The Hivemaker's Code

A toolkit for building value-driven, decentralized digital ecosystems.

by

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Introduction

What is This Document About?

The document you're about to read will help you create a living digital ecosystem. It's divided into two parts.

In the first part, you'll find the toolkit. This highly practical, nine-step thinking process will guide you through designing your ecosystem's strategy piece by piece.

You'll start by defining your vision and purpose, then build foundations, understand ecosystem players, map your future ecosystem, and think about its economy, governance, and technologies. At the end, you'll define specific affordances for making first interactions with the ecosystem easy and select tactics to spin up the network effect.

In the second part, you'll find multiple articles that will help you understand the topics essential for ecosystem builders. You'll learn about ecosystems, human cooperation, trust, neutrality, and open society. Rather than being an exhaustive curriculum, the articles are a loosely connected journey that opens you up to a broader context and gives you theoretical foundations for building your project.

This document is a result of collaboration between:

> Swarm
- decentralized storage and communication system for a sovereign digital society

> theLivingCore
- knowledge and innovation architects rooted in cognitive science

We believe that in today's state of the decentralized, blockchain, and crypto world, it's crucial to take a step back and look at the bigger picture. We now see an environment ripe with fierce competition, where players are motivated by extrinsic motivation - the vision of getting rich.

We want to approach the challenge of building a thriving ecosystem by starting from virtues and purpose.

In this regard, Swarm wants to be different. We want to approach the challenge of building a thriving ecosystem by starting from virtues and purpose. We want to think consciously about how our technology can impact and advance society.

This is important, especially when building fully-encrypted systems like Swarm. When you can't control what your system is used for, your options for maximizing its positive impact are limited. You have to start by creating the right set of values and working to align the ecosystem's participants around them. You must enable its positive uses and engage people to develop an intrinsic motivation to do good.

By releasing this document, we want to start a movement. One that will attract those of you who want to build decentralized ecosystems consciously and gradually change how the scene looks. So that purposeful technology will soon help people regain sovereignty over their data, identities, and lives.

PART A

Toolkit

Nine-step thinking process for
designing your ecosystem's strategy.

Starting Your Journey

On September 26, 1991, eight researchers locked themselves in a majestic *glass dome* in the middle of the Arizonian desert. Although light and electricity could enter the facility from the outside, it was otherwise a closed system, living its own life.

The goal was to answer whether humans can sustain themselves isolated on an extraterrestrial world. Can we build a functioning ecosystem from scratch? Will it be able to sustain itself autonomously?

The mission lasted until September 1993 – exactly two years and twenty minutes. It was a failure. Oxygen levels dropped considerably over time, crops fell short, cockroaches spread everywhere, and nitrogen levels rose alarmingly.

Further projects followed – and failed again. Scientists argued over what caused the ecological tipping. While it's puzzling and fascinating to search for an answer, there is one thing we have already learned. It's tough to build a functioning, self-sustaining ecosystem, and it can't be engineered from the top down.

The guide you are reading right now shares some of the ambitions of the above project. Its goal is to help you build a truly living, decentralized ecosystem. Only this time successfully, and in the digital world.

What does it mean to create an ecosystem in the digital world?

Let's first define a digital ecosystem. A digital ecosystem is a socio-technical system that, just like natural ecosystems, exhibits characteristics of spontaneous self-organization and systemic creativity. Hence, digital ecosystems are based on digital social interaction and value exchange.

There is another similarity between the challenge of building a physical biosphere and a living digital ecosystem. Both of them are (or should be) autonomous. They are not driven by an executive authority. They don't have an all-powerful leader. Their structures are decentralized – which takes us to this guide.

We designed this guide for those who want to build ecosystems owned, run, and governed by their members. Ones that are grounded in infrastructure that isn't owned by a single party be it a company or a government. It's owned by those who use and develop it. Just like the bits and pieces of a biological ecosystem, a digital ecosystem is embodied and brought forth by the living beings and objects that inhabit it.

Why should you use our guide?

For some time already, we have been noticing the shift of the general Web3 market into a profit-driven, zero-sum game that incentivizes the investment of precious energy and skills into projects with little added value or innovation.

More and more, however, the Web3 community is starting to recognize that the future of the internet needs to become much more value-driven and support the positive transformation of society. One example is the *paper* co-authored by Vitalik Buterin, which calls for new Web3 features encoding social trust. With the internet wielding such power and influence today, things can't be left up to chance.

Yes, things can be left to chance, and unexpected patterns and forms of interaction will emerge no matter what. But will they be driven by a strong purpose? Will there be a sense that this new ecology exists for a reason? And will it thrive and grow in the long term?

This guide addresses the challenge of making things happen "on their own" and helps you think about how to foster a sense of purpose. If you want to build a digital ecosystem that is decentralized and owned by its members but still allows desirable values to thrive, this guide is for you.

The 3 Principles of Digital Decentralized Ecosystems

Before you start working through the steps of this guide, we recommend you read the following principles you need to apply to succeed in building a living digital ecosystem. They don't come out of nowhere. They are based on the fundamental laws of theoretical biology and the groundbreaking insights of organizational systems science. Great thinkers such as *Stuart Kauffman* and *Hanne De Jaegher*, who reflect on the ecological and social nature of human systems, advocate for these principles.

1

Principle of Self-Organization

A genuinely living system organizes itself. The way it's structured is not imposed from the outside. Its identity is self-made, and its processes are circular.

2

Principle of Decentralization

A self-organized system arises from the sum of its parts. There is no central authority that manages everything. Subsystems might play different roles, but there isn't one that fully controls all others. For example, a cell might look like a centralized system with a defined nucleus - a core. But it only seems this way. In reality, it's a distributed system in which all parts must work together to keep it alive.

3

Principle of Emergent Creativity

Living systems are contradictory. On the one hand, they are conservative by preserving what already works. But on the other, they need to change to stay alive. They are constantly evolving. A living digital ecosystem will only succeed if it finds new ways to engage with a changing environment. Like a biological one, your digital ecosystem must create new niches - new ways of interacting and doing things. It must develop the ability to create new opportunities and prepare itself for the future.

We have built the above principles into every step you will take through our guide. We share them with you to be transparent and help you keep them in mind during your journey.

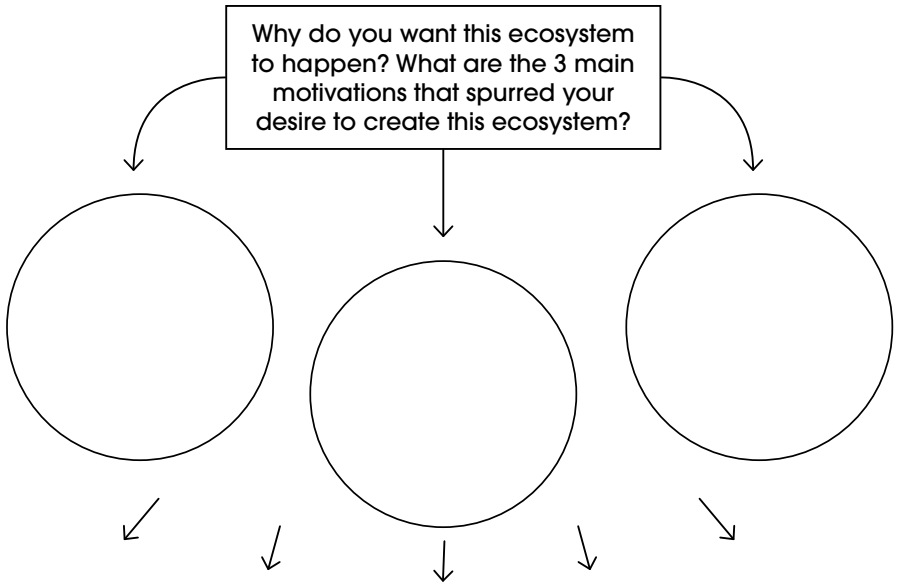
Let's take the first step into creating your value-aligned, decentralized, digital ecosystem!

1. Your Aspirations

Before you start laying the groundwork for a new ecosystem, you need to have a vision of where you want to go. What is it that you want to build? And what will be the reason for its existence? Who will be the likely members of your ecosystem and how do they relate to your motivations?

The goal is not to have a detailed picture of what your ecosystem will look like. Rather, the question is: as you dream about the future of your ecosystem, how will it realize the values you believe are most important to it? Though understand that you won't be able to impose them on a living ecosystem. However, they can guide its development and provide an anchor for the future.

This first step is about your personal take, your first thoughts on what journey you are starting, and where you are heading to.



WHY

What do you want to achieve?

Why should your ecosystem exist?

Why is there room in our world for your ecosystem?

FOR WHOM

Who will be the core players in your ecosystem?

What is the level of openness you intend for your ecosystem? How much should it be open towards the public and new members?

WHAT

What are you creating or starting?

What is new, special, or unique about your ecosystem?

What kind of ecosystem do you want to build? Is it a service platform, a marketplace, a community, or something else?

RECOGNITION

What would you like your ecosystem to be recognized for by people?

MANIFESTO

If your ecosystem were based on a three-line manifesto, what would it be?

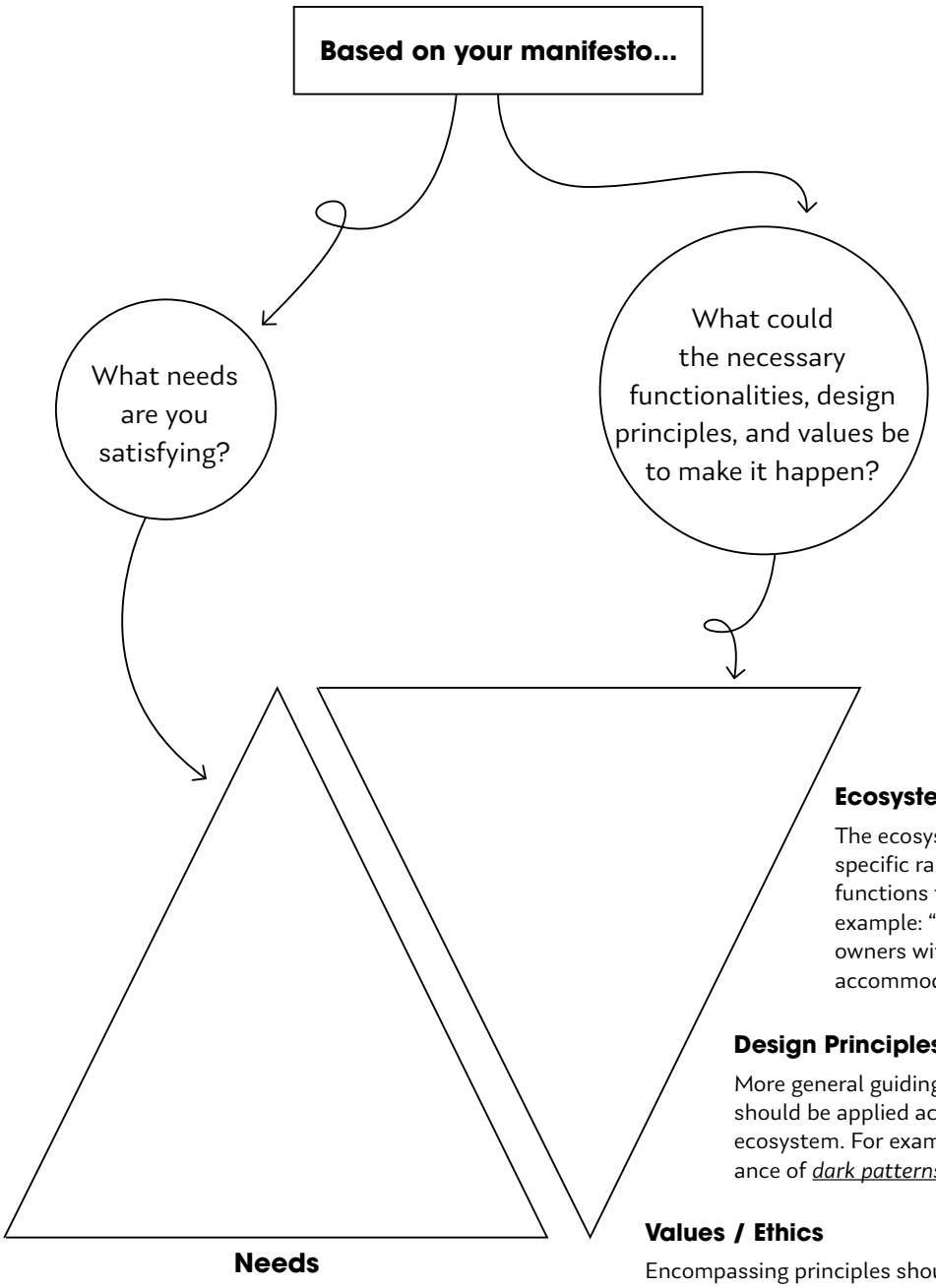
2. Building the Foundation

Based on the previous step, take a closer look at your project. First, answer the question on the left side of the template - what needs are you satisfying? Second, define functionalities, design principles, and values, which you will put into practice to match those needs.

Get inspired in Principles & Foundations

Regulations suck. But do they? Can we create a truly decentralized internet while making it work for everyone?

5. Democracy and Decentralization



Ecosystem Functionalities

The ecosystem should provide a specific range of operations and functions to fulfill its purpose. For example: “connecting apartment owners with people in need of accommodation.”

Design Principles

More general guiding qualities should be applied across the ecosystem. For example: “avoidance of *dark patterns*.”

Values / Ethics

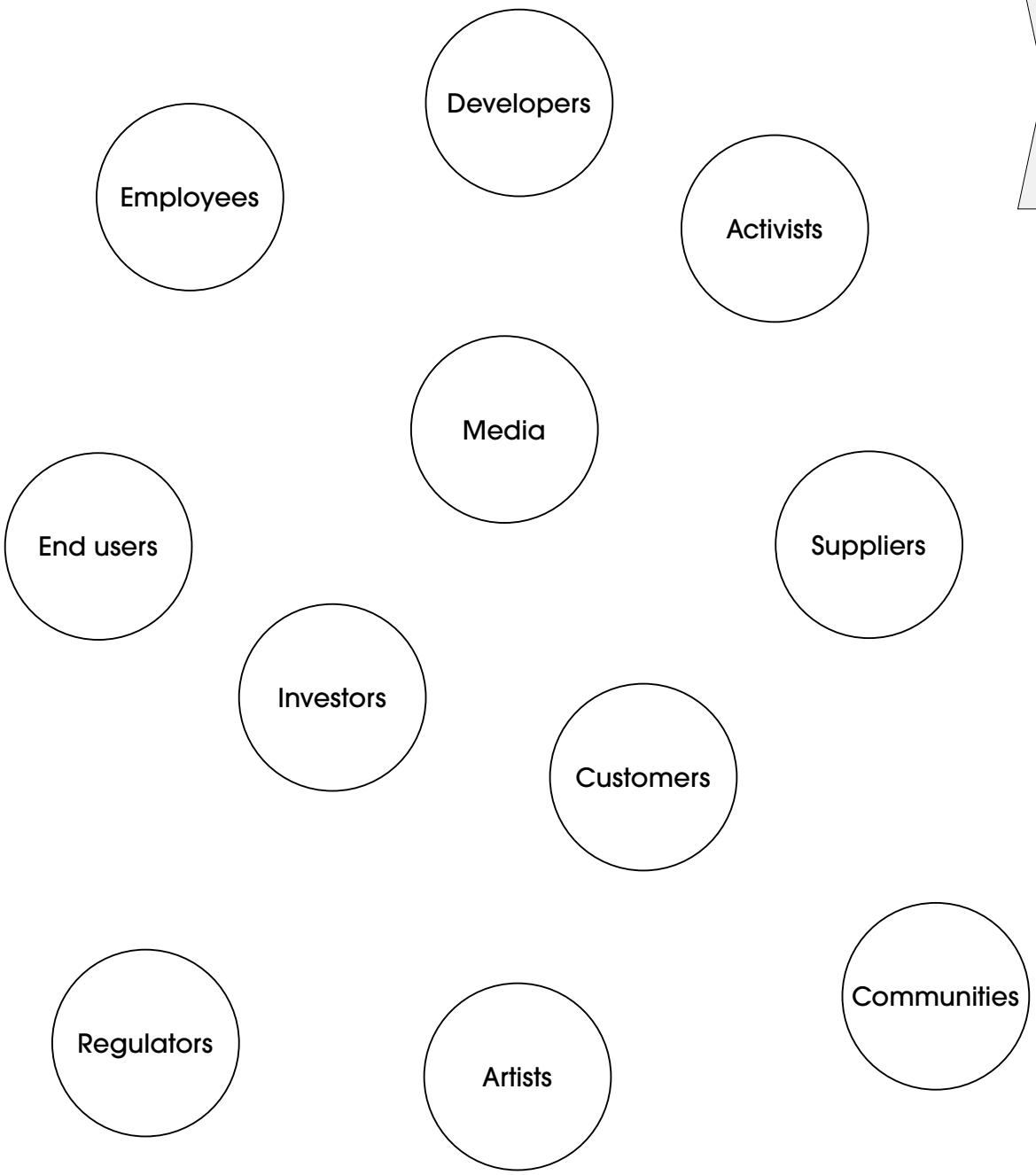
Encompassing principles should guide the overall strategy of the ecosystem and specific behaviors of the founders and ecosystem players. For example: “we maintain open-mindedness.”

3. Ecosystem Players

Understanding who you are designing the ecosystem for is crucial in its design process. Suppose you are to create an ecosystem that grows because people find it valuable. In that case, you first need to define what are their motivations, needs, and expectations, so that you can build an environment that provides and delivers on them.

1

Here are examples of different types of ecosystem players. Pick up to 5 most important ones for your project.
Ask the following guiding question: What ecosystem players does the ecosystem need to work?



Get inspired in Principles & Foundations

How can your ecosystem benefit from keystone species? How do living systems grow, and what do they have in common with digital ones?

1. How do Ecosystems Grow?

2

Create profiles of the selected players using the templates below. You will need these profiles in the next step - creating the ecosystem landscape.

Role:

How are they going to benefit from joining the ecosystem?

What do you expect from them? How should they contribute to the ecosystem?

What do they expect from you and others in the ecosystem?

How will they join the ecosystem?

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What do you expect from them? How should they contribute to the ecosystem?

What do they expect from you and others in the ecosystem?

How will they join the ecosystem?

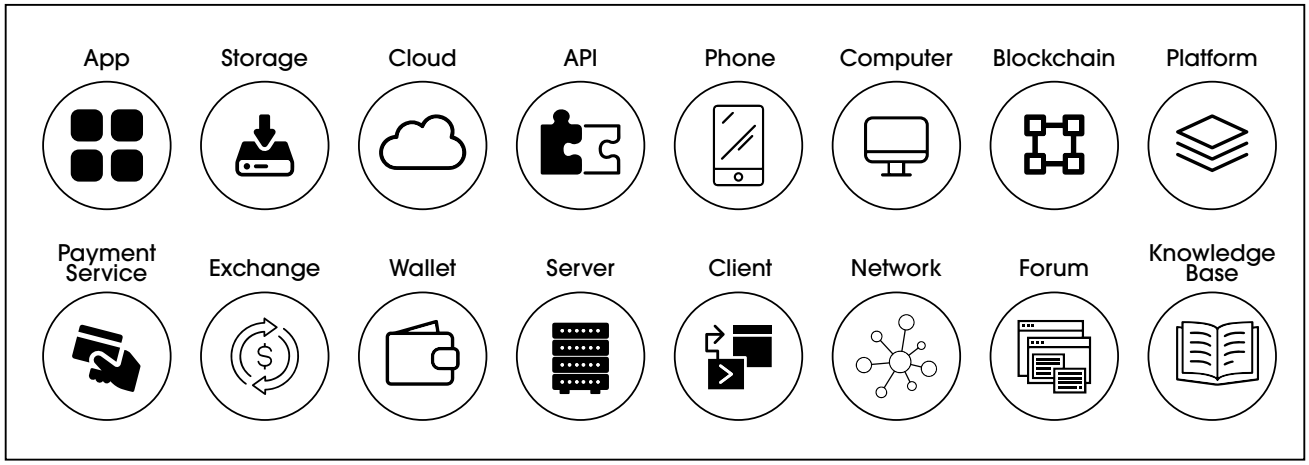
4. Ecosystem Landscape

If you want to explain your ecosystem, you will have to draw its map - its geography. It will answer questions like: How do groups of ecosystem players interact or contribute? How does value flow through the system? How does information flow through the system? Where and what are its borders?

1

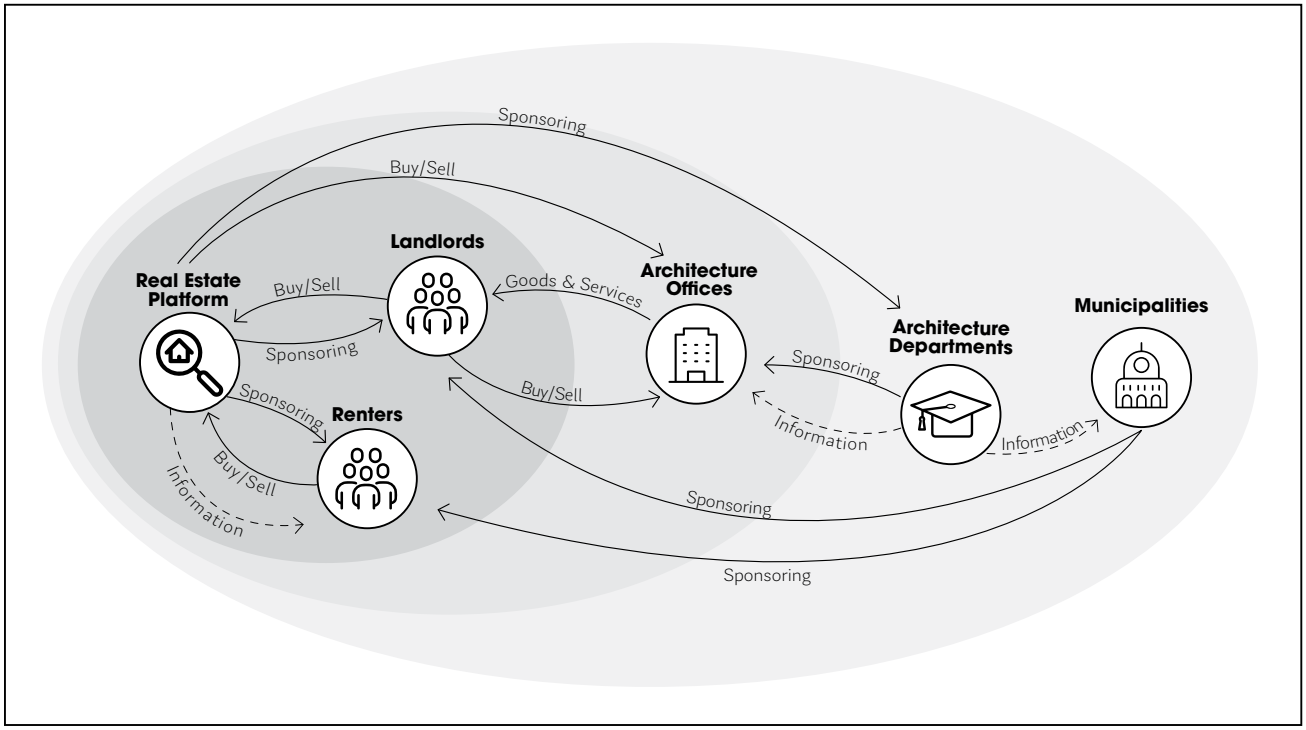
Prepare the stakeholders (from step III) and technical elements present in your ecosystem. You can pick them from the library below or create your own.

Technical Elements Library



2

Look at the below example of an ecosystem map. You will be drawing a similar one.



The map shows an ecosystem structure of a decentralized real estate platform focused on connecting apartment owners and renters. You will learn about why the specific elements are positioned where they are in the following parts of the process.

3

Lay the ecosystem players and technical elements on a map template below and mark the value flows between them. You will find examples in the value flows library below. Feel free to add your own or describe them more precisely. For example, when using the “knowledge and information” value flow, you can specify what kind of knowledge is provided.

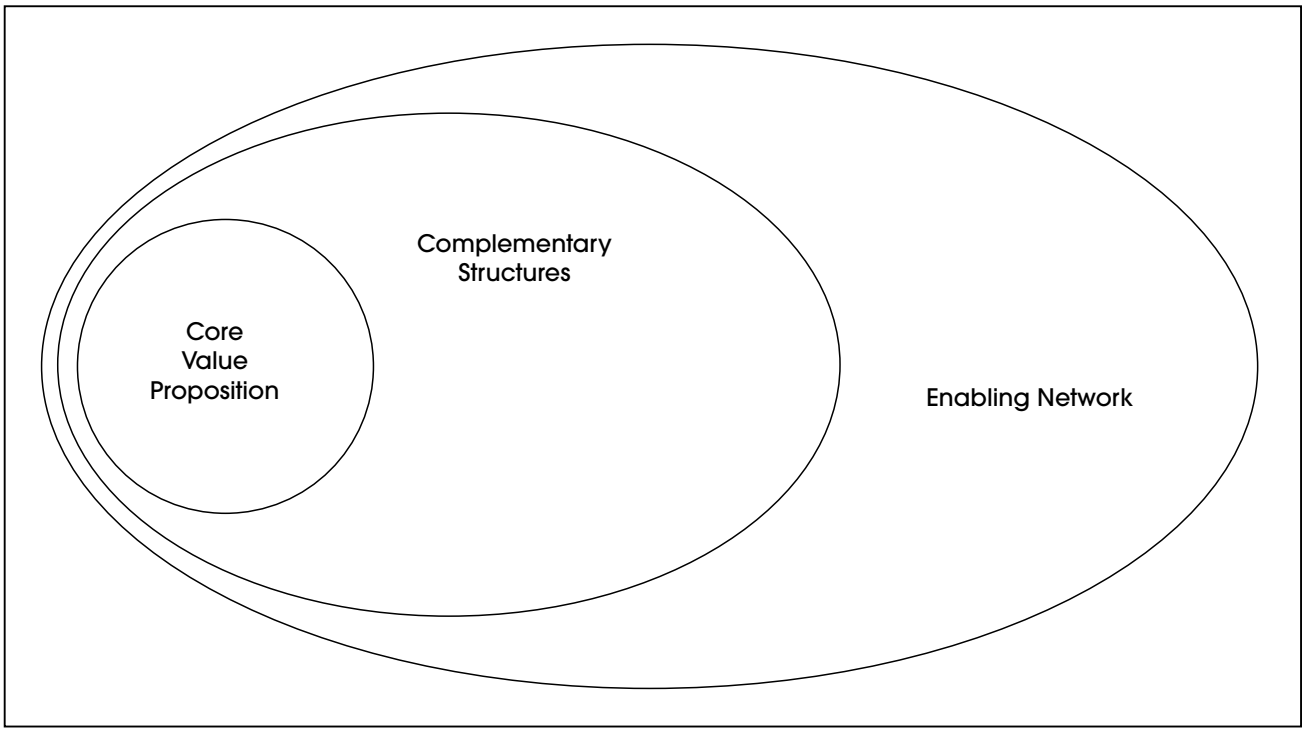
While laying the players and elements out, use these descriptions to decide which category they fall under, then place them on the template in the corresponding area.

Core value proposition:
Here, put the players and elements that form the ecosystem’s core. For example, if you are building an ecosystem around renting housing, the housing owners, the renters, and the platform that connects them without an intermediary will probably be positioned here.

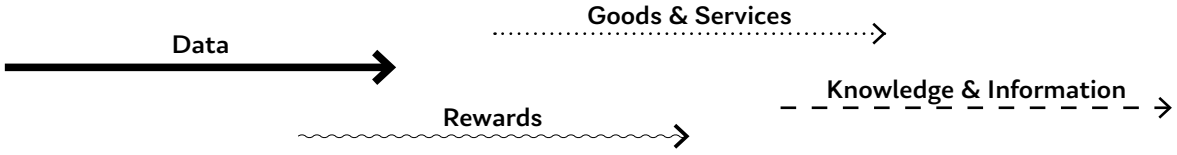
Complementary structures:
Into this area, put players and elements which support or bring added value to the ecosystem. Think about them as secondary, nice to have, exchanges of value. For example, while *Discord*’s initial focus was on creating gaming communities, it was also open to many other groups formed around hobbies or interests. After some time, these started to shift into the core value proposition area when Discord recognized this potential and started seeing itself as a more universal community platform.

Enabling network:
Here, put players and elements which create the conditions for the ecosystem to thrive. For example, regulators or authorities who create favorable conditions for self-organized structures enable the growth of such systems.

Draw your ecosystem map here:



Library of value flows:



Get inspired in Principles & Foundations

Should your ecosystem players be anonymous? What does it mean for the wider society? And how can surveillance be turned upside down?

4. Anonymity in the Crypto-sphere

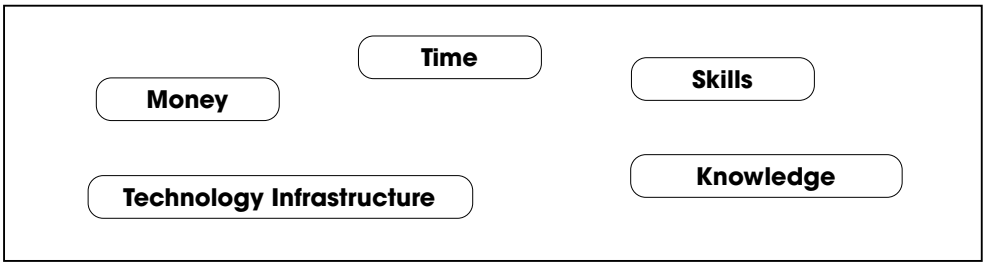
5. Economic Viability

An ecosystem sustainable in the long-term needs to provide itself with the necessary resources. In this step, you'll assess where resources will come from and where they will flow in your ecosystem. This way, you can discover potential gaps where resources might be lacking and make sure to cover them.

1

Look again at the ecosystem landscape map you created. Then mark the main streams of resources between the ecosystem players. Where do they come from? Where do they go?

Examples of resources:



2

Think about what sources will you use to jump-start the economic sustainability cycle. What resources do you need to start with?

What resources do I need at the start?	How am I going to obtain them?

Examples:

- Offering new members to buy a share of the ecosystem
- Organizing a crowdfunding campaign
- Asking members and fans for donations
- Asking members to volunteer their skills
- Getting a traditional investment or a loan from VCs, funds, or banks

Get inspired in Principles & Foundations

Everyone has heard of the "tragedy of the commons." But do commons have to fail every time? Or is there a way to make them work for the benefit of everyone?

2. Cooperating on Blockchain

6. Governance

In 2009, *Elinor Ostrom* won a Nobel Prize in Economics. She has traveled the world for many years and observed how communities manage scarce resources together.

Since the 1970s, people have often thought that if such "commons" are not privately owned or centrally managed by a government, they will get depleted because everyone will selfishly over-use them.

However, Ostrom has shown that the "*tragedy of the commons*" is not inevitable. She discovered that communities could sustainably manage their commons without falling for this trap. Based on her findings, she has created eight rules that communities need to follow to achieve that.

Because implementing them will help your ecosystem become a sustainably decentralized, self-governing community, we have selected them as a framework for the following exercise. *Here*, you can also see an example of their application in a blockchain smart contract project.

Look through Ostrom's eight rules described below and define how you will apply each of them to the governance of your ecosystem. You can answer this question by describing the culture, behaviors, rules, or infrastructure that will help you put the rules into practice.

1 **Commons should have clearly defined boundaries:** It should be clear who has access to your ecosystem, under what conditions, and where your ecosystem begins and ends.

How will you apply this rule to your ecosystem?

2 **Governing rules should match local needs and conditions:** Commons are context-sensitive, so people in the community should create the rules.

How will you apply this rule to your ecosystem?

3 **Decision-making should be participatory:** People affected by rules are likelier to adhere to them if they have participated in defining them.

How will you apply this rule to your ecosystem?

4 **The commons and their use should be monitored:** The community must develop a system for checking and monitoring the community members' use your ecosystem.

How will you apply this rule to your ecosystem?

5 **Sanctions for rule violators should be gradual:** Commons work best when they include systems of warnings, fines, and informal reputational consequences before banishing members from the resource for good.

How will you apply this rule to your ecosystem?

6 **Conflict resolution should be simple and accessible:** Members should be encouraged and enabled to bring up any issue so that problems can be solved by mediation rather than ignored.

How will you apply this rule to your ecosystem?

7 **Other authorities should recognize the commons:** Commons can only sustain themselves if their rules are recognized as legitimate by higher authorities under which the community falls.

How will you apply this rule to your ecosystem?

8 **Commons should be embedded in larger systems:** Many ecosystems and issues require large-scale cooperation and widespread responsibility to be managed successfully.

How will you apply this rule to your ecosystem?

7. Enabling Technologies

"Enabling" means allowing something to thrive independently and not through external intervention. It means creating the conditions or framework for a system to "self-actualize." Enabling technology is a prerequisite for your ecosystem to grow and thrive on its own. Think of technology not as the end itself but as a condition for achieving what your ecosystem is all about. Think of technology as an essential prerequisite for realizing your vision!

Get inspired in Principles & Foundations

Can blockchain networks learn from centralized solutions without compromising their core vision? If so, could it help them overcome their dilemmas?

6. Is Net Neutrality Important for Blockchains?

1

Looking back at the results of the previous steps, what technologies would best enable you to realize them in practice? What will you need to build the infrastructure of your ecosystem? Follow the steps below, which will guide you in the process:

a. **Identify the core technologies for your ecosystem - both specific ones and those critical to its existence. Put them on the canvas based on whether they already exist or whether you'll need to create them.**

b. **Identify the technologies which play a supporting role for your ecosystem. Put them on the canvas based on whether they already exist or whether you'll need to create them.**

	Exist	**Need to be created**
Core Technologies		
Supporting Technologies		

2

Take at most 3 of the core technologies you identified and place them on the impact canvas. For each of them, think about their potential for positive impact, as well as what could go wrong with them and cause a negative social impact.

3

In the fields below, write down what this means for your ecosystem - what you need to do to prevent the negative impact from materializing and ensure the positive impact takes place.

Core Technology 1		**Core Technology 1**		**Core Technology 1**	
Potential for positive impact	**Potential for negative impact**	**Potential for positive impact**	**Potential for negative impact**	**Potential for positive impact**	**Potential for negative impact**
What this means for my ecosystem		**What this means for my ecosystem**		**What this means for my ecosystem**	

8. Setting up Affordances & Spinning up the Network Effect

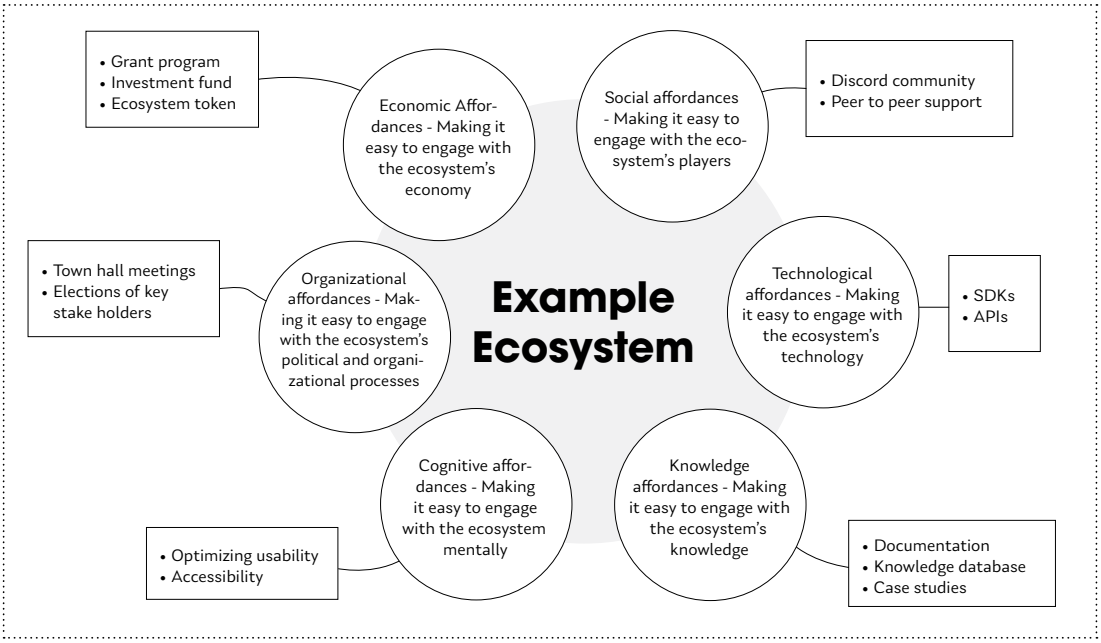
Setting up affordances

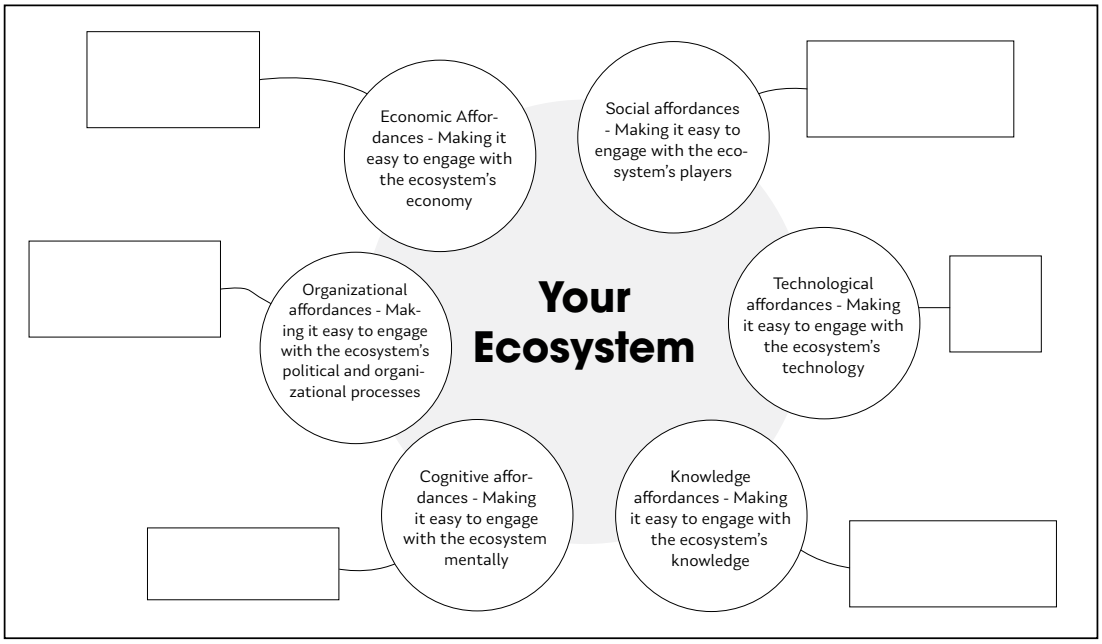
Affordances are parts or properties of an object (in our case, an ecosystem) which invite a person to make an interaction with this object. For example, a door handle is an affordance of a door that invites a person to open the door. A good affordance clarifies how to interact with an object and enables this action well.

In daily life, you often encounter confusing door handles, where it's unclear how to open the door or in which direction it opens. And a door handle that doesn't enable the afforded interaction would have sharp edges, be uncomfortable to use, or be hard to grasp with your hand. In the case of your ecosystem, affordances are points of contact or action that make it easy for people and organizations to join or interact with the ecosystem.

Think about different affordances you could set up to allow people to join your ecosystem with as few barriers as possible. Use the categories presented below and look at the provided examples. Look at step III of the toolkit and check if these affordances support all ecosystem players.

You can also think about what you want to achieve with each affordance, like enabling a sense of belonging, shaping positive habits, or something else.





Get inspired in Principles & Foundations

We won't build a good Web3 in separation. So how can we make things work with each other?

7. How Can Knowledge Ecosystems Benefit from Data Interoperability?

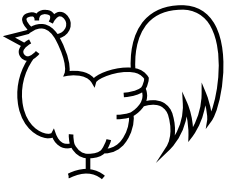
Spinning up the network effect

The network effect is a situation in which a value of an ecosystem for a newly joining player grows with the number of players already taking part in the ecosystem. For example, a social network like *Mastodon* becomes more and more attractive for new users as the number of already existing users grows.

This is a challenge for many new ecosystems, as initially, they might not be as attractive as the established ones with strong network effects. This is called the "chicken and egg problem," and most new networks need to overcome it.

In this chapter, we will look at the different tactics for overcoming the chicken and egg problem and kick-starting the growth of your ecosystem.

Look at the provided tactics for overcoming the chicken and egg problem and thus spinning up the network effect - allowing your ecosystem to grow itself by attracting new members. Pick one or multiple of them, read their descriptions and describe how you will put them into practice in your ecosystem.



Overcoming the chicken and egg problem

Niche focusing

Niche focusing is a tactic where you temporarily select a smaller group of users within which you will market your ecosystem. This helps it achieve a reputation of a "successful" ecosystem sooner and helps you further broaden the scope to users from other groups.

For example, *Facebook* started as a network where only Harvard students were allowed. Later, they let students from other universities join and then broadened the criteria further to students of high schools too.

Identify a group/community in which your ecosystem can kickstart effectively.

How can you create an initial value offering for one stakeholder group which is not dependent on the presence of other stakeholder groups?

How could you narrow down your project's initial niche/ target group to gain popularity (network density) within it? What would define this niche? What are their specific needs?

Spear-heading

Spearheading is a way of building positive market expectations around your ecosystem by creating a demonstration of its value and viability. It also signals that you are invested in the ecosystem yourself.

Usually, the founder builds the first product or creates the initial content on the ecosystem. For example, a founder of a blogging platform might also start their own blog on it at the beginning. Or a company building an operating system would also make the first software that runs on it.

Think about how you can "eat your own dogfood" first!

What spearhead product could you create?

What qualities of your ecosystem will the product/service demonstrate?

What spearhead product would have a true potential to become a "killer app" in its niche but at the same time, wouldn't threaten potential partners too much?

Incentives

Incentives provide a direct motivation for joining the ecosystem by giving something of value in exchange for participation.

There are many possible incentives, such as grant programs, venture funds, or referral rewards.
However, incentives can also be non-financial. They can include gamification systems, public recognition of the participants, or supporting them in building on the ecosystem.

For example, an application ecosystem might provide technical, hiring, or marketing support to developers who build apps on it.

How do the members and stakeholders like to be rewarded?

How can people engaged in the network be rewarded socially and in other ways than financially?

For example:
- Through recognition
- Gamification
- By reminding them of the purpose/values they are helping to put into practice
- By supporting them in building on the ecosystem-technical, marketing support...

How do you make progress visible to the community?

How could you incentivize stakeholders to bring new people into the ecosystem?

Partnerships

Partnerships build positive market expectations by providing social proof, demonstrating that there are already others who see the value of an ecosystem.

They are also a good way of building spearhead products when the ecosystem founder can't do so.

For example, a blockchain platform might partner with existing organizations to transfer their systems to the blockchain. Then, it would use this fact to communicate the platform's value.

Who are the key allies you need to give birth to your ecosystem?

Who could be considered your ally? Do they know about it? Do you have a relationship?

How will you select the partners?

What unexpected partnerships could you benefit from?

How will you benefit from the partnerships?

What do you expect from partners?

What can you provide to partners?

Building positive expectations

Positive market expectations can be also built by more direct methods, such as investing the founder's money into the development of the ecosystem and communicating a long-term commitment to the project.

Explain the long term potential of, and commitment to your (growing) ecosystem!

How will you help people discover the long-term potential of your project?

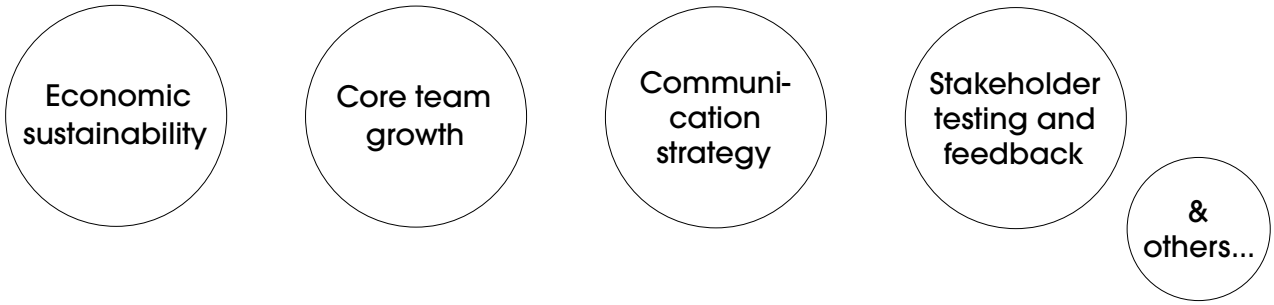
How will you signal your commitment to the project in the long term?

What investments will you make into the ecosystem? How will you communicate them?

How will you build market trust in your ecosystem?

9. Fin

Now the real journey starts. There are multiple things you'll need to do to make your project a reality. You will need to further consider areas like:



We want to leave you with one more thing that will help you communicate your project: finding a metaphor or analogy for your ecosystem. Below, you will find some examples of such metaphors.

Swarm: With the Ethereum blockchain as the CPU of the world computer, Swarm is best thought of as its "hard disk".

Swarm is like a city street: The infrastructure is the environment of the street. If it's designed well, it enables high-quality interactions between people, flourishing shops, and social spaces.

Your ecosystem's metaphor:

Further Guiding Questions

One last bonus from us is a set of guiding questions you can use to work with your ecosystem further and shape it in practice.

1 Economic sustainability

- What is the overall economic model to make the ecosystem self-sustainable?
- What is your best guess on how the ecosystem will evolve in the next three years (market, technology, existing alternatives, ecosystem player needs, compelling solutions)?
- What are essential cost and income items (best guess on the potential number of participants, total income potential), and how could your ecosystem cover the costs?
- Who are the key ecosystem players, how do they contribute, and how do you secure the ecosystem´s independence?
- How can you set up funding in a long-term way that allows for risk-taking and does not jeopardize the project´s vision?

2 Hiring / growth of core members

- Remember that the first co-workers are the most important ones since they tremendously impact the ecosystem´s culture.
- What mindset and values would you like to see among your collaborators?
- How do these values translate into observable actions and behaviors?
- How could you organize the collaborator selection process to identify these values and behaviors among applicants?
- How could you prevent the core members from being too much of the same?

3 Communication & marketing strategy

- What do you want to achieve by communicating this ecosystem project? Create a coherent human-centered compelling story.
- What are your core message and your shared understanding of what you want to communicate?
- To whom (different stakeholders and ecosystem players) do you want to communicate what kind of messages?
- When do you want to communicate what? Draft a communication schedule (who, what, when, how).
- How do you maintain visibility across all ecosystem projects so that potential players learn about the project?

4 Prototyping and feedback

- Make the ecosystems´ hypotheses/assumptions explicit and, based on them, develop questions you should explore.
- Build prototypes (artifacts and experiences) that will solicit feedback on these questions you want to explore about your ecosystem.
- Test your ecosystem with real people (for example, early adopters) and determine if they want the solution and how it could work.
- Revise your ecosystem project based on the insights and feedback from prototyping and testing.
- Draft a rollout plan indicating the next steps forward (required capabilities, ecosystem partners, making pilots, prioritization of work, and so on).

Good Luck!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