and increased trust within the ecosystem. In fact, trust between the actors was a key factor in the success of the project, enabling cooperation and forming the basis for the solution.

Creating a client-oriented way of operating

The functioning of an ecosystem should always be based on problems or client needs that actors strive to solve together. Defining client needs is a key capability of the ecosystem. The ecosystem must be able to identify which problems are worth solving and which can be developed into a feasible and profitable business. Success requires operations that are both client- and business-oriented. The ecosystem should identify client needs, and solutions should be developed in close cooperation with clients.

In client-oriented product development, the first question to answer is *"what is the real problem?"*. The following question should then be *"what is the correct solution?"*. Only when the client's needs are genuinely understood can solutions be considered.

Once the solution ideas are known, ecosystem actors should validate the solutions with clients. Validation ensures that the solution meets the needs of the clients and is desirable to them. In addition, it must be possible to demonstrate the concrete benefits of the solution to the clients. The benefit can mean, for example, a financial advantage, a smoother client experience or the facilitation of a time-consuming task. This benefit is described to the client in written form and is called *the value proposition.* Value propositions should be created and validated with each client group, so that they meet the group's specific needs.

The target group of a solution created by an ecosystem may differ significantly from the ecosystem operators' own client groups. Therefore, it is a good idea to discuss the desired client base and map out its needs at the beginning of the cooperation. The best way to identify client needs is to interview and discuss, as well as observe their current operations. In this work, as well as in the conceptualisation of solutions, it is worth involving service designers who are experts in client research and human-centred design.

Differences between data-related ecosystems

Next, the ecosystem needs to choose the right organisational model that directly affects how efficiently and flexibly it can meet goals and client needs. Ecosystems focused on the use or exploitation of data can be classified into two types: data ecosystems and data-guided ecosystems.

In a data ecosystem, data is a key resource, around which the entire ecosystem is built. This means that actors – be it companies, research institutes or public sector organisations – work together to collect, share, analyse and utilise data. This approach enables diverse and innovative data-driven solutions that would not be feasible without the resources provided by the ecosystem. For example, a data ecosystem can focus on developing smart cities, improving healthcare or finding sustainable environmental solutions by utilising the large amount of data and diverse expertise that can be found in the ecosystem.

A data-guided ecosystem, on the other hand, does not only focus on data, but uses data as part of larger operations. Such an ecosystem can form in any sector, such as manufacturing, retail or education. The goal of a data-driven ecosystem is to use data to improve the efficiency of its operations, find new business opportunities or improve the client experience. For example, in retail, data can be used to analyse client behaviour and generate personalised recommendations, while in industry, data can be used to optimise processes and improve production efficiency. In a data-guided ecosystem, data is therefore an important, but by no means the only element, that defines operations.

Ecosystem actors should consider which model is better suited to their current and

future operations. If data is at the core of an organisation's operations and a business model has been built around it, a data ecosystem can offer the best opportunities for utilising data. If data is just one area among many, a data-guided ecosystem may be a more flexible and practical option. When making decisions, it is important to carefully evaluate the organisation's current resources, expertise and long-term goals.

Organisational models for ecosystems

When a fledgling ecosystem is thinking about how to organise itself, it should keep in mind that technological development and new innovations may affect how the ecosystem runs. In particular, new operating models and technologies, such as data spaces and decentralised autonomous organisations (DAOs), offer new organisational models for data-based activities.

Out of these two, data spaces are better known. A data space is a decentralised digital system that allows participants to transfer data reliably and securely. A data space can be implemented using one or more digital infrastructures. However, the infrastructure does not define the data space – the rulebook does. All participants follow the rulebook.

DAO stands for a decentralised and independent organisation that utilises blockchain technology and operates in a communal manner. The collective decision-making of the DAO and its ability to serve as a platform for data management and sharing can make it a viable option for ecosystems looking for innovative ways to use and share data. In the case of DAOs, however, it should be borne in mind that the related legislation is still incomplete in Europe.

In addition to the examples mentioned above, there are other possible models of organisation, such as the platform model. Platforms such as large online stores or social media sites collect and utilise large amounts of user data. However, platforms face the challenge of using their data fairly. Typically, large platforms lead to market concentration, where a few players control much of the data. This can limit competition and innovation.

The ecosystem organisation model should be flexible enough to adapt to changing needs and opportunities. This requires on-going evaluation of the organisational model and its practices, as well as a willingness to learn and improve the model based on experiences and new insights.

Distribution of resources and roles

Regardless of the ecosystem's organisational model, its operations are based on trust between actors and mutually beneficial cooperation. Therefore, the ability of ecosystem participants to collaborate is of paramount importance for the success of the ecosystem.

When the intention is to develop solutions in cooperation with other companies or organisations, it always brings its own challenges. The operating methods, business models and available resources of different actors can vary significantly. The success of an ecosystem requires support, investment and commitment to solving a jointly identified problem.

The support of the management in the participating organisations is also significant. With the support of management, the ecosystem is much better placed to access sufficient data, skills and other resources. Management support and commitment to ecosystem activities also sends a message to other actors that the solutions produced by the ecosystem are strategically important to the organisation, and that the organisation is genuinely committed to cooperation.

Successful collaboration in ecosystems requires clearly defined roles and responsibilities, as operations require careful coordination and management of different tasks. The ecosystem must therefore have both leadership and implementation roles. Leadership roles should guide and direct the functioning of the ecosystem, while implementation roles focus on the concrete implementation of these plans. The role and responsibilities of each actor must be clearly defined in order for the ecosystem to function in a goal-oriented and efficient manner. The division of roles and responsibilities helps ensure that each actor understands their role in the ecosystem. In data-using ecosystems, the following roles can usually be identified:

An enabler is someone who identifies a problem and starts conversations with partners. The enabler initiates cooperation and takes the definition of the problem and client needs forward.

An orchestrator is the party responsible for running the ecosystem activities. The orchestrator ensures that the ecosystem is organised, that it has fair rules and that the actors have appropriate means for cooperation. The orchestrator is also responsible for engaging partners and securing funding for the ecosystem together with other partners. The orchestrator's role as a neutral actor is central to the success of the ecosystem.

The operator plays a technical role. The operator is responsible for building and maintaining the infrastructure enabling data sharing. The operator works closely with the orchestrator.

Data producers often disclose data in accordance with agreed data models and quality criteria. If necessary, data producers also refine the data needed in the ecosystem, putting it into the required format.

Data users use data for purposes such as creating new business, improving the efficiency of their operations or conducting research. They are the developers of the actual solution of the ecosystem and provide the end product.

Data rights holders are entities that have the legal right to use or redistribute data for others to use. The holder of the rights to the data can sometimes be the same as the producer of the data. More than one rightsholder may also be associated with the same dataset.

In the start-up phase of an ecosystem, roles and responsibilities are still formed and will develop as the ecosystem takes off. It is good to note that the roles are indicative and flexible – each role can be handled by a different actor. On the other hand, one party can also act in many roles, such as an orchestrator and operator, or as a producer and user of data. Therefore, it must be clear to all ecosystem actors what their role is. The ecosystem must avoid a situation where an actor would lack a clear role altogether.

The role of the orchestrator cannot be overemphasised. As the leader of the ecosystem, the orchestrator must ensure that cooperation is effective and goal-oriented. The orchestrator also coordinates ecosystem communication to champion transparency and trust within the ecosystem.

Review the ecosystem activities regularly

Ecosystem actors often establish a steering or management group to manage operations, which is responsible for the performance of the ecosystem. However, it is important to ensure that the orchestrator has the freedom to perform their role as they see fit. Having a separate steering group for the orchestrator has been proved to significantly hamper and slow down collaboration in many

ecosystems. According to a study by the BCG Henderson Institute, lack of ownership or lack of clarity about ownership is the biggest stumbling block in networked collaboration. This leads to the withering away of cooperation in up to one in three ecosystems.

Because all ecosystems are different, each one must discuss what kinds of roles and tasks are appropriate for that ecosystem. The "ecosystem role cards" tool published as an appendix to this handbook lists all the tasks needed for the functioning of the ecosystem. The role cards can be used as an aid in the discussion. The tool helps to identify and select roles suitable for different actors.

The resources and capacities available to ecosystem actors for co-creation may vary. The actors may be at different stages of maturity, for example in terms of ecosystem business or technical capabilities. It is worthwhile to have an open discussion about the maturity level of the actors. This enables the development of the maturity level from the perspective of the entire ecosystem and individual actors. The party acting in the role of orchestrator often defines the concrete next steps.

Challenges are a natural part of cooperation

Ecosystems often face challenges related to data management, the reconciliation of organisational cultures and skills shortages. These challenges can be faced both within a single organisation and collaboratively between different organisations and can have a significant impact on the efficiency and innovation capacity of an ecosystem.

There may also be disagreements between ecosystem actors about who manages the data or who is responsible for the work related to the data. Another challenge may be that different organisational cultures and practices, such as ways of thinking, and working methods and processes, do not sufficiently support the utilisation of data. In this case, the capability, understanding and competence to utilise data is lacking. In order to solve these challenges, clear rules are needed as early as possible. It is also important to discuss how a collaborative culture can support data sharing.

Another challenge may be the lack of data, or its poor quality. The absence or inadequacy of the required infrastructure, such as data space technology, may also prevent data sharing. To address this, technologies and information systems available in the ecosystem should be able to adapt to specific needs. In addition, it is recommended to allocate resources to technical and data expertise within the ecosystem.

Failing to identify the commercial opportunities of data and prioritisation of data utilisation can also hinder the ecosystem from setting realistic goals. Legal or ethical problems related to the use of data can also be challenging. These problems can be solved by investing in commercial and legal expertise, educating management on the opportunities and importance of utilising data, and utilising rapid experiments to understand the challenges and solutions. In addition, it is good to consider the roles of both the individual actor and the entire ecosystem, as well as the kind of added value each can bring to the ecosystem.

Shared agreements support cooperation

The success of data sharing between ecosystem actors is based not only on their voluntary participation and mutual trust, but also on the ability to come to agreements in terms of data sharing.

When ecosystem actors have reached a shared view of the goals for cooperation and gained trust in their partners' competence, it is important to create necessary agreements.

The agreements define the responsibilities and obligations that guide the actors' cooperation and ensure its smooth operation.

Sitra has created ready-made contract templates that allow organisations to agree on cooperation in accordance with fair data sharing principles. In this way, the functioning of ecosystems is sustainable and ethical from the start.

The Fair Data Economy Rulebook includes ready-made templates

- General Terms and Conditions
- Constitutive Agreement
- Accession Agreement
- Dataset Terms of Use
- Description of the Data Network

Operators must also decide at what stage contracts are drawn up. Agreements can be created at the very beginning of the collaboration or only when data sharing begins. Agreements concluded too early can increase the initial administrative burden. Rights and obligations listed in great detail may also make the newly started cooperation more rigid. Often, experience of cooperation brings more insight into the issues that are good to agree on. Ready-made contract models also help new operators become part of the ecosystem.

In addition to agreements, it is important that ecosystem actors internalise and commit to the principles of fair and equitable data sharing. According to these principles, data is used ethically, respecting the individual's privacy and the digital rights of the individual. Additionally, corporate responsibility is taken into account. The main purpose of the agreements is to ensure that the principles of data sharing are implemented in practice.

Summary: What to remember when beginning to collaborate

1. The foundation for successful collaboration is built on the ecosystem's common purpose and genuine client needs. On this basis, the ecosystem defines goals for its operations.
2. Defining an appropriate organisational model and the roles of different actors is critical. The role and responsibility of the ecosystem orchestrator is particularly significant.
3. Fair and clear rules and agreements create transparency and trust, which enable the success and further development of the ecosystem.

1 Tools for building collaboration

1.1 Identifying ecosystem opportunities. The tool helps you identify which problem the ecosystem could solve.

1.2 A problem worth solving. The tool helps you crystallise the selected problem and create a value proposition.

1.3 Using data to solve the client's problem. The tool helps you understand the client problem to be solved, especially from the perspective of data sharing.

1.4 From a solution value proposition to a validated concept. The tool helps you understand how the data concept should work and how it creates value for clients.

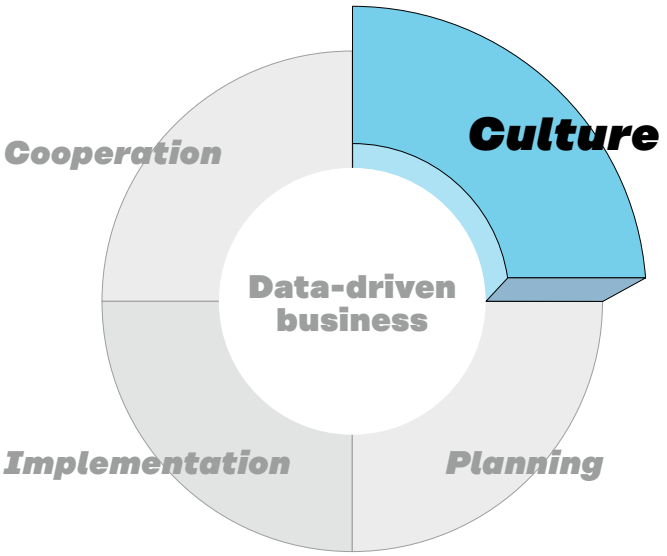
1.4 Concept validation. The tool summarises key client needs and other findings related to the concept based on qualitative and quantitative client data.

1.6 Ecosystem role cards. The cards are intended to help in agreeing on and distributing ecosystem roles and tasks for each role. Role cards help identify tasks that are critical to the functioning of the ecosystem, which are not yet distributed to actors. The tool also helps to select natural roles suitable for different actors.

1.7 Ecosystem maturity level. The tool helps you determine the maturity level of ecosystem actors and the whole ecosystem for networked activities.

All tools are available on the webpage of the handbook

2 Building an ecosystem culture



Once the prerequisites for effective collaboration have been built in the ecosystem, it is time to pay attention to the operating culture and mutual trust between the actors. The development of culture can and should be intentionally influenced, as culture defines how actors cooperate, how committed they are and how eagerly they express their ideas in the ecosystem.

Culture can be viewed from the perspective of different communities. Organisational culture refers to the thought patterns, values, beliefs, norms, practices and behaviours shared by the people working in a particular organisation, which create a specific atmosphere and operating culture. Every organisation has its own culture, whether conscious attention is paid to it or not. The aim of ecosystem development is to build a culture that supports cooperation and takes into account the best practices of the partner organisations' cultures. An open and bold culture built on trust encourages actors to share data and expertise. A cautious, reserved, and distrustful culture, on the other hand, can keep actors separate and suspicious of each other.

Trust is built through interaction between actors

The ecosystem's shared culture is based on interaction and trust. Its construction begins

with getting to know the objectives, activities and views of the actors involved in the cooperation. When an ecosystem defines a problem, common purpose and goals to be solved together, trust between actors also begins to grow. In other words, developing ecosystem operating models promotes the creation of a shared culture. The development can be supported by proven practices from the participating organisations' own cultures. These can be, for example, matters related to leadership, competence, processes, tools and guidelines that support the achievement of goals and desired behaviour.

Whether it is a data ecosystem or a data-guided ecosystem, building trust is important as ecosystems are always entities based on voluntary cooperation and subject to change. The dynamics of an ecosystem change whenever new players join the team or old ones leave. Due to the turnover of operators, the strength of ecosystems lies precisely in their ability to adapt to the opportunities and challenges of the changing operating environment. Creating new innovations together also requires open dialogue. Therefore, trust and interaction play an important role in holding ecosystems together.

The foundations of an ecosystem culture are built on the frameworks, values, norms and operating models of each organisation's own cultures and the individuals operating in them. These aspects are then combined in the interactions between different participants. The starting point for a shared culture should be to ensure a common purpose, language and understanding. Therefore, it is important that ecosystem actors have time to get to know not only the business operations of different organisations, but also each other. Such interaction creates the conditions for mutual understanding and open communication. The experience of ecosystem actors regarding the fairness of cooperation and workload also affects the creation of trust. Building a culture of trust is a time-consuming process that proceeds through cooperation and jointly set goals. Actors should consider together:

- What problem has the ecosystem been created to solve?
- How can the ecosystem members create value together?
- What kind of value proposition can the ecosystem make to its clients?

A value proposition means crystallising what the ecosystem's core offering is, what kinds of benefits it offers to its clients, and why clients should choose the solution produced by the ecosystem over other alternatives. When the ecosystem goal and value propositions are created together and they can be proven to work, for example through pilots, trust in the ecosystem's operations and partners grows.

Trusting each other is not the only glue necessary between ecosystem members. They also need to be able to trust the ecosystem itself. Members need to see that the ecosystem creates value and is constantly evolving. The ecosystem orchestrator must ensure that participation in the activities is meaningful and that actors can rely on the continuity of the ecosystem. The orchestrator can support this through active interaction and communication with the participants.

Mutual trust between ecosystem actors is strengthened when they are able to engage in open and reciprocal cooperation. In practice, participating organisations agree to make their assets available to the rest of the ecosystem, without certainty as to how others will use them. In the name of reciprocity, a company can also rely on receiving similar assets from other players in the ecosystem, just as the following FAMN ecosystem example shows.

CHECK OUT THE ECOSYSTEM

Trust is built into the foundations of the FAMN ecosystem

The Finnish Advanced Manufacturing Network (FAMN) ecosystem consists of 17 industrial and technology companies of various sizes. The ecosystem aims to improve the competitiveness of the Finnish manufacturing industry through sustainable development and digitalisation. The ecosystem is orchestrated by DIMECC, an industrial collaboration platform company. Data has been identified as a significant factor in the FAMN ecosystem, and several projects related to data and its utilisation are underway.

The operating model and rules of the FAMN ecosystem have laid the foundation for a trustworthy and open culture that enables joint innovation. In the FAMN ecosystem, all members are equal to each other, regardless of the size of the company. The members sign a cooperation agreement that commits them to common goals, operating methods, membership fees and possible terms of public funding. In the ecosystem, the information shared between the members is public, but separate agreements on confidentiality and intellectual property rights are drawn up for RDI projects. This way, it is clear to everyone that sensitive information will not flow outside the projects, and there is a shared understanding of how each project benefits the ecosystem actors.

In addition, ecosystem meetings commit to complying with the Code of Conduct, which defines the permitted and prohibited topics for discussion (e.g. commercial matters) so that the discussions cannot be interpreted as affecting the market. The Code of Conduct ensures that members can trust that the ecosystem rules are known to all involved and binding for everyone. This creates an atmosphere of trust.

The diverse membership of the FAMN ecosystem has contributed to the creation of a strong learning culture that supports innovation. Involving both smaller and larger companies is seen as a great advantage within the ecosystem. The varying organisational sizes bring different strengths to the operations and give the actors the opportunity to learn from each other.

For example, smaller players are often agile, which makes larger players in the ecosystem value their insights and expertise. Larger players, on the other hand, have better resources available for the implementation phase, when cooperation benefits both parties. In addition, ICT companies bring with them technological know-how and visions of the future, which enrich the discussion and contribute to innovation. By identifying the strengths and competencies of the actors, the members' mutual trust increases, as they better understand what kind of value each brings to the ecosystem and what benefits they derive from it.

The orchestrator plays an important role in promoting ecosystem activities and culture. DIMECC is a neutral, non-profit and independent operator, and therefore also a reliable orchestrator. DIMECC's task is to ensure the progress of practical work, for example by organising joint workshops, helping to apply for funding and familiarising new members with the ecosystem. In addition, it monitors that the ecosystem's operating methods support cooperation, that the operating principles are followed and that trust between the actors is maintained. For example, in order to maintain trust, the orchestrator monitors activities to ensure that no one tries to sell anything to other members in ecosystem meetings. In addition, DIMECC helps members find suitable people for steering group activities and project preparation workshops. The most important factor in a successful ecosystem culture is people, and the ecosystem has noticed that each actor receives as much as they are willing to give to the operations.

To build trust, it is essential to create space for voicing current concerns. For example, one ecosystem member has said that they only need a small part of their own data and is willing to share it with others, as long as they receive mutually useful data from their partners. This way, it is clear to everyone how different actors benefit from the collaboration and sharing of data. This encourages the sharing of data.

Identifying good practices for collaboration

A common ecosystem culture does not emerge by itself, but it can be influenced by practical measures that support the creation of shared values, norms and working methods. Such measures include the development of ground rules, communication and interaction, and organisational structures and tools.

Creating an ecosystem culture is an opportunity to consciously determine what kind of atmosphere is built in the ecosystem and what kinds of structures are created to support the desired team spirit. Culture can be developed, for example, by jointly identifying good practices from different organisations and agreeing that they will be adopted in ecosystem cooperation. Culture can also be developed by introducing successful operating models from outside the network into the ecosystem, even if they are not already in use in any organisation belonging to the ecosystem.

The development of the ecosystem's culture, along with supporting structures and working methods, is best assigned to a specific actor so that it is addressed thoughtfully. The most natural actor to manage the ecosystem culture is the orchestrator. However, the discussion must be conducted together with all ecosystem actors.

It is a good idea to create a learning culture in the ecosystem right from the start. Therefore, the first step is to share the practices of your own organisation with other actors.

The following questions will help identify good practices:

- What examples of good cooperation do you have in your organisation?
- What kinds of values, interaction, rules and shared working methods emerge from these examples?
- How could good practices at the organisational level be integrated into the functioning of the ecosystem?

After mapping out the practices, it is useful to discuss together what kind of culture the ecosystem is aiming for. This discussion can be conducted with the same questions as in identifying good practices, but the focus is on how the ecosystem wants to form a shared culture. The key is to identify the most important and best practices in terms of ecosystem cooperation and use them to define the culture that the ecosystem is aiming for. When making the definition, it is important to listen to each member of the ecosystem and summarise what they think effective and open cooperation looks like.

Supporting transparency with working methods and structures

In addition to interaction, culture is also formed through doing, which emphasises the importance of common working methods and structures. Working methods and structures refer to leadership, competence, processes, reward models, tools and related instructions that support the achievement of goals and desired behaviour. Systematic working methods and clear structures are most clearly visible in people's everyday lives. At best, they lead to behavioural change and gradually shape attitudes and even values.

As a rule, ecosystems are the sum of the actors involved in them, i.e. organisations and people. However, leading people from different organisations with different educational backgrounds and experience

towards common goals can be a demanding task. The objectives of the ecosystem and the organisations involved in it, as well as the skills and needs of individuals, must therefore be taken into account in the process.

Ecosystems are suited to a working method in which operations take place in small, independent teams. The teams develop solutions together with clients and work in an agile manner, which means developing and improving the solution step by step based on the feedback received. This way of working requires a leadership style that has faith and trust in the team members and their expertise to choose the right approaches and develop solutions that genuinely bring value to clients. Teams should be built so that they include motivated and cooperative experts from different organisations in the ecosystem, as well as from different educational backgrounds and experiences (e.g. commercial, technical and design expertise).

The emergence of a common culture also requires structures that support cooperation. These include, among other things, data utilisation practices, communication methods and channels, decision-making processes and practices related to project management. These operating models and processes bring predictability and efficiency to cooperation and help actors understand how cooperation takes place in practice.

Tools also play an important role in creating ways of working that support collaboration. Digital platforms such as shared online workspaces, project management tools and file-sharing systems enable smooth information exchange and interaction between different actors. These tools allow teams to share information and update their progress in real time. This promotes an open flow of information, improves the efficiency of collaboration and reduces information fragmentation.

Outlining shared rules

To support cooperation, the ecosystem needs rules that support trust and openness. They bring clarity, fairness and stability to cooperation. The rules are intended to ensure that the parties are treated equally and that everyone has equal opportunities to participate in and benefit from the ecosystem. In addition, the aim of the rules is to lay the foundation for long-term and committed cooperation. One of the most important tasks of an ecosystem orchestrator is to come to an agreement on the rules together with the ecosystem actors. The rules usually include the goal, the actors in the ecosystem, the commitment required of them and the roles of the actors. When defining the rules, the ecosystem actors should agree on how to commit to the rules and what the consequences of violating them will be.

The common rules of the ecosystem can be discussed with the support of the questions:

1. What is the goal of the ecosystem?
2. Who does the ecosystem primarily serve?
3. What kinds of actors have access to the ecosystem?
4. What kind of commitment does it take to participate in the ecosystem (for example, workload, funding, technology, data provision, contracts)?
5. What matters need to be secured through agreements (for example, intellectual property rights, non-competition and confidentiality matters)?
6. How can ecosystem actors disconnect from the ecosystem activities?

Summary: What to remember when building an ecosystem culture

1. Building trust and a shared culture requires perseverance. Therefore, it is a good idea to start the work by getting to know the members of the ecosystem and considering the goal and objectives of the cooperation.
2. Each actor brings parts of their own culture to the cooperation. Therefore, it is important that they familiarise themselves with the organisational cultures from which ecosystem actors come and try to identify good practices to share with the ecosystem. Based on this, it is possible to discuss what kind of ecosystem culture the actors want to build.
3. A common culture is built on common working methods. Operating models, tools, guidelines, processes and reward models can support desired behaviour.
4. Cultural development should be included as part of ecosystem development. When creating contract models, rules or operating methods in an ecosystem, it is important to simultaneously discuss what kind of operating culture is created and promoted through these elements.

2 Tools to support a shared culture in ecosystems

2.1 Identifying good practises. The tool helps you identify the best practices and needs of different member organisations in order to build an ecosystem culture. Once these have been identified, common practices for the entire ecosystem can be defined.

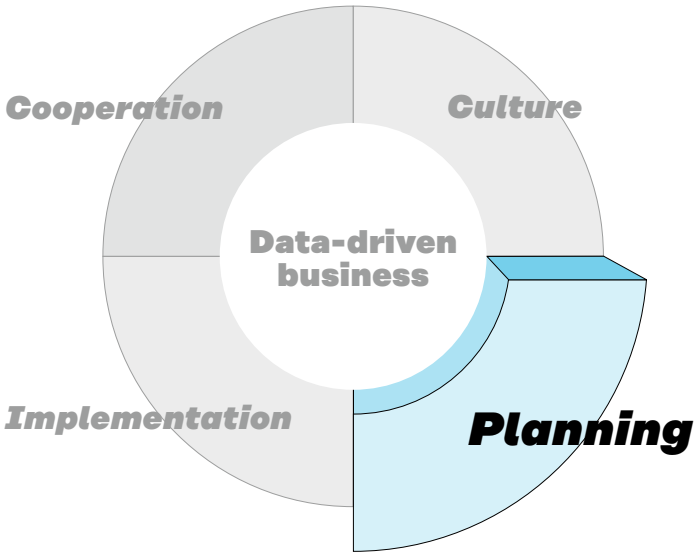
2.2 Defining the desired working culture. The tool can be used to clarify the ecosystem's shared understanding of culture, values and common goals. The tool also helps you define common practices and rules of conduct.

2.3 Ecosystem rules. The tool helps you define how to participate in the ecosystem's activities and how the value created by the ecosystem is shared among its members.

2.4 Rules for data usage. The tool helps to outline the rules for sharing and utilising data in the ecosystem.

All tools are available on the webpage of the handbook

3 The operation of an ecosystem requires a plan to support it



Once the basic prerequisites for cooperation are clear, the next step is to plan the ecosystem's joint actions. The planning progresses from defining the use case to identifying revenue models, after which a business plan is drawn up. Finally, a joint roadmap is drawn up showing the ecosystem parties concrete steps towards implementing the solution.

Ecosystems typically solve problems that individual actors cannot solve alone. The activities start with finding a shared goal. It is a good idea to start designing a co-produced solution through a clear and concrete use case that helps to understand what problem the ecosystem solves for clients or operators themselves, and what kind of added value it generates compared to the current way of working.

Based on the use case, a business plan can be drawn up. Especially in the early stages, ecosystem work takes place in the member organisations alongside their other activities. It may therefore take some time before the economic viability of the activity can be assessed. Therefore, companies may feel that it is risky to invest organisational resources in something whose productivity is difficult to predict in advance. For this

reason, it is particularly important that ecosystem participants draw up a business plan for their joint activities.

There are four steps to making a plan:

1. Definition of the use case
2. Selection of the earnings model
3. Creation of a business plan
4. Drawing up a roadmap

A use case describes a solution designed for client use

Ecosystem actors must understand what problem or problems their data is solving, or how the data produced by the parties creates added value as new services. A use case is a systematic description of a situation or example in which a product, service or system is tested in practice. It describes how a specific target group or person uses a product or service to meet a specific goal or need. The use case helps to understand the functional requirements of the solution and the expected behaviour in a real situation. In other words, the use case focuses on concrete situations and goals, not just technical implementation. It is an essential tool for the specification, design and testing of requirements.

There are several things to consider when defining a use case

1. Define your user: the first step is to define who the users of the solution are.
2. Define the user's objective: crystallise what each user group wants to achieve with the solution.
3. Identify the need leading to the use case: describe the initial situation and the need that brings the client to the solution.
4. Potential preconditions: identify the condition(s) that must be in place or met before a use case can materialise.
5. Use case stages: a detailed description of how users interact with the solution, i.e. the product or service.
6. Identify use case termination conditions: the use case may include conditions that are prerequisites for its termination.
7. Deviations: explore possible exceptional situations and their impact on the use case.
8. Update and customise the use case: defining your use case is not a one-time process but should be updated and adapted regularly to meet changing needs and circumstances.

After creating a use case, it becomes easier to develop an earnings model. Defining a use case can also be used to outline the capabilities and infrastructure needed to implement it. Based on these, a preliminary business calculation can be made, indicators can be defined, and the results achieved can be evaluated. The use case can also be used to manage risks, as it creates a limited area for pilots.

Identification of revenue models

Data-driven solutions typically have several alternative revenue models depending on the nature of the solution. When designing revenue models, it is important to take into account the interests of other actors. Equity and fairness in earnings models play a key role in building trust and long-term success in the ecosystem. Personal data and data protection issues, as well as legislative requirements, must also be taken into account. Ultimately, revenue models depend a lot on the nature of the ecosystem, the role of the actor in it, and the way in which data is produced, shared and utilised. In a well-functioning ecosystem, several revenue models are often used side by side.

Data-driven revenue models

1. Pay for data use: a simple model where actors pay for access to the data provided by the ecosystem. The fee can be based on the quantity, quality or value of the data.
2. Subscription-based model: users pay a fixed monthly or annual fee for unlimited or limited access to data.
3. Data sales: actors sell data to third parties. This can be raw data, or processed and analysed data.
4. Commission model: if the ecosystem acts as a marketplace, it can take a commission on each transaction.
5. Freemium model: operators can provide basic data for free and charge for additional features or analysis.
6. Advertising: if the ecosystem has a large user base, an ad-funded model may be possible.
7. Data exchange model: actors can exchange data with each other without financial compensation, when both parties consider the data obtained to be sufficiently valuable.
8. License model: access to specific data groups or analytics tools can be sold as a license.
9. Affiliate model: the ecosystem can recommend third-party products or services and receive a commission for each client referral.
10. Analytic services model: actors can sell analytics and insights based on ecosystem data.
11. API call pricing model: if data is made available through an *application programming interface*, operators can charge for each API call or a certain number of calls per time period.
12. A publicly funded model: for example, a service of general interest for all citizens.

A business plan shows the profitability of the solution

Once a functional use case and revenue model have been found for the solutions produced by the ecosystem, it is time to make a more detailed business plan.
An ecosystem can have one shared business plan, and individual actors can also have their own business plans as part of the ecosystem.

Creating a shared business plan for the entire ecosystem consists largely of the same elements as when an individual company makes its own plan: it analyses the market situation, builds a pricing model for the solution, and makes a profitability, investment and business calculation.
With the help of these, operators can assess how profitable business can be done with a shared solution. In the early stages, the business plan also serves as a means of communication and a tool for engaging actors. Later, it helps to lead measures aimed at commercialisation.

The market analysis of the business plan describes the market environment in which the solution is planned to be created in. It is useful to analyse the market environment in cooperation with other actors in the ecosystem, because different companies have access to different market data. Based on this analysis, ecosystem actors can consider whether the operating environment is attractive enough to make it worthwhile to develop a new solution. In the market analysis, it is worth noting:

- Market trends: what changes can be observed in the operating environment?
- Similar services: what services are already available or being developed on the market to solve the same problem?
- Market maturity: are clients ready to receive the solution?
- Market potential: what kinds of willingness and ability do clients have to pay for the solution?
- Competitors: what kinds of players can be found in the market and with what strategy?

Regardless of the assessment of market potential, a calculation characterising the financial viability of the solution is also required. This calculation should include assumed revenue streams based on earnings models as well as fixed and variable costs. In addition, the necessary investments and their need for financing must be taken into account. It is also important to clarify how costs and revenues are shared between the different actors in the ecosystem. In addition to a joint business calculation, ecosystem members should make their own calculations of what participation in the ecosystem will bring to them.

Drawing up a business statement helps to identify things that members were previously not fully aware of. For example, the calculation may reveal uncertainties related to how much revenue the new service may generate or what kinds of costs it will involve. In addition, the calculation gives an idea of how long the development of a new solution requires investments and when an income stream can be expected from it. These are used to calculate the payback period of the solution, i.e. when revenues exceed costs, and the solution starts generating a positive cash flow.

It is advisable for ecosystem actors to make a business calculation together, as it must take into account the expected revenue streams, costs and investments received by different actors. At the planning stage, it is acceptable that the calculation is based only on an estimate. Often the business calculation is refined after the pilot, when more is known about the clients' attitude towards the solution.

The business plan also takes into account the risks related to the operations. For example, there may be a risk that clients are not as interested in the solution as expected and are not ready to use or pay for it. On the technical side, challenges may also arise – data is not available, analysis is inadequate, technical solutions are not robust enough, or the technologies of different actors are not compatible. Common contract models and ground rules between ecosystem actors may also be insufficient. If the rules are deficient, there is a risk, for example, that data protection will be compromised, or that benefits are unevenly distributed among operators. In addition, the ecosystem may face financial challenges such as unexpected costs, lack of financing or a prolonged payback period for the project.

Define the future direction of the ecosystem with a roadmap

As part of your plan, you should create a roadmap for the ecosystem that describes the

step-by-step measures required to create and commercialise solutions. The roadmap should define what technical requirements are needed to implement the solutions. Additionally, it should define when the first version of the solutions is advanced enough for commercial release. The roadmap should not be too rigid, as ecosystem actors must be able to develop it also in the future. It should be remembered that actors can also draw up their own road maps. The roadmap should specify the tasks of each actor separately and show how they are intertwined. Ideally, the roadmap shows the dependencies between different actors and possible overlaps in schedules.

Formal agreements must be concluded by this point at the latest, when the actors have drawn up a business plan and committed to it. If the actors have progressed to this stage by openly discussing the principles and rules of cooperation, the drafting of agreements should proceed smoothly. After drawing up the plan and contracts, it is time to move on to the implementation phase.

CHECK OUT THE ECOSYSTEM

Roadmap guides the SIX Mobile Machines ecosystem towards ambitious goals

The goal of the SIX Mobile Machines ecosystem, formed by Finnish machinery manufacturers and their key technology partners, is for Finland to be the world's leading developer of mobile machinery and the associated key supporting technologies by 2025. The Mobile Machines ecosystem has brought together various actors, such as machine builders and technology and research partners from Finland and internationally. In the ecosystem, the roles of the actors are clear, and all participants actively take part in the practical work. This is also a prerequisite for participation in the ecosystem.

A key tool for steering ecosystem operations is a shared and practical roadmap. The roadmap is based on global challenges and related themes that the ecosystem members have jointly identified. Based on this, they have defined a common goal for the ecosystem for 2030 around different thematic areas. The target defined in the roadmap does not focus on traditional technologies, but includes functionalities, features and services that enable value creation throughout the value chain. Examples include data-driven services, new levels of performance, new job opportunities and new business models. Based on the target picture created through the roadmap, the research actors in the ecosystem have also defined what kind of research is needed to achieve the goal.

With the implementation of the roadmap, the functioning of the ecosystem will be consistent. However, the roadmap requires on-going monitoring and updating in order to keep the ecosystem's operations relevant and up to date. A separate group has been created within the ecosystem to monitor changes affecting the roadmap.

Summary: What to remember at the planning stage?

1. Designing a common solution begins with a use case, which is a systematic description of a situation or example where a product, service or system is tested in practice. The description helps to understand the functional requirements of the system and the expected client behaviour in a real situation. The use case focuses on concrete situations and goals, not just technical implementation.
2. The profitability of the planned solution is assessed with the help of a business plan, which includes a market analysis, selection of the earnings model and risk analysis. The business plan also serves as a communication tool and a way to engage participants in ecosystem activities.
3. In the final phase of planning, the actors draw up a joint roadmap that defines practical measures to promote the plan. At this stage, the necessary cooperation agreements are also concluded and the distribution of revenue in the ecosystem is agreed.

3 Tools for making a plan

3.1 Creating a use case. The tool outlines and crystallises the key elements of the selected use case.

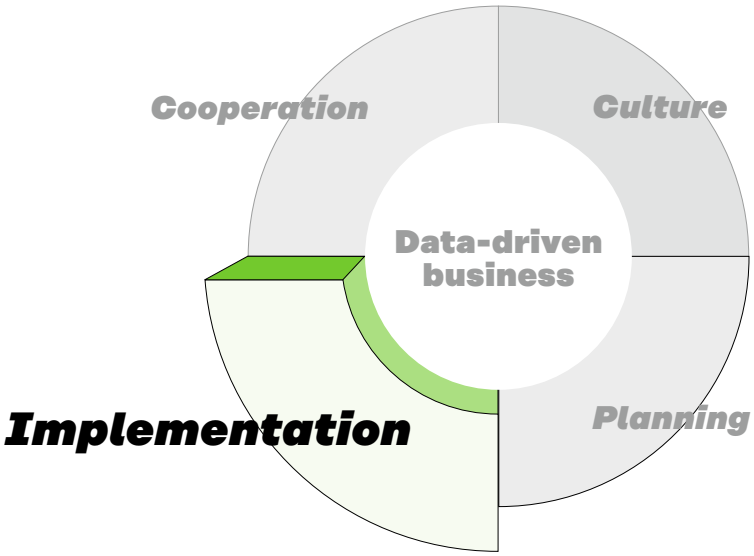
3.2 Identifying data sources. The tool helps you identify what data is available to the ecosystem for the use case, what is still missing and how data can be made available to the necessary parties.

3.3 Crystalising the business plan. The tool helps you define the core elements of your business plan together.

3.4 Business calculation template. The tool makes it possible to calculate the costs and investments of the solution and to estimate the revenue streams generated by it.

All tools are available on the webpage of the handbook

4 Implementation of the solution produced by the ecosystem



It is advisable to proceed to the implementation phase of the solution through piloting. In the pilot, the ecosystem will test the solution together with clients and users in the target group. The aim is to ensure the quality and compatibility of data and the implementation of data protection in the solution. At the end of the pilot, ecosystem actors will evaluate the functionality of the solution and decide on its implementation and continued cooperation.

Piloting refers to testing a new product, service or system in a limited environment before the solution is deployed more extensively. The experiment makes it possible to identify risks and gives room for learning and making the necessary changes. Piloting also helps convince different parties of the benefits and necessity of the solution. At the same time, the smoothness of cooperation will also be tested in practice.

As a rule, all parties whose input is required in the implementation of the final service or product participate in the piloting. Naturally, the roles and contributions of different actors may vary, but it is advisable to agree on the division of duties at the very beginning of the pilot. The actors must also agree on which data they will hand over for the pilot. In this case, the technical solution to share the data is chosen, as well as how often the data will be updated, and how the data may be used or refined.

Qualitative assessment of available data

The first step is to find out what kind of data is available from different sources and what kind of data is needed to test the solution. The data must be fit for purpose and reliable. Its quality criteria may include, for example, the number of missing values, incorrect or abnormal values and the timeliness of the data. It is also important to ensure that the use of data is legal, ethical and complies with all data protection standards.

A "Four V model" can be used to assess data quality:

1. Volume: how much data is available?
2. Velocity: how often does data update or change?
3. Reliability (Veracity): is data reliable and accurate?
4. Variety: is there data in different formats and sources?

After this, the data can be evaluated further from different perspectives. At least the following factors should be taken into account:

- Type of data: what different types of data can be identified from the whole collection of data (for example HR data, financial data, product use data)?
- Special features of the data: for example, is data real-time and how reliable is it?
- Data sources: where does the data come from (for example, internal systems, external sources)?
- Data coverage: which areas does the data cover, and which doesn't it cover?
- Data format: in what format is the data (for example text, table)?

Defining the objectives of the pilot project

It is a good idea to set clear goals for piloting a data-driven solution. Targets should be measurable so that progress can be monitored through concrete indicators. When piloting, it is wise to focus on a few key goals. At the same time, it must be ensured that the targets set are realistic and achievable with the available resources and within the agreed timeframe.

Agreeing on funding is an essential part of defining objectives, especially if the product or service is shared by several actors. In ecosystem activities, agreeing on funding and the budget can be difficult and time-consuming, as numerous companies and other actors are involved. On the other hand, securing funding also acts as an acid test for determining how seriously ecosystem actors are involved. The willingness or unwillingness to put their own money on the line says a lot about the parties' trust in the solution. Once funding has been arranged, it must be considered whether the budget should be used in its entirety at the very beginning of the pilot, or whether it should be divided into different phases whereby the budget is increased if the expected results are achieved during the pilot. Scheduling must take into account the different phases of the pilot and the time required for them.

Roles of actors during piloting

Before piloting, roles must be defined for the actors. The rules define the ways in which data is used, shared, refined and utilised. In the piloting phase, one actor can have several different roles.

The data producer creates and delivers original data. The origin, format and quality of the data must be known. The data producer must deliver data consistently and reliably in order for the pilot to be successful.

Data users use data for various purposes, such as analytics, reporting or decision-making. It is essential for them to have relevant, high-quality and up-to-date data.

The data refiner increases the value of the data by transforming the original data. A data refiner can combine or analyse data to produce relevant information. Data refiners must have the right tools at their disposal and understand what kind of end result the users expect.

Data brokers act as a link between producers and users and often provide value-added services. The reliability, speed and security of data transmission and distribution are key.

The data administrator takes care of data management. The administrator makes decisions about the usage, sharing and storage of data. It is important that data access rights and related responsibilities are clearly defined.

The data custodian is responsible for the technical storage and management of the data, such as backups and data security. At the same time, it must be ensured that data storage and recovery take place safely and efficiently.

Identifying and understanding these roles and the relationships between them is critical in piloting. Defining clear roles, setting expectations and responsibilities, and understanding data processing and movement between roles help ensure the reliability, availability and efficient use of data. In addition, clear roles contribute to the creation of trust and a shared culture between actors.

Development of a prototype solution

The pilot often develops a so-called *Minimum Viable Product* or solution, which is called an MVP. In other words, an MVP is a prototype of a solution that includes only the functionalities and features that are most important to use the solution and that are proven to deliver the most value to users. The prototype aims to focus on the essentials and avoid wasting time and resources. Ecosystem actors should spend enough time defining the MVP in order to reach a consensus on the scope of the work.

For piloting, it is advisable to build a technical environment that enables the collection, analysis and sharing of data securely. In addition, it must be ensured that all systems and platforms used in the pilot are compatible. The technical environment can be created by the ecosystem itself or provided by a third party. In Finland, for example, the test environment of the Virtual Finland programme can be utilised.

CHECK OUT THE ECOSYSTEM

The rental car business revolutionised by a new business model

There are several services on the market through which you can rent a car for a full day or several hours. The service idea, operating logic and business model of the new services have been built from the very beginning to utilise data, combining the resources and services of different actors into a common digital platform.

The user registers as a user of the service and has access to the entire vehicle fleet of the service provider in their area. A vehicle is enabled for use and deactivated via the mobile app. Payment transactions, insurance, checking the right to drive, locating permitted driving zones and monitoring the car's usage time are all handled in the background without the user or service provider having to agree on matters face-to-face. Monitoring the remaining driving charge of popular electric cars in urban areas, taking care of charging and other maintenance measures are also an essential part of producing and using the service.

Providing an easy and seamless service to the client requires various data sources. In addition, the pooling of data offered by different service providers, and consideration of the different business models of different parties are necessary. Some of these follow transaction-based models (battery charging, payment transactions), some follow data usage models (map and navigation services), and some follow monthly billing agreements (parking agreement with the city provider).

The service provider must create suitable payment models and enter into agreements with different service providers. These agreements are likely different from the pricing model offered to the end client. The end client can pay for the use on a per-minute basis, for example. The service provider acts as an orchestrator and operator of the ecosystem and coordinates the partners' different models to provide a seamless client experience.

Testing pilot outputs with clients and users

For piloting, it is advisable to form hypotheses, i.e. different assumptions to be tested at each stage. They aim to understand whether clients like the solution, whether it is technically feasible and how promising it is from a commercial point of view. Hypotheses are presented as statements, which are tested as true or false during the pilot. They can also be accompanied by precise target figures.

Examples of hypotheses

- Client need based on client understanding. Example: a client needs to reduce the energy consumption of their processes.

- Value proposition for the client, in other words, the value added that a solution generates for the client, and an estimate of the amount of added value in terms of savings. Example: solution adds value to clients by reducing energy costs and improving operational efficiency.

It allows clients to save an average of 15% on energy costs, which is equivalent to approximately €500,000 per year in one company. Due to cost savings, clients are willing to pay a monthly license fee of EUR 1,500 for the solution.

- Factors that are significant for the functionality of the solution and the success of data sharing. Example: the functionality of the solution and successful data sharing depend on technical factors such as robust security and data protection architecture, compatibility with different systems, and ease of use.

Clear rules apply to the assessment of hypotheses. For example, a possible rule is that if at least a certain percentage of clients carry out a certain action during a pilot, it signals client interest in the solution and makes it worthwhile. Another useful rule might be, for example, that if a certain number of clients indicate that a feature is central to the solution, that feature will be included in the first commercial release.

Measuring, validating and next steps of pilot outputs

The main goal of the pilot is to test the solution and learn from it. In the piloting phase, it is key to analyse how well the solution meets client needs and how they perceive its value. It is also necessary to find out in which environment the clients are using the solution and whether there are any problems or obstacles in use. In addition, clients' readiness to utilise the solution is assessed.

The results after the pilot should also be viewed from different perspectives. They can be compared, for example, to client feedback or the functionality of the earnings model. The most important question is whether sufficient evidence of the functionality of the solution was obtained during the pilot and whether the evidence corresponded to the hypotheses. A successful pilot shows that the solution has been tested in practice and found to be in demand in the market. The results of the pilot provide concrete evidence of the functionality of the solution and the value it brings. The results of a successful pilot can also reduce the risks associated with the investment and demonstrate that it is possible to achieve a good return on investment.

If there is not enough concrete evidence of the functionality and benefits of the solution for clients during the pilot, the alternatives may be to continue the pilot phase with different client groups or focus, change the solution to something different or end the entire project. Many pilots fail, but that should not be allowed to discourage you, because the most important thing is to learn from the pilot.

It's a good idea to share the results within the ecosystem. In this way, the actors participating in the pilot will learn and be able to develop the ecosystem further. The pilot phase is important because it helps to identify potential problems and risks at an early stage. At the same time, practical experience of cooperation between operators will also be gained.

Summary: What to remember during the implementation phase

1. The pilot is a practical experiment that will be implemented and focused on in stages. In the pilot, hypotheses focused on the commercial desirability and technical implementation of the solution are tested.

2. In the implementation phase, it is ensured that sufficient resources and participants have been reserved for the piloting. Success should be measured by both quantitative and qualitative means so that the views of clients are considered.
3. The results of the pilot should be evaluated in cooperation. Decisions and observations are clearly communicated to both participants and stakeholders. This will also strengthen cooperation after the pilot.

4 Tools for piloting the solution

4.1 Defining an MVP. The sums up what is meant by the minimum viable product, what it aims to achieve from the perspective of the client and the desired business, and how limited the implementation of the MVP should be.

4.2 Roadmap for pilot implementation. The tool helps you plan the actions during the pilot, such as goal definition, client validation, building the IT infrastructure, and developing and commercialising the solution. With the help of the tool, actions can be scheduled into clear steps during the pilot.

4.3 Key aspects of data utilisation in the pilot. The tool helps you summarise the key issues related to data sharing that must be taken into account during the pilot on one page.

4.4 Validation design. The tool helps you map out how the hypotheses should be validated, criteria for the success of testing, and the most important findings during validation. The tool makes validation planning more systematic.

4.5 Checklist for user validation. The tool helps you ensure that different client perspectives have been comprehensively taken into account during the pilot.

All tools are available on the webpage of the handbook

In brief

The handbook presents the stages of ecosystem formation, from building cooperation and culture to designing the desired solution and piloting its implementation. The most important thing is to strengthen practices that support data sharing and collaboration between ecosystem actors.

Initially, it is important to create a solid foundation for cooperation, crystallise what problem the ecosystem is solving, and define goals, roles and operating models for the operations. Operations should focus on developing client-oriented solutions. This requires deepening client understanding, identifying real and solvable problems, and continuously developing the business model.

An operating culture based on trust is a prerequisite for the success of ecosystem operations. Technological know-how is also important, but this alone does not guarantee the success of the solutions developed. The importance of cooperation and interaction is emphasised in networks formed by many actors. The need for clear operating methods, rules, and high-quality management is also emphasised. Operational management requires an orchestrator that can target the efforts of different actors towards a common goal.

The ecosystem aims to identify opportunities arising from client needs for new services that utilise data. The solution implementation plan is made using a use case description and a business plan. Once the plan is ready, the ecosystem will start implementing the data-driven solution in stages. This usually means piloting together with clients. While testing the pilot, the hypotheses are validated, and the technical functionality of the solution is verified. Under the leadership of the orchestrator, ecosystem actors ensure that the business and revenue models used are fair to all parties involved in the collaboration.

Ecosystems offer an opportunity to solve societal problems in cooperation with various actors. We want to encourage companies to get involved in cooperation open-mindedly and include the utilisation of data as part of their strategy. By using the information in this handbook, you will contribute to creating sustainable and data-driven ecosystem activities.

Glossary

The glossary defines the most common terms used in the handbook and helps to strengthen common understanding as a basis for ecosystem work.

Application programming interface (API) is an interface through which software or a system communicates with the outside world. Interfaces allow different software applications to communicate with each other.

A client refers to an individual or company that purchases data or a product or service created from data and makes a payment in accordance with a shared agreement. After payment, the client uses the data as agreed by using the product or service themself or makes it available to others (see also end user).

A client profile is a description of how certain clients behave in different situations and what kinds of needs they have. Client profiling is a way of structuring clients according to their needs and behaviours. Client profiling takes into account that people can assume different roles in different contexts and life situations.

A client segment is a smaller part of an organisation's entire client base, defined by certain criteria. With the help of client segmentation, the market can be divided into percentages and an idea of the size of the segments can be obtained. Client segments often describe client demographics, such as age, geographic location, income, and family and work status.

A DAO, or decentralised autonomous organisation, operates independently or autonomously without the management of a normal organisation and utilises blockchain technology. Members direct operations with smart contracts and digital tokens in their possession. Decentralised autonomous organisations can be considered as cooperatives of the digital age.

Data is digitally stored machine-readable information consisting of signs and symbols. Data is generated, for example, as a result of everyday activities, such as trading and other events, processes and activities, either automatically or manually.

A data ecosystem is a network of multiple data networks where actors collaborate to share and use data within the network and promote, champion innovation and new business.

The data economy is a sector of the economy where the collection and utilisation of data are a key part of operations.

A data engineer is a specialist who designs and implements technical solutions consisting of data modelling, data integration, data warehousing and cloud-based data pipelines, for example.

A data lake is a solution for business intelligence that enables the collection and storage of different types of data for further processing. The data lake differs from a traditional data warehouse solution because modelling is light and the data lake allows storing and processing also other than traditional data types (e.g. images, documents, sensor data).

A data pipeline is a controlled set of functions for refining data and creating business value generating services. A data product can be, for example, a report, or a prediction produced by a machine learning algorithm that is accessed through an interface. A data pipeline includes several components covering the reading of source data, data editing and analysis, storage in different data models, and data activation through a refined data product.

A data provider is any organisation or natural person that makes data available to another party through an ecosystem and/or data network.

A data scientist is a specialist who processes and analyses data using different methods.

Data sharing refers to the transfer of data between two or more parties.

A data source is any source system from which data is obtained. Data sources can be, for example, APIs, internal systems and databases, or IoT devices.

A data space is a distributed digital system that enables participants to transfer data reliably and securely within or between industries. A data space can be implemented using one or more digital infrastructures, but the infrastructure does not define the data space, which is done by the rulebook. All participants follow the rulebook. Data spaces promoting the sharing and utilisation of data are developed in sectors such as transport, health, energy and agriculture.

A dataset refers to an identifiable collection of electronic data. A dataset is a typical mobile unit in data sharing between companies, such as a set of data describing a specific activity.

An ecosystem is a cooperation network of many actors that is formed around a common vision and goal and focuses on solving problems that a single organisation cannot solve alone. It is a dynamic and evolving community where new features, functions and innovations are created through interaction and interdependencies between actors.

An end user is a person who uses a product or service created on the basis of data. The end user can be, for example, an employee of a paying client company or a consumer client.

Fair data economy is a sector of the economy that focuses on creating services and data-based products in an ethical manner. Fairness means that the rights of individuals are protected, and the needs of all stakeholders are taken into account in the data economy.

In the freemium model, consumers exchange data or privacy for access to the "free" features of the product. In addition, some consumers pay for using some of the features of the product.

A Minimum Viable Product (MVP) is a product or service that meets the most important need of the end user with the least possible development investments.

A platform is a (technical) solution that enables data sharing between different actors, to which they connect their data and digital services.

A prototype is the first concrete version of a product that is used to view and test the shapes and functions of a product. It can be very close to the final product, or it is made only for testing certain features or value proposition.

Stakeholder refers to groups and organisations that are affected by the activities of an ecosystem or company and that affect the functioning of the company or ecosystem. An individual company can have different stakeholders both inside and outside the company.

A use case is used to express the functionality and functional requirements of a system or solution at the system level. Its description format varies. A visual diagram is often used as an aid.

Literature

Alvarez, Cindy 2017. *Lean Customer Development: Building Products Your Customers Will Buy.* O'Reilly Media.

Bland, D.J., Osterwalder, A. 2019. *Testing Business Ideas: A Field Guide for Rapid Experimentation.* Wiley.

Heimala, P., Korhonen, K., Malkamäki, S. 2023. *Better products, services and insight – data-sharing networks reap rewards of collaboration*, Sitra.

Kaihovaara, A., Härmälä, V., Salminen, V., 2016. Mitä innovaatioekosysteemit ovat ja miten niitä voi kehittää?. ***Policy Brief 15/2016.*** Government's analysis, assessment and research activities.

Knapp, J., Zeratsky, J., Kowitz, B. 2016. *Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days.* Simon & Schuster.

Olsen, Dan 2015. *The Lean Product Playbook: How to Innovate with Minimum Viable Products and Rapid Customer Feedback.* First Edition. Wiley.

Osterwalder, A., Pigneur, Y. 2010. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers.* Wiley.

Otto, B., Mohr, N., Roggendorf, M., Guggenberger, T. 2020. *Data sharing in industrial ecosystems: Driving value across entire production lines*. McKinsey & Company.

Pitkänen, O., Luoma-Kyyny, J. 2022. *Rulebook for a fair data economy*. Sitra.

Pidun, U. Reeves, M., Schüssler, M. 2020. *Why do most ecosystems fail?* BCG Henderson Institute.

Ries, Eric 2011. *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses.* Crown Currency Publishing.

Ruokonen, Mika 2020. *Growth Reinvented: Turn Your Data and Artificial Intelligence into Money.* Futurice Oy.

Strategyzer 2011. Business Model Canvas Explained. YouTube video.

Valkokari, K., Hyytinen, K., Kutinlahti, P., Hjelt, M. 2021. *Collaborating for a sustainable future – ecosystem guide*. VTT Technical Research Centre of Finland.

Viitanen, J., Eskola, A. 2022. Kilpailuetua alustoista: Horisontissa digitaalisen alusta- ja datatalouden vahvistuva symbioosi. ***Publications by the Ministry of Economic Affairs and Employment of Finland 2022:26.*** Ministry of Economic Affairs and Employment of Finland.

SITRA STUDIES 244

The Sitra studies series publishes the results of Sitra's future-oriented work and experiments.

ISBN 978-952-347-390-4 (PDF)

SITRA.FI
Itämerenkatu 11–13
PO Box 160
00181 Helsinki
Tel: +358 294 618 991