

Financing Transitions

Foreword

The transition to a sustainable economy is one of the greatest challenges of our time. We know what is at stake, yet the pace of change still lags behind what is needed. Not because we lack ambition, but because systemic change often meets deeply rooted barriers – and financing is a key part of that puzzle.

This report on financing transitions clearly outlines the obstacles faced by the financial sector in enabling sustainable transitions. At the same time, it offers perspective: thoughtful solutions and new ways of thinking and acting. It is a valuable contribution to the ongoing conversation about how financial flows can be better aligned with long-term value, societal impact, and ecological limits.

What strikes me personally is that we already have so much knowledge and insight – and yet we still struggle to accelerate together. That is precisely why I believe in the role of Nyenrode and TNO as a bridge between research and practice. In the collaboration between them and others we can establish a place where critical questions are explored, new ideas emerge, and meaningful impact is fostered.

We warmly invite you to work with us to further develop the solutions we need. Let us join forces, share knowledge, and build financing systems that do not delay the transition, but enable and accelerate it. The time to act is now – and only together can we move forward.

With sincere regards,

Micky Adriaansens

Chair of the Executive Board. Nyenrode Business Universiteit

Next steps for interested organisations



Collaborative Experimentation



Capacity Building



Learning Networks and Policy Innovation

To move beyond the current barriers, TNO and Nyenrode want *to adopt an approach that combines experimentation with collective learning together with you*. It will help us and organisations that aim to accelerate transitions to bridge the gaps between emerging innovations and their scaling potential. We propose the following next steps:

Collaborative Experimentation

Initiating joint experiments between entrepreneurs, public and private organisations to test and refine new business models. These pilots will serve as living labs, where stakeholders can assess real-world challenges and opportunities, adapting solutions based on direct experience. This co-development approach will ensure alignment between the financial sector and the long-term, cross-sectoral goals of the transition to climate-neutrality

Building Learning Networks

Creating platforms for continuous learning among investors, entrepreneurs, municipalities, NGOs and policymakers. These networks will foster cross-sector dialogue, enabling the rapid exchange of best practices and insights gained from experimentation

Policy Innovation and Alignment

Working closely with policymakers to co-design policy frameworks that align with the needs of emerging technologies and business models. This collaboration will help mitigate systemic inertia and ensure that incentives and mechanisms support long-term sustainability goals.
By embracing experimentation and learning together, we can overcome the barriers to investment, create a more inclusive and resilient financial ecosystem, and accelerate the systemic change required to meet our climate and sustainability goals

Disclaimer

DISCLAIMER

This report is the result of a collaboration between TNO and Nyenrode. The report is based upon preliminary desk research, the analysis of experts of both TNO and Nyenrode and externally validated in a workshop bringing together experts and practitioners with knowledge and experience in the field of transitions, value chain development and finance

This report is built upon preliminary desk research, the analysis of experts of both TNO and Nyenrode and insights gathered during the workshop, covering the identified barriers, various case studies, potential solutions, and most importantly, possible options for conducting experiments to advance the industry and our collective insights. The potential solutions presented are in no way exhaustive and exploratory in nature based upon insights from the workshop, expert analysis and desk research

Importantly, this should not be seen as the conclusion of years of research, rather as the beginning of a stronger positioning and collaboration of both institutes towards new approaches for financing transitions

This report is intended to provide a general overview of transition finance and is therefore focused on overarching high-level concepts and sector agnostic. Real world examples for specific sectors are included at the end of the report

This report is written from the perspective of private investors and the barriers that private investors face when allocating capital towards early-stage transformative industries. It is aimed at the further strengthening of the knowledge base around this topic

Executive Summary (1/4)

What barriers are preventing private capital from flowing into climate-neutral transitions, and what potential solution pathways can address these challenges to support the scaling of sustainable value chains and bridge the valley of death for green entrepreneurs? These are the central questions of this report. To answer these questions, this report provides a high-level overview of the current financing landscape, it highlights the barriers that investors face and explores potential solutions for the financing of climate-neutral transitions

Barriers

This report highlights four critical barriers to scaling and accelerating private investment in the green transition towards a climate-neutral economy : *Risk/Reward Imbalance*, *Policy and Regulatory Risk*, *Culture*, and *Governance*. Early-stage transformative ventures often exhibit high uncertainty and unclear revenue prospects, creating a (sometimes perceived) **risk/reward imbalance** relative to other potential investment opportunities. **Policy and regulatory risk**, stemming from shifting regulations or uncertain long-term government commitments, can also undermine investor confidence. **Cultural factors** within the financial sector, including risk aversion and a preference for incremental innovation, reinforce a conservative investment approach. Finally, **Governance** constraints such as fiduciary duties, strict investment mandates, and limited standardisation of Environmental Societal and Governance frameworks and impact metrics limit institutional investors from engaging with high-risk climate-neutral transitions



Risk / Reward
Imbalance

Policy and
Regulatory Risk

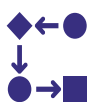
Culture

Governance

Executive Summary (2/4)

To effectively mobilize private capital into early-stage sustainable transformative industries, a range of targeted solutions is needed to address the risks and structural barriers currently limiting investment. Some potential mitigation options were identified and explored (*The potential solutions presented are in no way exhaustive and exploratory in nature based upon insights from the workshop, expert analysis and desk research*)

Potential Mitigation Options



De-Risking



Blended
Finance



Size
transformation
& Capital
aggregation



Impact
Measurement

- **De-risking instruments** including financial guarantees, blended finance, and concessional lending, help align the risk-return profile of early-stage investments with investor requirements
- **Blended Finance** by deploying public capital under softer conditions, blended finance catalyzes private investment in sectors and technologies where market solutions alone are not yet viable
- **Size transformation and capital aggregation** enable participation from both large and small investors through bundling, securitisation, and structuring investments into scalable format, improving market access and capital efficiency
- **Enhanced data and impact measurement transparency** assist in reducing due diligence complexity and aligning sustainable ventures and project with investors' internal sustainability criteria and regulatory frameworks, thereby increasing confidence in emerging sectors

Executive Summary (3/4)

Potential Mitigation Options



Policy Risk &
Uncertainty:
Adaptation &
Mitigation



Market
Creation



Early
Involvement of
Investors



Impact Private
Debt

- **Policy and regulatory risk mitigation** through long-term, stable regulatory frameworks and predictable support mechanisms is essential to reduce uncertainty and build investor trust in transformative sectors
- **Market creation through demand-side policies and signaling** helps address market failures and create a level playing field, stimulate demand, and improve revenue certainty
- **Early investor involvement** enables alignment on governance, impact strategy, and commercialization pathways from the outset, increasing a sustainable venture's investment readiness and long-term scalability
- **Impact Private Debt** impact private debt can play a crucial role in addressing financing gaps for projects that fall outside the scope of both traditional equity investment and conventional bank financing

Executive Summary (4/4)

Potential Mitigation Options



Venture Debt



Alignment of
Returns with
Impact
Performance

- **Venture Debt** addresses a financing gap for companies that have secured initial equity funding but require additional capital between equity funding rounds to scale operations
- **Alignment of financial returns with impact performance**, such as tying carried interest* to ESG outcomes, strengthens accountability and ensures fund manager incentives reflect both financial and sustainability goals

Next Steps

To overcome barriers to investment and accelerate the transition to climate neutrality, we invite stakeholders from the financial sector, industry, government, and civil society to engage in joint experiments, continuous learning, and policy co-design

By working together to test innovative business models, share insights, and align regulatory frameworks, we can create a more resilient financial ecosystem adapted towards supporting long-term sustainability goals

* The share of a fund's profits that a fund manager earns as compensation, only after returning the original capital and a minimum return (hurdle rate) to investors

Financing Transitions

Setting the Scene



Scope and Objective

This report provides a high-level overview of the current financing landscape for early-stage, mission-oriented transitions, that are transformative and critical to achieving sustainability and circularity goals

Its objective is to build a shared understanding of the financial ecosystem, the roles and motivations of various private investors, and the barriers they encounter when investing in climate-neutral transition-related innovations and value chains. By doing so, the report aims to lay the groundwork for collaborative exploration of strategies to unlock and direct more private capital toward the systemic transitions our economies urgently require

Specifically, this should not be seen as the conclusion of years of research, rather as the beginning of a stronger positioning and collaboration of both institutes towards new approaches for financing transitions



Target Group

Stakeholders directly involved in the development and scaling of early-stage sustainable transformative sectors, such as entrepreneurs, project developers, policy makers, cities and ecosystem builders

The goal is to join forces to connect, collaborate, and co-create financing pathways that accelerate the scale-up of mission-driven innovations and drive systemic change



Definition ^{1,2}

In this report Financing Transitions is defined as “financing of ventures, projects and investments driving forward mission-oriented transitions that enable the net-zero transition and climate-resilient development”

Introduction of Financing...

“ The green transition towards a climate-neutral economy is a key challenge for the EU and requires substantial investment to 2030 and beyond.” ³

To reach the goals of the Paris Climate agreement trillions of dollars of investments in mission-oriented transitions is required. The European Union alone needs to approximately invest **an additional** EUR 400 billion **annually** to achieve its goal of cutting emissions by 55% compared to 1990 levels.³ For the Netherlands, Planbureau voor de Leefomgeving (PBL) has estimated that around €200-300 billion of investment will be needed between 2020 to 2040 to achieve emissions reduction of 80-95% from 1990 levels by 2050⁴ (PBL, 2020).

Public funds are however not sufficient to finance the required economic transformation towards a climate-neutral economy in The Netherlands and the European Union.⁵ In the past roughly 20% of Europe's investments have originated from public funds, with the largest share coming from the private sector.⁶ It is, therefore, imperative that significant private investment from a variety of private financial institutions (e.g. Venture Capital, Private Equity, Commercial Banks, Institutional Investors) is required to achieve the transition of our economic system towards a climate-neutral economy.

However, despite their importance, the existing financial ecosystem is facing a range of barriers and challenges that is limiting the amount of private investment flowing towards the climate-neutral transition. Addressing these barriers is essential to mobilize the private sector investment required to meet climate and sustainability goals.

To achieve a structural transformation of our economies towards sustainability and circularity it's crucial to understand the transition process, build and scale value chains, and mitigate the challenges investors face in helping 'green' entrepreneurs bridge the Valley-of-Death towards market impact.

...Transitions

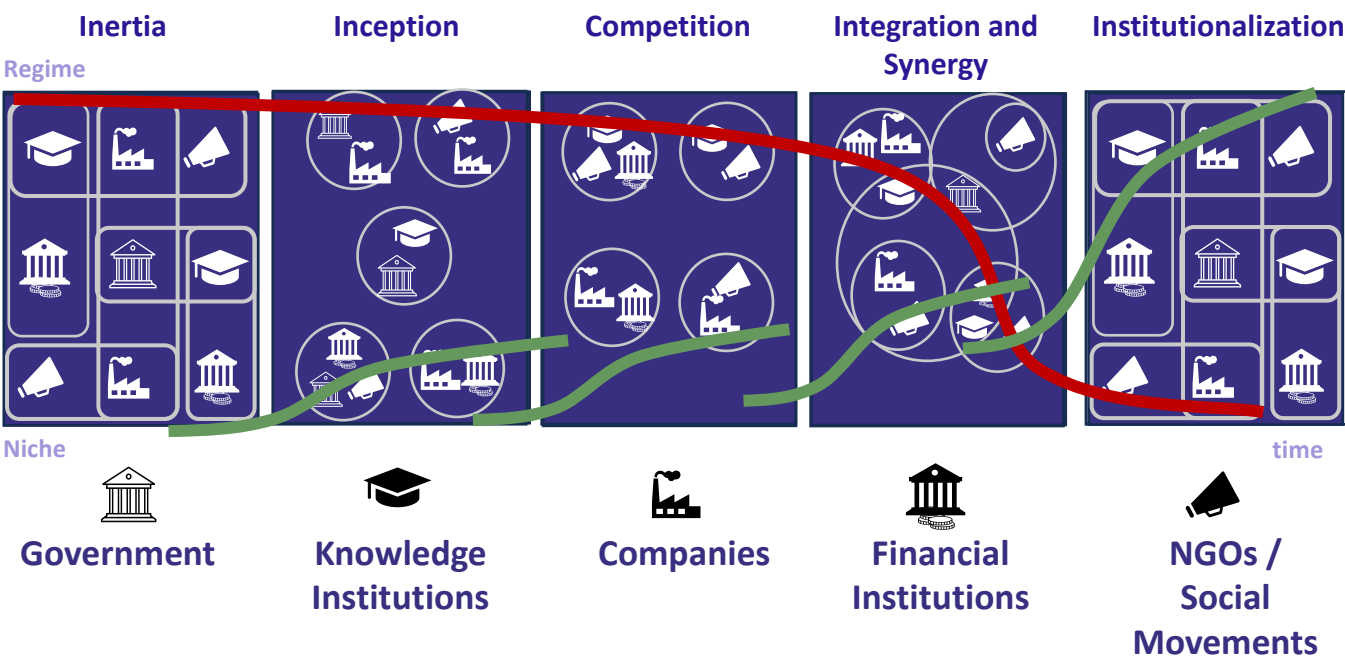
Yet the challenge is not only one of mobilizing capital at scale, but also as much about ensuring that this capital **reaches the right places**. Policymakers and regional transition leaders seeking to steer change, encounter systemic inertia: the mechanisms and incentives of the current ecosystem are often misaligned with the long-term, cross-sectoral, ambitions of mission driven transitions.

Similarly, entrepreneurs developing breakthrough sustainable technologies and business models frequently **struggle to access the early-stage capital and tailored financial instruments needed to move beyond pilots and enter markets at scale**.

These frontrunners are not just building individual businesses, they are laying the groundwork for entire value chains that could drive systemic change. However, **they face a paradox**: the transformative nature of their work, places them outside the bounds of conventional finance, even as their innovations are central to the future climate-neutral economy we aim to build.

It is at this crossroads, of transitions and finance, where expertise meets the urgent challenge of shaping and accelerating transitions that TNO and Nyenrode have come together. This report shares the barriers we’ve encountered, the insights we’ve gathered, and the solutions we believe are worth exploring. **With you. Because transitions are not built alone, they are learned and led together.**

Transmission Framework *



Source: *The framework is taken from : transmissie-raamwerk-juni2023.pdf

Outline of the Report



Investment Landscape

An overview of the different types of investors, investment stages and the flow of investment in the financial ecosystem



Barriers

Explanation about barriers that investors face when investing in transitions and we identified the **critical** barriers



Overcoming the Barriers & Next Steps

A first inventory on potential mitigation strategies to overcome the barriers and approach for next steps



Real World Examples

We have collected six examples to show some of the challenges that are faced and how they have overcome these barriers to get financed

Goal

To help better understand and navigate with the financial ecosystem

Goal

Increase understanding of the main challenges private investors face when investing in early-stage transformative industries

Goal

To provide insight into practical solutions that can help attract more private investment

Goal

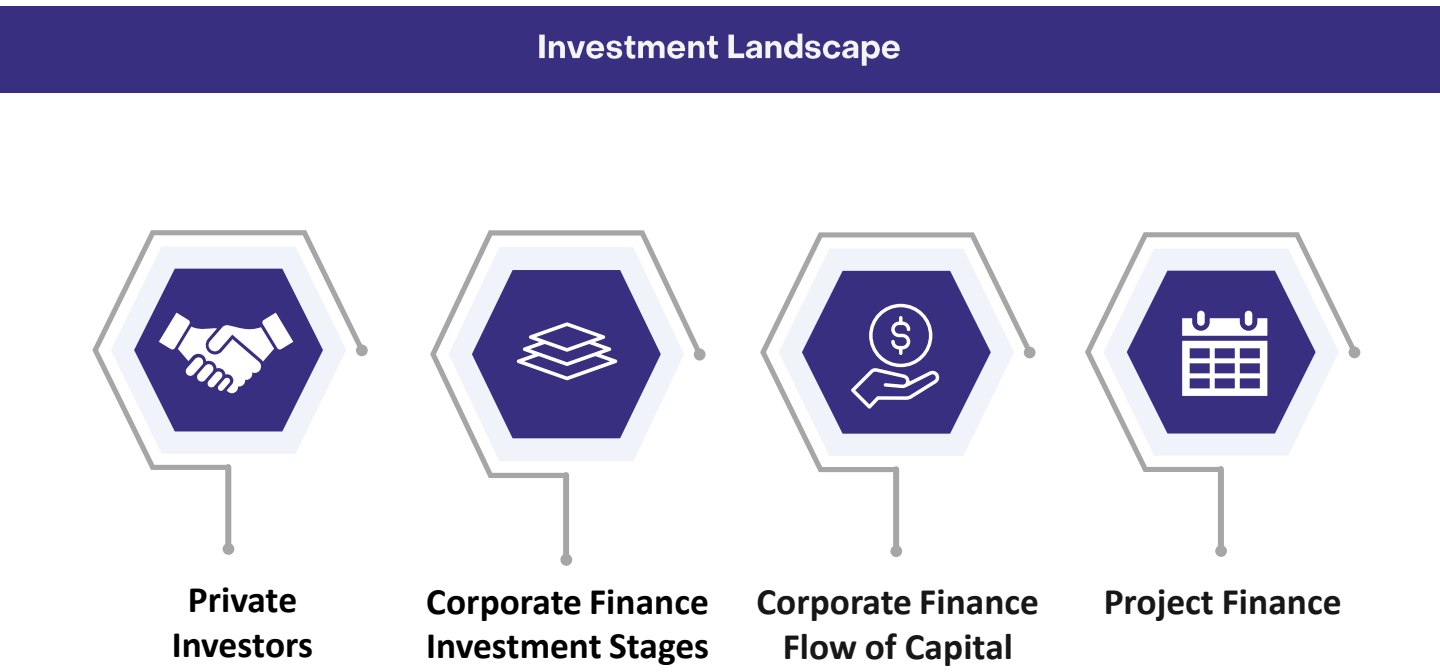
To demonstrate how investment barriers and solutions play out in practice, offering real-world insights to learn from

For definitions of key terms used throughout this report, please refer to the Glossary on page 64



Investment Landscape

Investment Landscape



Description
<p>This section provides a generic overview of the investment landscape including the key types of private investors active within the financial ecosystem, outlining their respective investment preferences, return expectations, and risk profiles. The presented investment landscape is broadly applicable across sectors and the same principles also apply to sustainable and transition-focused investing, where the flow of capital supports the development of technologies and transformative business models towards climate neutrality</p> <p>It also details the stages of corporate finance, from seed funding to growth and expansion, and highlights which investor types typically operate at each stage</p> <p>This section also describes how capital flows through the financial system, illustrating how funding is mobilised from large institutional sources and allocated down to innovative ventures through intermediaries such as fund managers and financial instruments</p> <p>Finally, Project Finance is described, providing insight into the activities for both investors and project developers during the different stages of a project lifecycle</p>

Types of Financing

Types of Financing

Corporate finance and project finance are the two primary approaches used to fund companies and projects. In the context of financing transitions each approach offers different advantages for supporting the development and scale-up of sustainable solutions



Corporate Finance

Corporate finance involves raising capital based on the overall financial health and outlook of a company, including its revenue model, profitability, cash flows, and strategic positioning, and is used across all stages of growth, from early-stage development to full-scale deployment

Corporate finance is raised at the company level, backed by the overall financial health and assets of the firm



Project Finance

Project finance is often used for large-scale capital-intensive projects that require significant upfront investments

Funding usually comes from equity and loans that are repaid from the income generated by the project

The funding is raised specifically for a standalone project, with repayment and risk tied to that project's future cash flows and performance

Equity Investors*

Angel Investor	Early Venture Capital
<div>Provides financing at earliest concept stage</div> <div>Ticket size € 25k – € 250k*</div> <div>1% to 25% Equity*</div>	<div>Provides financing at early stage even if there is no or little revenue / profit</div> <div>Ticket size € 25k – € 5m*</div> <div>5% to 30% Equity*</div> <div>Average investment horizon 7 - 10 years *</div>
Venture Capital	Private Equity
<div>Provides financing at commercialization stage</div> <div>Ticket size € 500k – € 50m*</div> <div>10% to 30% Equity*</div> <div>Average investment horizon 3-7 years*</div>	<div>Provides financing at mature stage</div> <div>Ticket size € 10m – € 100m*</div> <div>10% to 80% Equity*</div> <div>Average investment horizon 3-7 years*</div>

Source: [Private Equity vs Venture Capital vs Angel Investors – BDO](#)
* Note: Indicative: This represents an indication of an average range, values may vary

Institutional Investors*

<div>Commercial Banks</div> <div><div>Provide Commercial Debt Financing</div><div>Variety of Debt Instruments</div><div>Costs are lower than Equity</div><div>Require Collateral</div><div>Costs are between 3% to 10% per year</div><div>Low risk appetite</div></div>	<div>Pension Funds</div> <div><div>Indirectly Invest in Debt Securities and Equities</div><div>Indirectly Invest in Alternative investments such as Real Estate, Hedge Funds and Private Equity</div><div>New trend is that pension funds are exploring to make direct investments</div></div>
<div>Asset Managers</div> <div><div>Invest money for clients such as Institutional Capital into:</div><div>Debt Securities</div><div>Equities</div><div>Alternative investments such as Real Estate, Hedge Funds and Private Equity</div><div>Fund of Funds</div></div>	<div>Insurance Companies</div> <div><div>Invest in Debt Securities</div><div>Common Stocks</div><div>Long-term investments</div><div>Fund of Funds</div><div>Private Equity and Venture Capital Funds</div></div>

Corporate Finance

Corporate Finance



Corporate Finance

Description

Corporate finance refers to the capital raising activities of a company, where funds are secured based on the overall financial health, business model, revenue streams, and creditworthiness of the firm. It typically involves a mix of debt and equity financing, with repayment obligations linked to the company’s overall cash flow and balance sheet, rather than the performance of a specific project

Corporate Finance in Financing Sustainable Transitions

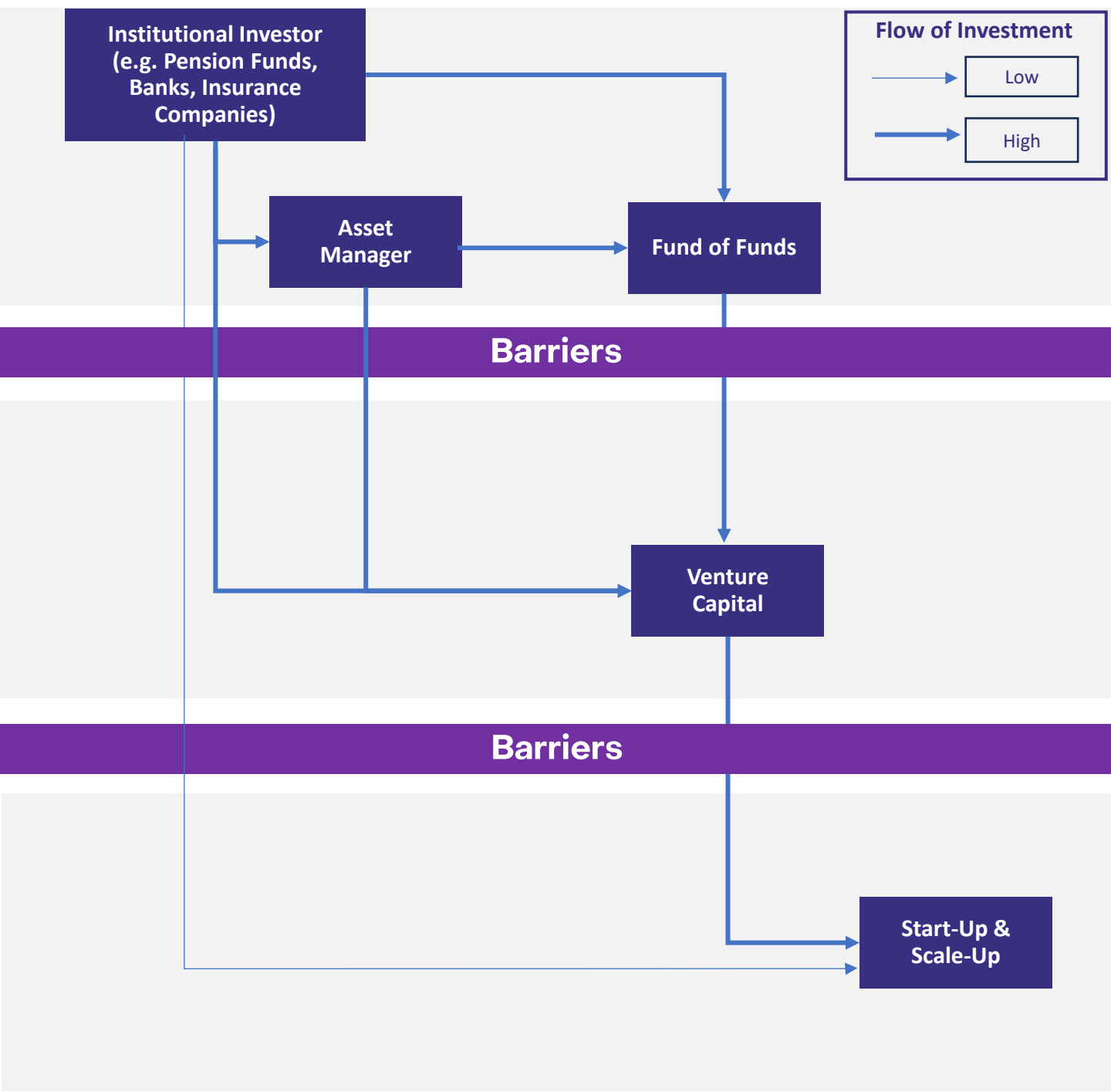
Corporate finance is well-suited for companies pursuing long-term sustainability strategies, as it allows firms to raise capital based on their overall financial strength, business model, and growth potential

Corporate plays a role in financing sustainable transitions by providing the capital needed for innovation, scaling, and long-term strategic planning. It enables companies to invest in R&D for clean technologies, transform business models to align with sustainability goals, and de-risk early-stage innovations

Corporate Finance - Investing Stages

Stage	Pre-Seed	Seed	Series A	Series B	Series C	Non-equity Funding
Description of the business stage of the start-up	Pre minimum viable product development	Going from business concept to an operational business	Minimum viable product in place and starting to generate sales and market interest	Strong growth in sales with high potential for further growth and profit	Robust business model with strong revenue growth and profit	Funding without taking stake in the company, means to keep control for shareholders
Use of Funds	Financial support to turn a business idea into reality	Refine product, build prototype, hire employees,	Scale the business and expand operations	Further scale the business, e.g. infrastructure , adding product lines, new markets	Further scale the business, e.g. infrastructure , adding product lines, new markets	Can be implemented at various stages
Type of Private Investor	Angel Investor (incl. Founder, Family, Friends)	Angel Investor, Early-Stage Venture Capital, Incubators	Venture Capital, Super Angel Investors or Institutional Investors	Venture Capital, Super Angel Investors or Institutional Investors	Venture Capital, Private Equity, Commercial Debt	Government, grant providers, banks or other debt financiers
Funding Size*	€25k – €250k	€500k – €2m	€2m – €15m	€10m- €20m	€50m – €100m+	

Flow of Investment



The flow of investment could be represented in 3 layers. These investment flows are however impeded by certain barriers faced by the stakeholders. Understanding this flow of investment and having an overview of where bottlenecks occur helps to identify targeted interventions to overcome the barriers

Project Finance

Project finance



Project Finance

Description

Project finance is used primarily for large-scale infrastructure, energy, and industrial projects. It is a form of off-balance sheet financing, which raises funds based on the future cash flows of the project. The financing is typically non-recourse or limited recourse, meaning that lenders have only limited claims on the company's assets if the project fails, relying instead on the project's ability to generate returns.

Project finance is generally not suitable for smaller-scale projects due to its high transaction costs, complex structuring, and intensive risk assessment processes.

Project Finance in Financing Sustainable Transitions

Project finance is particularly well-suited for capital-intensive, long-term projects with stable and predictable cash flows, such as renewable energy parks or utility infrastructure. It enables risk-sharing among multiple parties (e.g., sponsors, lenders, public sector entities).

In the context of early-stage transformative industries, project finance offers a pathway to scale innovations that require substantial upfront investment. Through project finance, companies can attract investment based on the project's viability and projected cash flows, rather than their limited operating history or balance sheet strength.

Project Finance – Lifecycle Stages

Stage	Pre-Development	Development	Financing	Construction
Description	Concept Stage	Pass Initial Intake Pass Initial Diligence Finalizing Data Room	Secondary Due Diligence Financial Close	Begin Mobilization Begin Construction Complete Construction
Project Developer Activities	Pre-design Stakeholder engagement Regulatory policy overview	Detailed technical design Detailed financial model Detailed economic analysis Secure suppliers and vendors	Finalize terms Sign contracts Funds receipt Definition of key performance metrics Stakeholder management	Installation Commissioning Stakeholder management Financial management Human resource management Regulatory compliance
Investor Activities	Deal prospecting Sector research Identification of opportunities	Commercial arrangements evaluation Financial modeling & analysis Risk analysis Sector analysis	IC decision Term Sheet execution Administration Financial close Transfer of funds	Drawdown Financial administration Monitoring funds transfer Commissioning report



Barriers

Barriers

Barriers



Overview of Barriers



Identifying Critical Barriers



Locating the Barriers in the Financial Landscape

Description
<p>This section outlines some core barriers that private investors face when considering investments in early-stage transformative industries</p> <p>Drawing on workshop insights and stakeholder input, the barriers are mapped according to two dimensions: their impact on investment decisions and the relative ease with which they can be mitigated. The framing leads to the identification of a set of critical barriers those that both have a high impact on investment decisions and are difficult to mitigate</p> <p>Finally, the critical barriers are mapped onto the financial flow of investment, as presented in slide 20, illustrating where the bottlenecks occur in the financial landscape</p>

Barriers for Investors in Financing Transitions (1/2)

Barriers for Investors in Financing Transitions



1. Risk / Reward Imbalance

The *perceived* risk of a scale-up process is often too high, or the projected return does not match the required return for investors



2. Scale

The investment size that investors have appetite for is usually too small or too large compared to the funding required



3. Mismatch in Knowledge

There is an asymmetry in technical knowledge between the entrepreneur and the financiers



4. Lack of Industry Network

For early-stage technologies, industry networks and coordination mechanisms between stakeholders are often not yet established



Sustainable Transition
Specific Barrier

Barrier (not sustainable transition specific). Although the barrier is higher in early-stage transformative industries compared to traditional sectors

Source: [Integrating finance into the multi-level perspective: Technology niche-finance regime interactions and financial policy interventions – ScienceDirect ; 0005834933 1..6](#) ; [Mobilizing private finance for low-carbon innovation – A systematic review of barriers and solutions - ScienceDirect](#)

Barriers for Investors in Financing Transitions (2/2)

Barriers for Investors in Financing Transitions



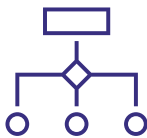
5. Investment Horizon

Financing innovations in early-stage markets usually requires investment horizons of 10+ years



6. Policy Risk

Risk that a change in policy will negatively affect the business model or end market of a venture



7. Cannibalization

Investments in new transformative sectors threaten the value of existing assets of the investor's portfolio



8. Culture

Culture plays a role in shaping investment behavior, risk tolerance, and decision-making processes



9. Governance

Public and private governance structures that inhibit investors to make investments in early-stage transformative industries



Sustainable Transition
Specific Barrier

Barrier (not sustainable transition specific). Although the barrier is higher in early-stage transformative industries compared to traditional sectors

Source: [Integrating finance into the multi-level perspective: Technology niche-finance regime interactions and financial policy interventions – ScienceDirect ; 0005834933 1..6](#) ; [Mobilizing private finance for low-carbon innovation – A systematic review of barriers and solutions - ScienceDirect](#)

1. Risk / Reward out of Balance



Risk / Reward out of balance

The **perceived** risk of a scale-up process is often too high, or the projected return does not match the required return for investors

Scale-ups active in early-stage transformative sectors display higher risk profiles compared to start-ups in established sectors based on 3 factors:

1. **Technological Risk:** Associated with the complexity of the product or service and the challenges involved in deploying and scaling the technology
2. **Financial Risk:** This relates to the capital intensity of the venture and the large sums of R&D investments required early on. It also includes cash flow constraints and lack of access to early-stage equity growth capital to fund business expansion
3. **Missing track-record:** Lack of track record makes it difficult for investors to evaluate the credibility and performance potential, increasing the perceived risk for investors

2. Transaction Size



Scale

The investments that investors have appetite for are usually too small or too large compared to the funding required

The equity tickets that venture capital funds are looking for are usually relatively small compared to the funding required in the pilot and demo phase. This requires entrepreneurs to deal with many different parties, each with their own set of conditions. This makes the process sometimes (too) complex for both the financier and the entrepreneur. But, while involving multiple financiers can add complexity for both the financier and the entrepreneur, it also brings benefits such as diversified support, broader networks, and stronger governance if well managed

Another problem with small transaction sizes is that the due diligence/transaction costs are relatively high compared to the size of the investment, deterring investors

Institutional investors on the other hand look at large scale investments primarily in publicly listed companies and often do not have the mandates to make direct investments into start-ups, scale-ups and unlisted companies

3. Specific Knowledge



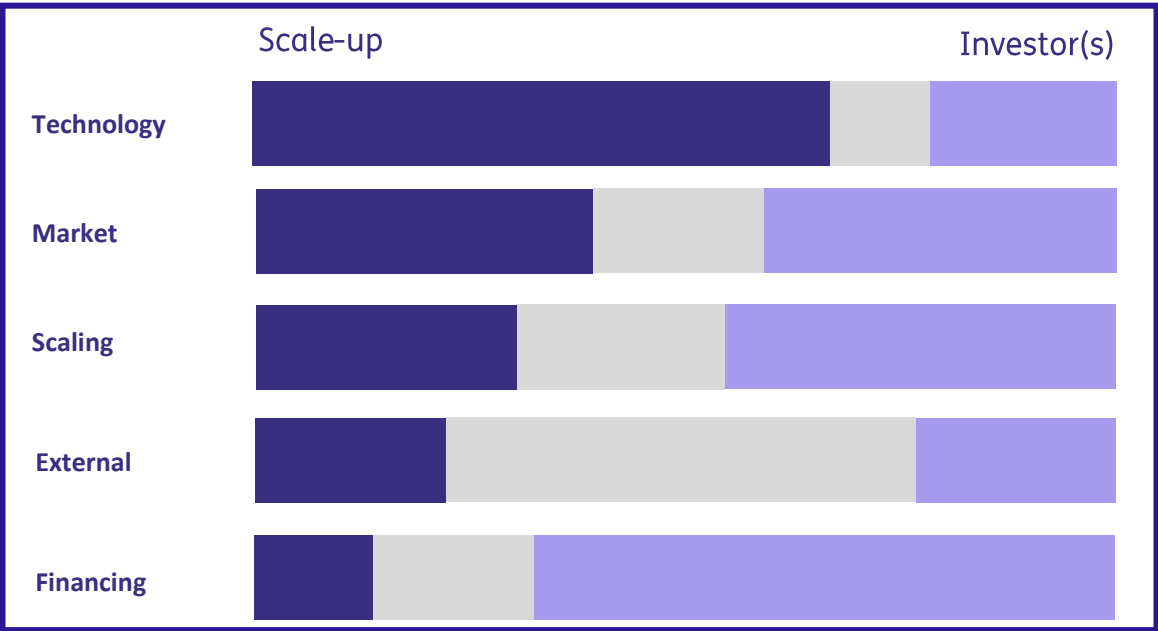
Mismatch in Knowledge

There is often an asymmetry in technical knowledge between the entrepreneur and the financiers

There is a possible mismatch of information / experience between Scale-up and investor on several dimensions:

On the technology side the scale-up typically has a higher level of expertise and information. The market information as well as scaling information might be more balanced, but potentially with a larger gap in information as these are typically new markets that need to be developed. This makes it challenging for financiers to properly assess technical and financial feasibility

External risks (e.g. inflation, policy changes, etc.) are typically uncertain for both parties. The financing expertise is typically larger on the investor side



Source: TNO Analysis; [Integrating finance into the multi-level perspective: Technology niche-finance regime interactions and financial policy interventions – ScienceDirect ; 0005834933 1..6 ;](#)

4. Industry Network



Lack of Industry Network

For early-stage technologies, industry networks and coordination mechanisms between stakeholders are often not yet established

Creating a successful innovation often requires a broad network of participants who contribute to the main offering's value for its customers or users

This network, or innovation ecosystem, includes various suppliers, distributors, and other partners who work together with the venture

These partners usually invest in designing and developing new components and services. The risk in this collaboration comes from the possibility of not securing the commitment of all necessary suppliers and partners essential to the business model of the venture

5. Investment Horizon



Long time horizon required to earn a return on investment

Financing innovations in early-stage markets can require investment horizons of 10+ years

Financing projects or start-ups in early-stage transformative sectors often requires a long-time horizon with returns only materializing during the scaling phase.

This does not align with the relatively short time horizon of most venture capital and private equity funds. This mismatch creates a funding gap, particularly during the critical scaling phase, often referred to as the "valley of death."

6. Policy and Regulatory Risk



Policy and Regulatory Risk

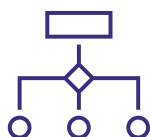
Risk that a change in policy will negatively affect the business model of a venture or project

The success of new technologies depend on a supportive and consistent political landscape. The success is subject to changes in policy and regulation. This is a source of policy risk for investors, and even though they can estimate the probabilities of different policy outcomes, they will be unable to be certain about the future policy. This hinders private sector investment, especially when the policy / regulatory cycle is shorter than the investment cycle needed to prove commercial viability. The World Bank, World Economic Forum (WEF) and Organisation for Economic Co-operation and Development (OECD) have indicated that policy risk induced by governments is a significant deterrent to investment over the past decades worldwide, particularly for infrastructure

However, as policy becomes more complex, this also gives rise to policy uncertainty. This means that policy change or intervention is necessary, but investors will not even know what possible changes can be in place in the future

Moreover, investors are looking for a market commitment in every stage of the scaling process, while government policy directly influences the availability of an end-market in many early-stage transformative sectors

7. Cannibalization



Cannibalization

Investments in new transformative sectors threaten the value of existing assets in an investor portfolio

Cannibalization is a barrier that can pose challenges for investors in new transformative sectors. This is the case where new investments threaten the value of existing assets. Key challenges in this respect are:

- **Undermining Existing Investments:** Transition-friendly investments (e.g., renewable energy, EVs) can erode the profitability of legacy sectors (e.g., fossil fuels, combustion vehicles), making investors hesitant
- **Stranded Asset Risk:** Shifting capital to emerging sectors can accelerate the obsolescence of traditional assets, leading to financial losses before investors can recover their initial investments
- **Portfolio Cannibalization & Internal Conflicts:** Investors managing diverse portfolios may face resistance when new investments directly compete with existing business units, creating conflicts in capital allocation

8. Culture



Culture

Culture plays a role in shaping investment behavior, risk tolerance, and decision-making processes

Institutional investors in Europe tend to have a lower risk appetite compared to US pension funds and fund managers. This is reflected by EU pension funds and fund managers that allocate a smaller share of assets to equities than their U.S. counterparts

European institutional investors tend to favor low-risk assets and gradual technological improvements within established industries rather than funding highly disruptive innovations

This creates a funding gap for ventures in these industries where initial breakthroughs may not yield immediate financial returns but are essential for long-term transformation

9. Governance



Governance

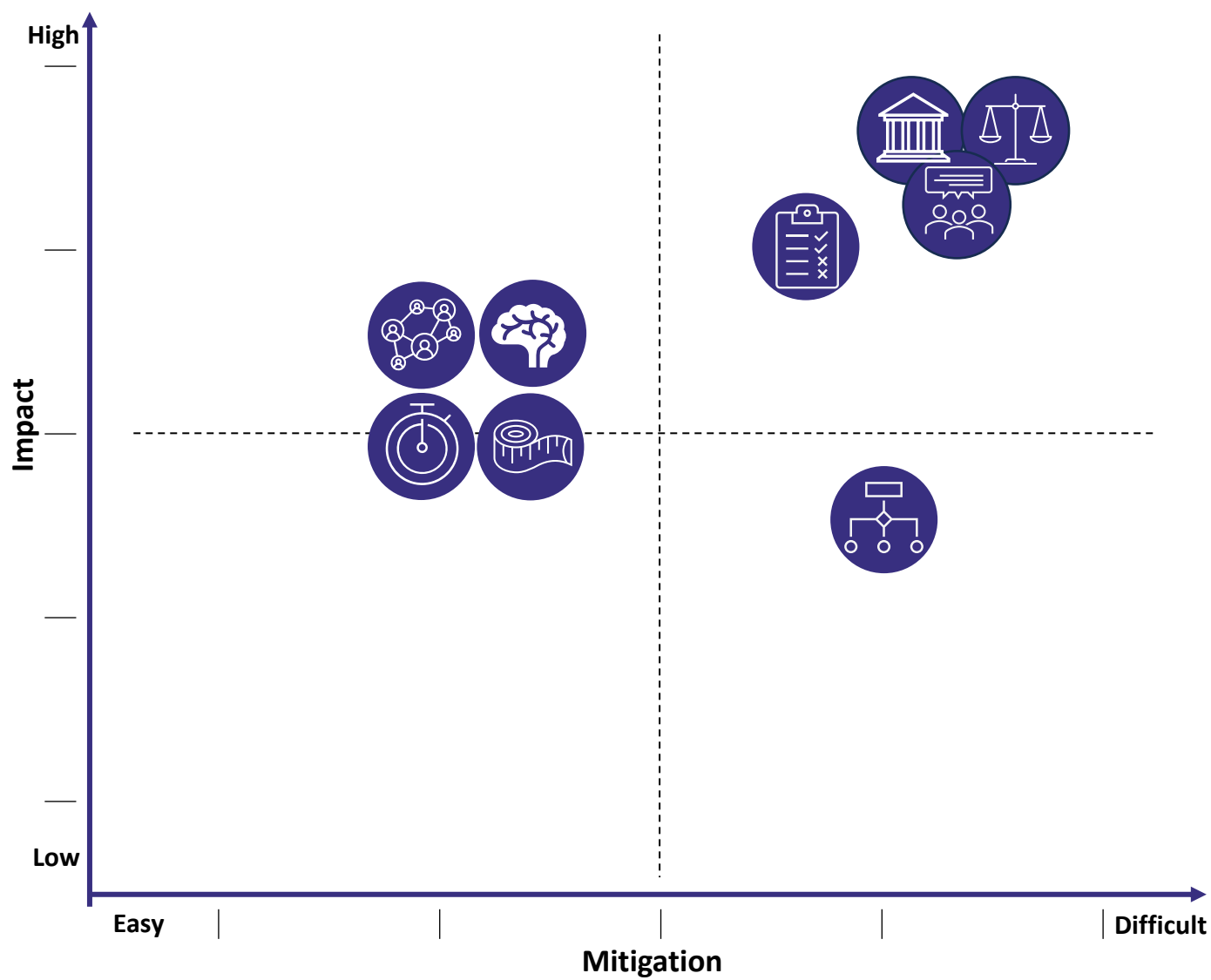
Public and private governance structures that inhibit investors to make investments in early-stage transformative industries










Governments impose governance rules and regulations on investors to ensure financial stability, transparency, and responsible capital allocation. While these rules serve important purposes, they can also create barriers to investing in early-stage transformative industries by limiting flexibility and increasing compliance burdens

“Most jurisdictions had quantitative investment limits that some pension providers had to comply with at the end of 2021, or at the latest available date. These limits are usually expressed as a maximum proportion of assets that pension providers are allowed to invest in a specific type of instrument or vehicle, such as equities, real estate, bonds, retail investment funds, private investment funds, loans and bank deposits.” (OECD (2022))

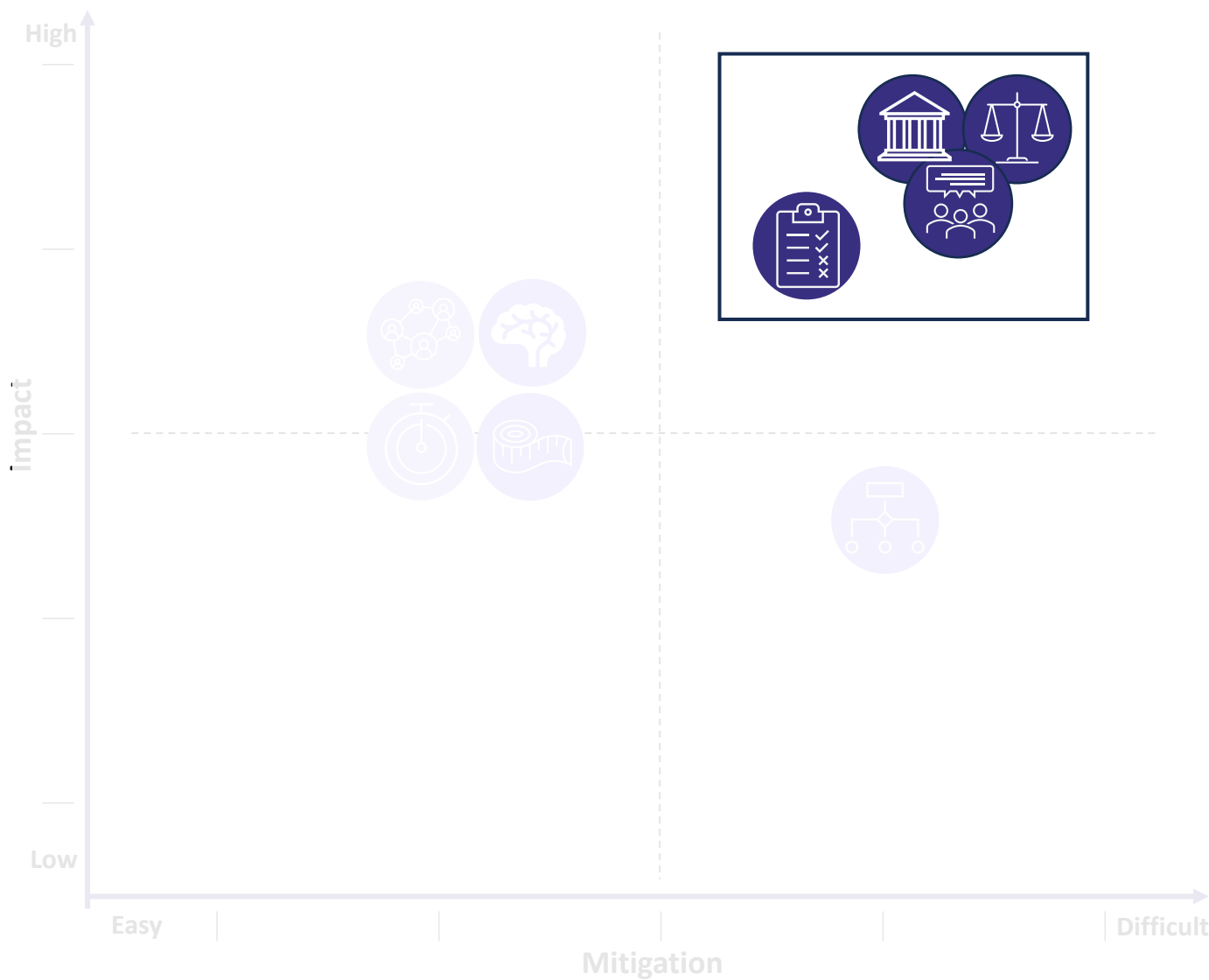
Large investors must balance liquidity needs with long-term commitments, often requiring a certain percentage of assets in highly liquid instruments (e.g., government bonds, blue-chip equities). Early-stage transformative sectors often require long-term capital lock-ups conflicting with internal liquidity requirements










Mapping the Barriers



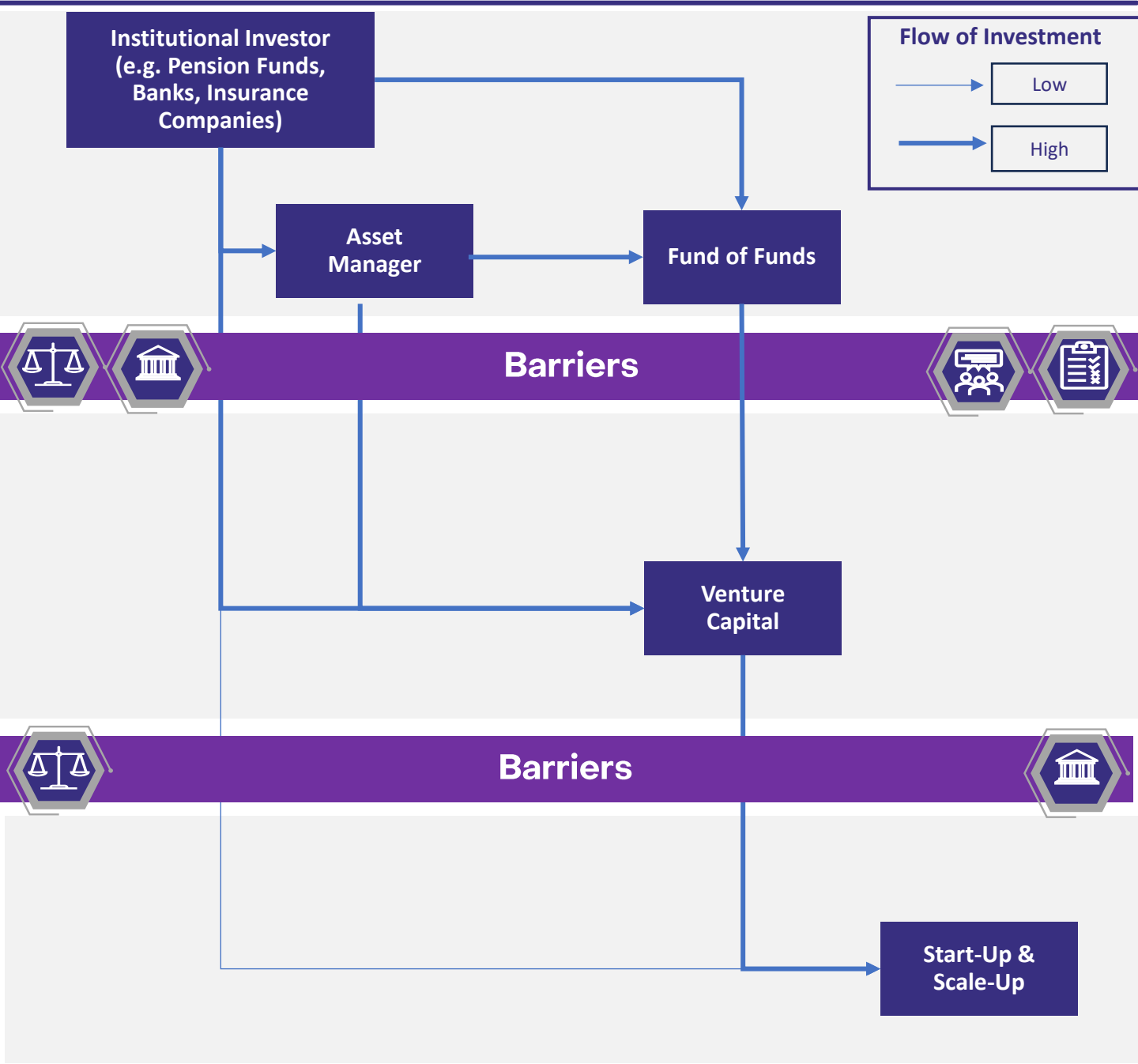
	Risk / Reward out of balance		Transaction Size
	Lack of Specific Knowledge		Lack of Industry Network
	Investment Horizon		Policy & Regulatory Risk
	Cannibalization		Culture
		Governance	










Identifying Critical Barriers



	Risk / Reward out of balance		Transaction Size
	Lack of Specific Knowledge		Lack of Industry Network
	Investment Horizon		Policy & Regulatory Risk
	Cannibalization		Culture
		Governance	

Flow of Investment



	Risk / Reward out of balance		Transaction Size
	Lack of Specific Knowledge		Lack of Industry Network
	Investment Horizon		Policy Risk
	Cannibalization		Culture
 Governance			

Summary



Risk / Reward
Imbalance



Policy Risk



Culture



Governance

During the workshop the four barriers: Risk/Reward Imbalance, Policy Risk, Culture and Governance were identified as critical barriers based on their impact on investor behavior and the relative complexity with which they can be addressed. These barriers have a significant influence on investment decisions in early-stage transformative industries

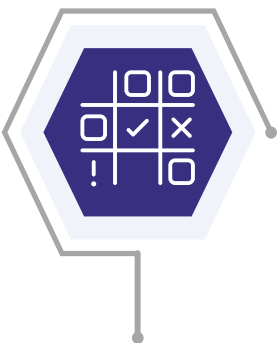
- **Risk / Reward Imbalance:** Early-stage transformative industries often present high technological and market uncertainty with unclear revenue prospects. For investors focused on stable, risk-adjusted returns, the perceived asymmetry between risk and potential reward creates hesitation
- **Policy Risk:** Investments in transformative sectors are often dependent on evolving policy environments, including subsidies, regulatory approvals, and national strategies for energy, climate, or innovation. Frequent policy shifts or lack of clarity on long-term government commitments increase uncertainty and can undermine investor confidence
- **Culture:** Cultural factors, contribute to a conservative investment mindset that favors established industries and incremental innovation. This includes risk aversion, a preference for short-term performance, and a lack of exposure to venture-style investing
- **Governance:** Fiduciary duties, strict investment mandates, and liquidity requirements lead investors to favor low-risk, liquid assets over high-volatility, long-term ventures. Additionally, the lack of standardized ESG reporting in emerging sectors raises compliance and reputational concerns. This barrier is particularly acute for institutional investors bound by fiduciary obligations and regulatory capital requirements



Exploring Solutions

Overcoming the Barriers

Overcoming the Barriers



Overcoming the Barriers

Description

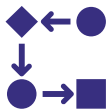
Successfully mobilizing private capital into early-stage transformative industries requires a range of targeted solutions to overcome the risks and structural barriers that currently restrict investment

This section presents a range of potential mitigation options aimed at addressing the critical barriers identified in the previous chapter. The solutions presented in this section are in no way exhaustive and exploratory in nature based upon insights from the workshop, expert analysis and desk research

The section includes policy measures, financial instruments, and strategic interventions that can help reduce perceived risk, align investor incentives, and enhance the overall bankability of transformative ventures and projects

Overcoming the Barriers

Potential Mitigation Options



De-Risking

De-risking aims to reduce, share or transfer risk

Blended Finance

Mobilizing private capital by strategically using public funding on concessional terms

Size transformation & Capital aggregation

Size Transformation & Capital aggregation aims to either increase the size of the investment



Impact Measurement

Improved data collection and standardized ESG reporting frameworks enable startups to credibly communicate their sustainability impact

Policy Regulation – Adaptation & Mitigation

Mitigating policy risk increases investor confidence by reducing uncertainty around future returns

Overcoming the Barriers

Potential Mitigation Options



Market Creation

The implementation of demand policies are potential levers for mobilizing private investment



Early Involvement of Investors

By embedding investor expectations, financial resilience, and ESG integrity from the start, ventures can become better positioned to attract follow-on capital and scale



Impact Private Debt

Impact private debt can play a crucial role in addressing financing gaps for projects that fall outside the scope of both traditional equity investment and conventional bank financing



Venture Debt

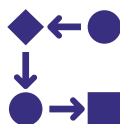
Venture debt addresses a financing gap for innovative, high-growth companies by providing liquidity in between equity funding rounds



Alignment of Returns with Impact Performance

Aligning financial compensation for venture capital funds with impact performance offers greater accountability, alignment, and transparency for institutional investors

1. De-Risking



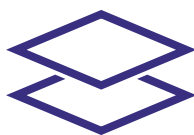
De-Risking

The risk-return profile of any investment is important in the decision making of investors. Lowering the risks associated with early-stage market investments better aligns the investment with the risk appetite of investors

De-risking aims to reduce, share or transfer risk by:

- Financial guarantees (first-loss, partial credit guarantees, credit letters, bank portfolio lending guarantees, underwriting by government of commercial bank lending to SMEs or innovative start-ups)
- Blended finance by participating in a syndicate in a sub-ordinated role, co-investing and providing debt at a rate lower than the market (see also next page)

2. Blended Finance



Blended Finance

Blended finance addresses a gap in the financing of early-stage, capital-intensive projects and ventures active in climate-neutral and circular transitions. This financing gap arises when private capital is not available in sufficient volume due to high perceived risk or uncertain returns, and subsidies are not made available. This while capital needs grow, as ventures mature

By deploying public capital under softer conditions, blended finance catalyzes private investment in sectors and technologies where market solutions alone are not yet viable

Blended finance works by deploying public capital under softer terms to mobilize private investment. It combines public and private capital through tailored financial instruments and tailored risk-sharing structures. These structures are deployed across development stages, from early technology validation and pilot projects to commercial scaling and infrastructure buildout

These instruments are structured to align with private investors' mandates, through adjusted repayment terms and capital seniority, making participation viable and potentially revolving

By reducing financial barriers and enabling shared risk-taking, blended finance makes early-stage, capital-intensive projects and ventures active in climate-neutral and circular transitions investable. This accelerates their development, and supports the transition towards a climate-neutral economy

Hence by mobilizing private capital, blended finance creates a multiplier effect on public funds

3. Size transformation & Capital aggregation



Size transformation & Capital aggregation

This size transformation better aligns capital expenditures with investors' portfolio's

Size transformation aims to either increase the size of the investment by bundling projects together and securitization (the process of selling off cash flows to larger scale investors e.g. institutional investors e.g. packages in a green bond to attract more risk-averse, larger investors to crowd-in to a market) or allowing smaller investors to participate in large capital expenditure projects by breaking down the investment in smaller parts

4. Impact Measurement



Impact Measurement

Improved ESG impact measurement enables investors to differentiate between technologies, compare emissions reduction potential, or assess lifecycle sustainability impacts. This reduces due diligence complexity and support compliance with emerging regulatory frameworks for investors

For investors with sustainability-linked objectives transparency and measurability of impact are important determinants in investment decisions, similarly these impact measures can bring to light underlying dynamics of the business and its value chains which is relevant to all investors. Early-stage ventures often operate in nascent or rapidly evolving sectors where consistent, sector-specific ESG performance data is lacking. This creates challenges for investors seeking to assess alignment with regulatory frameworks

5. Policy Risk & Uncertainty: adaptation & mitigation



Policy Risk & Uncertainty: adaptation & mitigation

Mitigating policy risk increases investor confidence by reducing uncertainty around future returns. Clear, stable, and transparent policy frameworks allow investors to better assess risk and project financial outcomes. This improved predictability makes ventures more investable, encouraging greater private capital allocation

Policymakers can adopt several approaches to mitigate policy risks

First, it is essential to clearly communicate the conditions under which policy changes may occur. This transparency helps investors anticipate regulatory shifts and incorporate them into their risk assessments

Second, providing policy guarantees, such as long-term contracts or support schemes, can enhance predictability and reduce exposure to abrupt policy reversals. Engaging stakeholders early in the policy-making process further strengthens the relevance and effectiveness of regulations, ensuring that investor perspectives are integrated from the outset

In addition, setting clear regulatory timelines and including sunset provisions allows investors to plan around the duration and phasing of specific measures

6. Market Creation



Market Creation

The implementation of demand policies are potential levers for mobilizing private investment

Policymakers can play a role in advancing new technologies towards market adoption by using a range of support measures. Consumer incentives, such as tax credits and subsidies, help boost demand for green technologies. In addition, governments can actively shape emerging markets through strategic public procurement, creating demand and lowering costs for innovative solutions. Public loans and loan guarantees also offer important financial backing to help early-stage ventures grow and scale

These policies work by stimulating market demand, addressing market failures and reducing investor uncertainty. These mechanisms can level the playing field with incumbent technologies and improve perceived return potential hereby de-risking market entry for investors

7. Early Involvement of Investors



Early Involvement of Investors

By embedding investor expectations, financial resilience, and ESG impact measurements from the start, ventures become better positioned to attract follow-on capital

Engaging investors at the proof-of-concept or pre-commercial stage, can help structure ventures in ways that are aligned with future capital market expectations, regulatory requirements, and ESG mandates. This includes support in establishing transparent governance, embedding robust impact measurement frameworks, refining business models, and developing credible commercialization pathways

Furthermore, early investor participation can bring start-ups the required market insight, capital planning expertise, and strategic guidance

8. Impact Private Debt



Impact Private Debt

Impact private debt can play a crucial role in addressing financing gaps for projects that fall outside the scope of both traditional equity investment (too capital-intensive or low insufficient return) and conventional bank financing (too high risk or misaligning with structural requirements of bank financing due to tenor, collateral or innovative business model)

In the transition to a climate-neutral economy, impact private debt is broadly used in financing the energy and materials transition, particularly in areas where traditional financing mechanisms fall short. It is especially relevant for projects that are essential to get to a more sustainable economy, but do not yet meet the criteria for conventional bank loans or equity investment. These include lower-return infrastructure such as district heating networks, product-as-a-service business models, and smaller-scale ventures

A key example of applying impact private debt is scaling production facilities and funding first-of-a-kind plants. Banks often cannot provide the financing at these stages due to unproven business models or non-traditional cash flow structures while these projects are usually too capital-intensive or low-yielding for equity. Impact private debt aims to bridge this gap, where traditional project finance is not yet viable, enabling companies to reach a stage where they become bankable and capable of attracting mainstream project finance

9. Venture Debt



Venture Debt

Venture debt addresses a financing gap for companies that have secured initial equity funding but require additional capital to scale operations. Traditional bank loans can sometimes be inaccessible to these firms due to a lack of collateral or profitability, while further equity financing can lead to dilution for existing shareholders. By providing non-dilutive capital, venture debt enables companies to extend their cash runway.

Venture debt is provided by specialized banks or non-bank lenders to investor-backed companies and is an addition to venture capital.

Venture debt is structured as a loan with required repayment obligations and features tailored to the unique needs of growth-stage companies. The loan can include different repayment schedules such as bullet repayments or an amortized repayment schedule.

This type of financing complements existing equity investments, providing additional resources without immediate dilution, and can serve as a signal of credibility, helping to attract further private investment.

Venture debt is not yet widely adopted in the EU, where venture debt represents about 3% of annual venture capital transactions, whereas in the US this is about 15% (EIB, 2022).

10. Alignment of Returns with Impact Performance



Alignment of Returns with Impact Performance

For institutional investors, especially those with ESG mandates or fiduciary responsibilities, such models offer greater accountability, alignment, and transparency. They help de-risk reputational exposure and validate that capital is being deployed in line with long-term sustainability objectives

A challenge that institutional investors face, when seeking exposure to early-stage transformative industries is the perceived misalignment between financial returns and long-term impact outcomes

Traditional venture capital compensation structures, particularly carried interest, are almost exclusively tied to financial performance. This creates potential conflicts of interest, especially in sectors where social or environmental impact is a fundamental investment objective. A potential solution is to tie carried interest to the achievement of measurable impact targets

This approach directly aligns the incentives of venture capital fund managers with the dual objectives of institutional investors: competitive financial returns and demonstrable, verifiable impact

An aerial photograph of a dense green forest. A light-colored, possibly paved or dirt, path or road winds diagonally from the top right towards the bottom left of the frame. The text is overlaid on a semi-transparent grey rectangular area in the center of the image.

Transition Finance

Real World Examples

Real World Examples

Real World Examples



Real World Examples

Description

This section presents a non-exhaustive series of sector specific examples that illustrate how investment barriers in early-stage transformative industries have been addressed in practice. Each example highlights real-world examples of mitigation strategies that have enabled private investment where it might otherwise have been constrained

This section contains broader examples with the goal to contribute to a shared learning process between the transformative sector and the financial industry. By highlighting both successes and lessons learned, this section aims to accelerate understanding and adoption of effective solutions across the investment ecosystem

The included example of a Circular Business model is to showcase how innovative value creation and resource efficiency strategies can contribute to sustainable economic transitions. This example was included as part of the workshop

The included examples for the Energy Sector and the Built Environment are selected to showcase some of the work that has been carried out by TNO in the field of Financing Transitions

As part of our next steps, we would like to invite readers that have specific case studies or examples that they want to discuss or can be used in a capacity building program to *please contact us for shared opportunities*

Circular Business Model (1/3)



Swapfiets

As a service requires a lot of working capital in the pre-financing of the bicycles. How can we involve the chain better in the use of circular incentives in the model and chain financing design?

‘As a service throughout the chain’

Issue

Most circular business models revolve around recurring transactions for products that are **used repeatedly** and **involve collaboration** between chain partners. This approach is new and different from traditional business models. These types of **circular businesses often struggle to attract the right kind of capital for growth**, facing either high costs or financing that doesn’t meet their specific needs.

Approach

Invite a broad field of experts to design a financial product supporting this kind of collaboration (focus group research).

Circular Business Model (2/3)

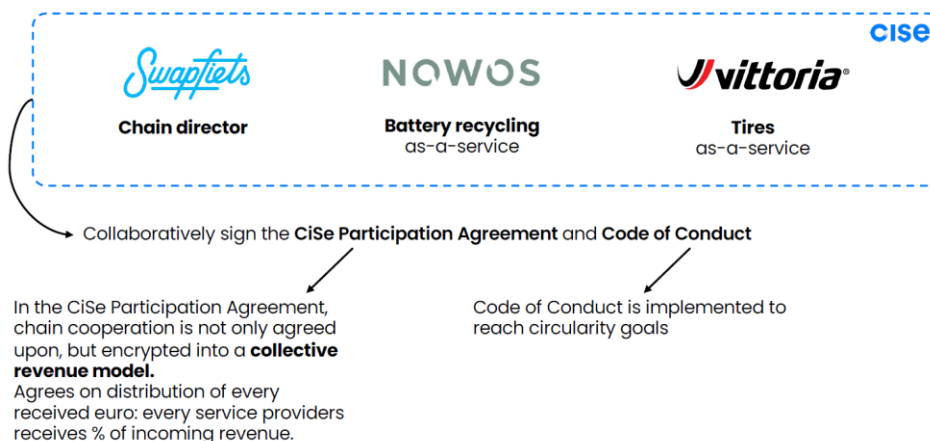


Swapfiets

Solution

- **CISE-model:** The CISE (Circular Service) model consists of a legal- and financial structure tailored to the needs of circular businesses with recurring revenue and integration of chain partners into the business model.

The process & insights: distribution of fees



This pilot was the first real-world test of the CISE structure. By applying the model to Swapfiets, it is shown that businesses built on long-term product use, rather than sales, **can attract financing** as long as the **right mechanisms** are in place.

Learnings:

- Bringing chain partners into the business model works, but it takes time and effort.
- Traditional financing models don't fit circular businesses, but they can be adapted.
- Banks are open to circular financing, but they need structure and security.

Circular Business Model (3/3)



Swapfiets

Financing

- **Money-as-a-Service:** The financier provides capital for a specific set of assets or projects, with repayments directly linked to the cash flows generated by those assets.
- **Shared Revenue:** The financier receives an upfront, agreed-upon percentage of incoming revenues on a pari passu (at the same rate) basis with other chain partners. Notably, the financier can be a chain partner, an end user, or a professional financier.
- **Cash Flow as Collateral:** Financing is secured against the ongoing revenue generated by the assets (i.e., cashflow-based financing), rather than their market or book value. This approach ensures alignment with the business’s long-term cash flow model.
- **Project Finance Characteristics:** Upfront cash flow distribution is agreed upon, and the loans are non-recourse, secured solely by the revenue from the assets rather than by the parent companies.

Energy Sector



GEAR-UP

GEAR-UP is a Horizon Europe project that tests and deploys an innovative framework designed to create a market for energy efficiency

By Generating Efficiency As a Resource, GEAR-UP will develop a framework to unlock financing for the energy retrofiting of residential buildings at scale and speed that is designed to scale energy efficiency renovations just as renewables have been scaled, as the true “first fuel” of the EU

By Generating Efficiency As a Resource, GEAR will test and deploy an innovative market framework to scale deep retrofits. The GEAR framework will overcome 4 key market barriers: 1) Split incentives between owner and tenant; 2) lack of deep retrofits; 3) lack of access to data-driven measured savings; and 4) lack of access to institutional capital

The GEAR Framework enables a building’s EE potential to be metered and paid for similarly to distributed renewable energy generation

GEAR will be tested and deployed across the EU, starting in Ireland and Spain. The project partners are industry experts, with decades of commercial experience and a wide network across the EU, including JLL who manages more than 26 million m2 of non-residential floor area in Europe

Energy Sector



New-Pace

NEW-PACE is a project, that introduces an innovative Property Linked Finance (PLF) model in Spain, with plans to adapt and scale it across the Netherlands and the broader EU. Unlike traditional financing, PLF ties financing to the property itself rather than the owner, covering up to 100% of renovation costs and transferring repayment obligations when properties are sold

PACE programs leverage on-tax financing to offer competitive-cost financing for renovation expenses, with repayments seamlessly integrated into property tax assessments. The key features of these programs include:

- Full costs associated with the execution of energy-efficient renovations to be financed.
- The costs are amortized over a long period, typically between 20 and 30 years, via a surcharge on the property taxes.
- These programs do not accelerate the repayment in case of default, reducing financial stress on property owners.
- Repayment is guaranteed, as the obligation is structured as a tax charge (“assessment”) on the property itself. This charge remains linked to the property rather than the owner, and it holds a lien position that ranks senior over any previous mortgage

This addresses key financial barriers, making energy upgrades more accessible and less risky for property owners and investors

In Spain, the project uses existing legal frameworks to develop the PACE Canon, a financial product aimed at long-term property improvements and will test it through 10 pilot buildings. Insights gained from these pilots will inform the co-design and adaptation of a similar PLF model for the Netherlands

Energy Sector



Launch

LAUNCH was a 2.5-year EU funded project, which aimed to accelerate deal closure and pipeline growth for Sustainable Energy Assets through standardised, investor grade Energy Performance Contracts, standardised risk assessment protocols for investors, a roadmap for project developers towards accessing growth capital, and market-tested value propositions for developers' end-clients

LAUNCH was highlighted as a leading project by the European Commission in Energy Efficiency Finance for its broad

involvement of stakeholders and real-life impact of standardized project finance materials. These include an investor-grade Energy-as-a-Service contract, a standardized risk assessment protocol for energy efficiency projects, tools for project developers to access growth capital, and market-tested value propositions for project developers' end clients

€2.1 million in deals were closed during the project itself, and a further €31 million of investments being processed for finance at the end of the project. LAUNCH has engaged close to 500 project stakeholders and laid the groundwork for broader and deeper engagement

Energy Sector & Built Environment



Climate City Capital Hub

The Climate City Capital Hub, launched by the European Commission, is an international finance resource designed to help cities participating in the EU Mission on Climate-Neutral and Smart Cities mobilize funding for climate action

Targeting cities that have received the EU Cities Mission Label, the hub offers support in structuring financial needs, accessing advisory services (notably from the European Investment Bank), and connecting with a broad range of capital providers, from public and private investors to philanthropic funds and innovative instruments like crowdfunding and sustainability-linked bonds

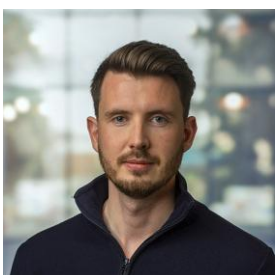
The hub, managed by the NetZeroCities platform, emphasizes engagement with private capital and supports investment in both mitigation and adaptation projects, particularly for cities involved in both the Climate-Neutral and Adaptation Missions. Complementing this, the EIB has earmarked a €2 billion lending facility to support labelled cities' investments in sustainable infrastructure, such as energy-efficient buildings, renewable energy, and green mobility

To date, 33 cities have received the EU Cities Mission Label and submitted investment plans totaling over €114 billion, highlighting the scale of urban ambition. The Climate City Capital Hub plays a vital role in turning these plans into action by bridging the gap between city-level climate commitments and capital market access, making it a promising model for channeling private finance into urban transition pathways

Team



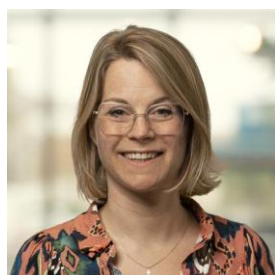
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Glossary

Carried Interest: the share of a fund's profits that a fund manager earns as compensation, only after returning the original capital and a minimum return (hurdle rate) to investors

Credit Letter: A financial instrument issued by a bank guaranteeing that a buyer's payment to a seller will be received on time and for the correct amount, adding security in commercial transactions

Direct investment: investment of capital in physical assets or in the ownership of a whole enterprise (Direct investment, n.d.)

ESG: Environmental, social and governance (ESG) criteria are a set of standards for a company's operations that socially conscious investors use to screen potential investments (ESG, 2019)

Financial Ecosystem: the network of financial institutions, investors, instruments, regulations, and support structures that collectively enable the flow of capital within an economy

First-Loss Guarantee: A risk-sharing mechanism where a third party (often a government or development finance institution) agrees to absorb the initial portion of losses on a loan or investment, thereby reducing risk for other investors or lenders

Green bond: Green bonds are financial instruments that finance green projects and provide investors with regular or fixed income payments (World Bank)

Indirect investment: investments made in portfolios and funds that pool investor money to buy or sell assets. Examples include mutual or index funds and real estate funds

Institutional Investor: an entity which pools money to purchase investment assets, such as stocks and bonds. The types of entities classified as institutional investors include investment managers, asset managers, pension funds, and insurance companies

Partial Credit Guarantee: A guarantee provided to cover a portion of the debt service (interest and/or principal) on a loan, improving the borrower's credit profile and making it easier to attract financing

Securitisation: When banks and other credit institutions package loans into securities and then sell them to investors, it's called 'securitization' (European Commission)

Venture: a business initiative, typically a new or emerging enterprise or project, undertaken with the goal of developing and commercializing a product, service, or innovation, often involving a degree of financial risk and uncertainty