

FOCUS NOTE SERIES ON FINTECH FOR SUSTAINABILITY

CURRENT LANDSCAPE AND KEY OPPORTUNITIES



COUNTRY REPORT #2: GERMANY

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Foreword

Aligning the digitalisation of finance with sustainability is one of the major tasks of our times to ensure that it does not introduce new or accelerate existing sustainability risks, but rather that it enables a leapfrog into a digital financial system which offers nations more financing avenues for the Sustainable Development Goals (SDGs). In 2018, the UN Secretary General (SG) decided to establish a Task Force for Digital Financing of the SDGs to explore how this alignment can happen and to offering guidance to policy makers and financial ecosystem players on how to scale sustainable digital finance.

The first Progress Report of the UN SG's Task Force for Digital Financing of the SDGs, launched at UNGA in September 2019, called for a framework to measure progress in harnessing digital financing for the SDGs at country level. The knowledge partner to the UN SG's Task Force, the Green Digital Finance Alliance (GDFA), was called upon to lead the development of such a framework. To design a framework for maximum utility value by regulators, policy makers, fintechs, and financial service institutions, a number of country tests are run as part of the framework development process. The final framework will be launched together with the final report of the UN SG's Task Force in mid 2020. The intention is that the measurement of the evolutions in sustainable digital finance (SDF) at country level can help policy makers and regulators harvest up-to-date insight on the market response to new regulation, but also that it can point to ways to innovate financing of the SDGs via the deployment of fintech.

Definition of Sustainable Digital Finance (SDF):

“An intended application of digital finance or fintech towards the achievement of financing for Global Sustainability goals such as the Paris Agreement and/or the SDGs”.

(Taskforce 2019, p. 8)

Germany was selected as a test country because of, among others, the country's position of being a regulatory frontrunner in the digital economy with a Data Ethics Commission recently issuing AI principles as well as being the largest European country to date having issued a blockchain strategy. In parallel, the German Ministry for the Environment (BMU) is a frontrunner on integration of digitalisation into environmental policy and strategy. Germany therefore has a number of specific characteristics making it an important case to inform the metrics for the measurement framework as well as a position to help move the SDF space forward in Europe.

The GDFA initiated a collaboration with Conscious Fintech for the German SDF measurement. The research team was from GDFA, Director Marianne Haahr and from Conscious Fintech, whose team brought together expert knowledge from different fields of relevance in this context: Sanika Hufeland is leading the Institute for Social Banking and has been gaining deep insights in Sustainable Finance, ethical and sustainable banks, and their engagement in technological innovation. As the founder and CEO of the Fair Finance Institute, Markus Duscha is i.a. professionally involved with financial service providers on their way integrating social and environmental aspects in their business. Ludwig Schuster is an expert in sustainable monetary systems design and advisor to various impact oriented cryptocurrency start-ups. Together, they have been organising the Conscious FinTech Meetup series¹.

The work for this project was carried out from mid-December 2019 to the end of January 2020. Since we have not conducted a more extensive survey, the mapping makes no claim for completeness. It is rather a first step for a continuous, in-depth monitoring. Special thanks go to the Conscious Fintech team, Jan Bonhorst, Konstantin Wolf, and Pola Vayner for preparing the grounds, as well as to Gibran Armijo, Tracy Brunnhorst, Maike Gericke, Markus Sauerhammer, and many others who were providing helpful information during this research.

¹ <https://www.meetup.com/de-DE/conscious-fintech/>

Executive Summary

MAIN FINDINGS

Finding #1: Fintechs are the Sustainable Digital Finance Champions in Germany

The landscape reveals that mainly the fintech startups, rather than the incumbent banks, are innovating sustainable digital finance solutions. Banks prefer to cooperate with those younger fintech companies. However, only between 3 and 5 percent of the total German fintech landscape are delivering on the SDGs.

Finding #2: Germany is an SDG 7 Fintech Innovation Frontrunner

SDG7 is the goal which most of the German SDG fintechs innovate on. Hence, it is a clear stronghold of the German sustainable digital finance ecosystem to deliver innovative financing to transition to a decentralised and renewable energy system. These solutions mainly emerge at the edge of the fintech landscape where it overlaps with cleantech. Germany has a number of SDG 7 fintech champions, such as IOTA, acting as market makers and leaders for more fintech to follow. It is a market which can be expected to further mature with the new German blockchain strategy which positions DLT as a tool to be used in the energy transition, coupled with pioneering legislation on the ability of banks to hold crypto assets.

Finding # 3: Second runner up is SDG algorithmic investing and robo advisory

It is clear from the mapping that the German fintech innovation ecosystem has incentivised the design of SDG robo-advisory and algorithmic investing services. The majority of the solutions have clear purpose to unlock sleeping savings into sustainable assets and projects by offering automated portfolio management with a low threshold for minimum investing. Most of the robo-advisors invest into ETFs and stocks, not into unlisted sustainable assets such as green SMEs. Even though the first regulated STO in the EU was issued in Germany this was not a sustainability focused STO.

Finding #4: High alignment between fintech innovation landscape and policy priorities

The landscape analysis shows a high degree of alignment between the supply side of SDF fintech and the SDG priorities of Germany. The largest concentration of fintech innovate on SDGs 7, 9, and 13, which mirror the national policy priorities.

Finding # 5: Limited degree of policy integration

The policies and strategies on digitalization (e.g. the blockchain strategy) tend to integrate sustainability whereas the sustainable finance strategy does not explicitly ascribe a role to fintech up to now and there are no defined targets for sustainable fintech. Environmental policy measures and notes have the highest degree of integrating environmental and digital trends, but these are not specifically fintech focused. They rather focus on integration of a broad spectrum of digital sectors.

Opportunity Avenues

The findings point to a number of concrete opportunity avenues to strategically leverage SDF as a tool to scale financing of the German SDG country priorities.

1. Accelerate SDG 7 fintechs to fast-track finance of the energy transition
2. Green STO's as a next step to unlock citizens and financiers of the green transition
3. Fintech to innovate public financing of public good SDGs
4. Financing the SDGs with a programmed Central Bank Digital Currency
5. Personalisation of SDF solutions - private data for green behavioural change
6. Pilot Green Robo-advisory and green algorithmic investing to channel capital into underlying green smart assets using IoT

For a real sustainable world not only ecological and social aspects are important. The economic development should not be endangered by, for example, possible new systemic risks by fintechs for the financial world, as stated by a report about big data and artificial intelligence of the Federal Financial Supervisory Authority (BaFin 2018).

Hence, the wide range of opportunities and risks emerging from deployment of the new technologies for a sustainable development has to be carefully monitored. Then, policy makers and regulators can form suitably adopted and new measures. These could include incentives for investments in sustainable enterprises, creating SDF-Hubs, and research programs. Last but not least, an official, long-term commitment and the institutionalisation on national and EU government levels as a cross-sectional issue would give a signal to all stakeholders that Sustainable Digital Finance is the way ahead for this decade.

Background

In Germany, 64 percent of the digital active consumers use fintech services (EY 2019, p. 7). This equals the global average, indicating that Germany is neither a forerunner nor a latecomer. The frontrunners are China and India, both with an adoption rate of 87 percent (p. 8).

A monitoring by the German start-up platform Gründerszene and CEBIT from March 2018 identified 699 fintech start-ups in Germany². A survey of comdirect (2019, p. 7) counts 898 fintechs³ in the country. This survey found a broad distribution of activities: 202 in the field of proptech (real estate), 172 in financing, 114 in insuretech, 96 in investment, 76 in blockchain/DLT, 72 in payment & accounting, and 166 in other categories.

Sustainable finance in Germany has a long tradition of few protagonists⁴ and the German Central Bank (Deutsche Bundesbank) was one of the founders of the Network of Central Banks and Financial Supervisors for Greening the Financial System (NGFS). However it is still a niche: The sustainable investment market⁵ made a share of 4.5 percent of the total market in Germany at the end of 2018. Nevertheless, the growth is very dynamic (plus 45 percent compared to 2017) (FNG 2019, p. 14). Other European countries started to strategically work with sustainable finance policy and programme development several years earlier than Germany, like France, the Netherlands, and Switzerland. This is reflected in the results of the “3fP-Tracker” (“Finance fit for Paris”)⁶, focusing on climate change: Germany with a score of 4.3 of maximum 10 points lags behind France (5.7) and the Netherlands (5.4) (Frankfurt School et al. 2019, p. 7).

Thus, sustainable and digital finance are in the early stages of market penetration, and both are experiencing dynamic developments. That is why it is worthwhile looking at how these important trends can be intertwined to innovate how Germany finance the SDGs, by both unlocking new sources of finance as well as re-allocating capital. Just think about if fintech can unlock the around 2.5 billion euros of German citizen savings that are currently either in cash or in call accounts and savings books into investing in a sustainable future.

² https://www.gruenderszene.de/wp-content/uploads/2018/03/INFOGRAFIK_So-steht-es-um-Deutschlands-FinTechs_FIN_AL.png

³ The online portal paymentandbanking.com lists a total of only 338 fintechs (September 2019). Because the other sources give considerably more, we do not take this figure into account.

⁴ For example the first German bank with an exclusive focus on sustainability (GLS Bank) was founded in 1974.

⁵ Sustainable investment funds and mandates

⁶ The 3fP-Tracker analyses how financial regulations and policies in a given jurisdiction reflect climate change related risks and thereby help to foster the low-carbon transition and greening of financial markets.

Country SDG Priorities

The German Sustainability Strategy speaks about the planetary boundaries, commits to the Paris Climate Change Convention, and integrates the SDGs (Bundesregierung 2018). In the current coalition agreement of March 2018, the parties in power have also committed themselves to the ambitious implementation of the UN Agenda 2030 with its 17 global sustainability goals and to the promotion of sustainable development.



The German sustainability strategy covers all SDGs. It does not explicitly and consistently set priorities across the SDGs. In the fields of action, a distinction is made between approaches and impacts on the national level on the one hand, and international/bilateral support and impact on the other hand.

On the *national* level, the German Sustainability Strategy⁷ highlights:

- Strengthening social cohesion – leave no one behind (SDGs 1, 3, 4, 5, 8, 10, 16)
- Climate politics (SDGs 13, 7)
- Innovation and digitalisation (SDG 9)

On the *international* level, the following topics are focused on:

- Climate protection (SDG 13)
- Flight and irregular migration (SDGs 1, 2, 3, 4, 6, 7, 10)
- Sustainable economy (SDGs 7, 8, 9, 11, 12)
- Multilateralism and strengthening of the UN institutions (SDG 17)

An update of the German sustainable development strategy is scheduled for 2020.

⁷ Bundesregierung 2018, p. 16/17 and p. 8/9; SDG-numbers added by the authors

Link between six priority German Sustainability Themes and SDGs

SDGs matching Germany's national sustainability goals	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Strengthening social cohesion	1		3	4	5			8		10						16	
Climate politics and climate protection							7						13				
Innovation and digitization									9								
Flight and irregular migration	1	2	3	4		6	7			10							
Sustainable Economy							7	8	9			11	12				
Strengthening of the UN institutions																	17

(own transfer and representation)

Because of the high priority of climate protection, the federal government decided on a climate protection law in the second half of 2019. Within the German climate goals, some measures and procedures have been fixed. In this way, climate protection has been given an even more binding role than before.

State of the German SDG Landscape

To draw the landscape, the sampling was based on the “Framework for Measuring SDF Progress” of the Green Digital Finance Alliance developed in partnership with the UN SG’s Task Force for Digital Financing of the SDGs. Data was harvested via search and outreach as no comprehensive database of sustainable digital finance solutions currently exists in Germany.

Disclaimer:

The mapping is not to be confused with a certified assessment, and being listed or placed in the map does not in any form represent an official assessment or label. Also, it was not possible to assess whether the selected fintechs do harm any other SDGs.

We could not make assessments if they really have a substantial impact on reaching the mentioned SDGs. In addition, we have not been able to check with companies where we have assigned the SDGs ourselves whether they share our assessment and priority setting. This said, we emphasise that some of the candidates in our list may be considered different shades of green, depending on the assessment criteria.

In order to verify our top level evaluation, an in-depth research is indispensable. A detailed explanation and reflection on the methodology for this monitoring can be found in the annex.

Sampling the landscape

Two main categories of sustainable digital finance solutions were included:

1. **SDG Native fintechs:** A fintech is native to the SDGs if its mission and vision is explicitly designed to tackle one or more SDG challenges.
2. **SDF solutions of incumbents or tech companies:** A sustainable digital finance solution offered as just one of the financial products of a fintech or an incumbent financial service institution. Only companies with their headquarters registered in Germany were sampled. Many of the companies sampled did not use a SDG terminology. Rather they described their business as supporting ecological and social objectives, e.g. addressing one or more of the SDGs or applying ESG criteria for their business or product. In the latter case, ESG criteria were translated by the research team into matching SDG targets.

The total mapping can be accessed under the following link: <http://annefolan.com/sdfa/germanyfintech.html>.

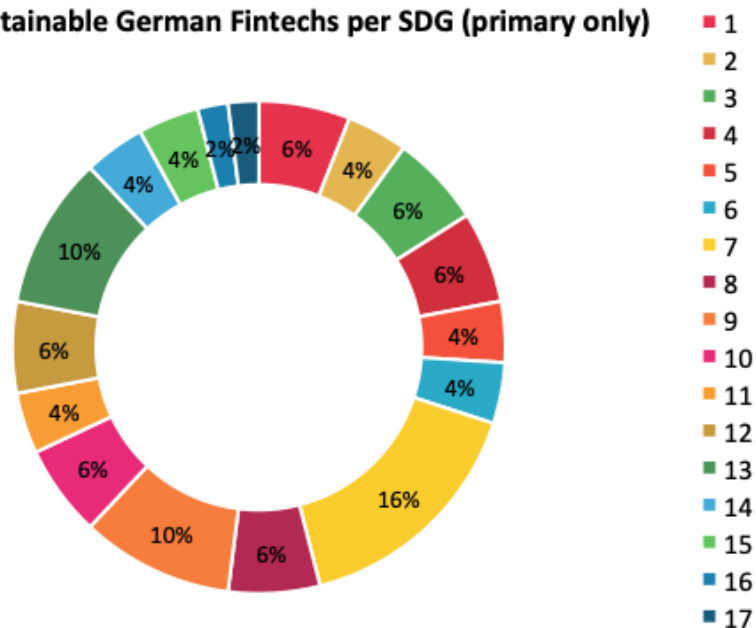
Total number of SDF fintechs in the country as a percentage of the total landscape in Germany

We were able to identify 36 fintechs in Germany which showed a more or less strong relation to the global SDGs and therefore found their way into the database and mapping. Many of them were not (yet) recognized in market surveys on fintechs in Germany, for whatever reason. Depending on the reference data, the 36 SDF fintechs represent about 4 to 5 percent of the total number of fintechs in Germany.

The German SDF fintech landscape in terms of the SDGs

A first quantitative evaluation of the data of German SDFs showed the following relative distribution of their SDG engagement:

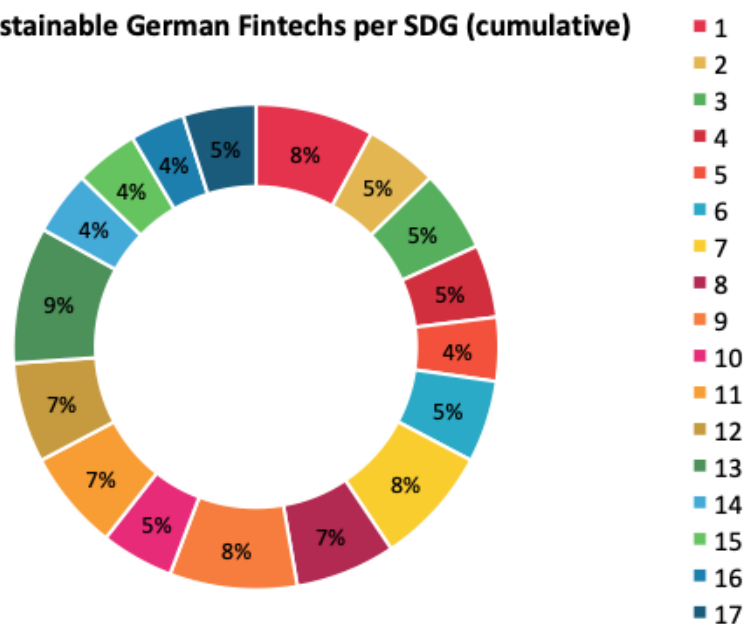
Sustainable German Fintechs per SDG (primary only)



When comparing the companies concerning the SDG most relevant for their engagement⁸, as shown in the image above, **SDG #7 (affordable and clean energy)** ranks highest, followed by **#9 (industry, innovation & infrastructure)**, and, on a par, **#13 (climate action)**.

In a cumulative evaluation, including SDGs for secondary impact⁹, the **#13 (climate action)** comes in first, followed by **#9 (industry, innovation & infrastructure)**, while **#1 (no poverty)** joins up with **#7 (affordable and clean energy)** on the third place¹⁰ (see image below).

Sustainable German Fintechs per SDG (cumulative)



⁸ The companies are classified according to the SDG they primarily have impact on. The classification also included the SDG for secondary impact, however, this is not included in this first assessment.

⁹ Including projects where we attributed "across multiple or all SDGs"

¹⁰ Primary SDGs, secondary SDGs, and "across all or multiple SDGs" included.

Concerning their publicly available description of their sustainability or impact approach, none of the relevant fintechs has formulated a direct link to the German national sustainability goals or action plan. However, the SDG priorities in our evaluation are perfectly reflecting the national SDG political priorities of Germany: climate change and energy transition, the chances and challenges of digitisation, and a fairer distribution of income and wealth.

If we match the priorities of the fintechs with the national priorities within Germany's sustainability goals (see chapter Country SDG Priorities), concordance can be seen in many areas. The closest match can be observed in the fields 'climate politics' / 'climate protection', translating to #13 (climate action) and #7 (clean and affordable energy); and in 'sustainable economy', where, apart from #7 (energy), #9 (industry and innovation) is met to a high degree; but also #8 decent work and economic growth, #11 sustainable cities & communities, and #12 responsible production & consumption have an average consistency. SDG #1 (no poverty) counts in on the goals of 'strengthening social cohesion' and 'flight & irregular migration', where #3 (good health and wellbeing) and – regarding 'flight' also clean water and sanitation – show a medium consistency. It is clear that more catalytic action will be needed from public sector to incentivise fintech innovators to deliver solutions for the two biodiversity related goals of SDG 14 and SDG 15.

Where SDF Fintechs contribute to Germany's SDG priorities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Strengthening social cohesion	✓✓		✓	(✓)	(✓)			✓		(✓)						(✓)	
Climate politics and climate protection							✓✓						✓✓				
Innovation and digitization									✓✓								
Flight and irregular migration	✓✓	(✓)	✓	(✓)		✓	✓✓			(✓)							
Sustainable Economy							✓✓	✓	✓✓		✓	✓					
Strengthening of the UN institutions																	(✓)

✓✓ = high, ✓ = medium, (✓) = low consistency (own transfer and representation)

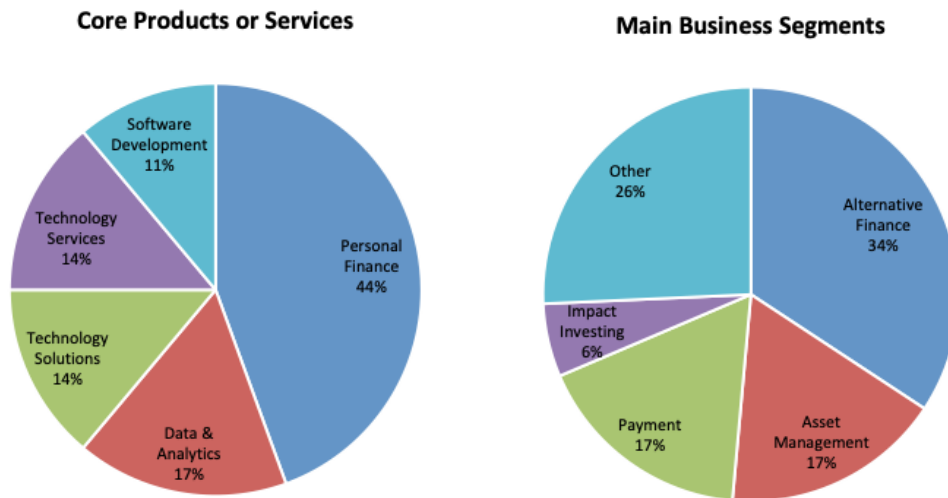
The German SDF fintech landscape in terms of technology and stage of scaling

Germany, so far, is not known as the home of big-sized global fintech corporations. For SDF fintechs, this is even more valid. Most impact oriented fintech companies are small and medium sized and concentrate on a single national or regional market (not necessarily in Europe). Furthermore, German SDF fintech innovations are rarely being developed in-house by established players. The findings point to a trend towards start-ups developing Software-as-a-service (SaaS) and customizable in-a-box solutions, widgets, mobile (web) apps, and white label p2p platforms, often provided with a licensing business model. In most cases, the underlying technology or its original provider is indifferent towards the SDGs.

If, for the digital economy, data is the new oil, processed data may be considered the new hydrogen, and data processing the fuel cell. A majority of German SDF fintechs is focussing on the processing of big data, improving (real-time) accessibility, quality, reliability, and significance of all types of SDF-relevant data. For applications working with user data, privacy, and individual data sovereignty is a serious issue for SDF fintechs.

Blockchain, DLT and smart contracts are on the rise also for impact-oriented applications. In SDF fintech, these technologies are enabling whole new financial tools, products, and economic games, with presumably the biggest disruptive potential for sustainable development.

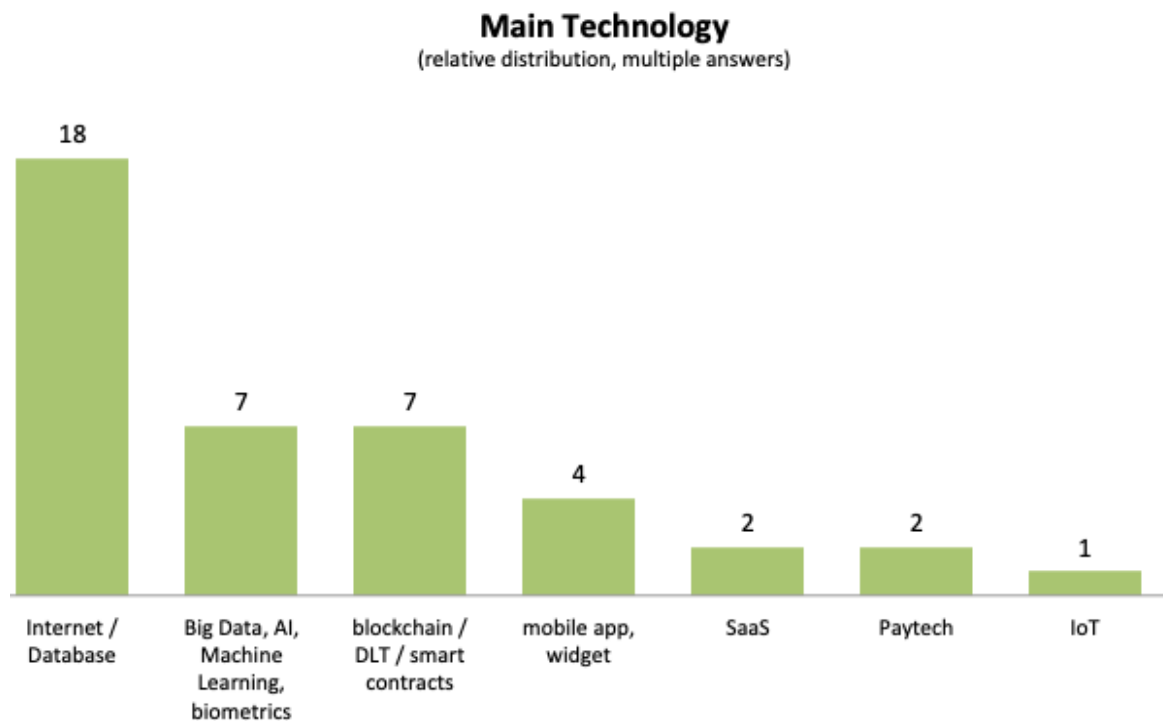
Core products or services and main business segments



A majority of core products or services developed by German SDF fintechs are addressing Personal Finance (44%). Data and analytics applications are ranking second (17%), followed by Technology services (14%), technology solutions (14%) and software development (11%).

A look into their main business segments shows a similar picture: Investment oriented applications form the great majority, which includes asset management (17%) and impact investing (6%) but also alternative finance (i.e. different types of crowd financing), which appears to play the major role. Only 17% of German SDF fintechs are involved in payment as their main business segment.

GERMANY: TECH STRATEGIES AND SIGNIFICANT TRENDS

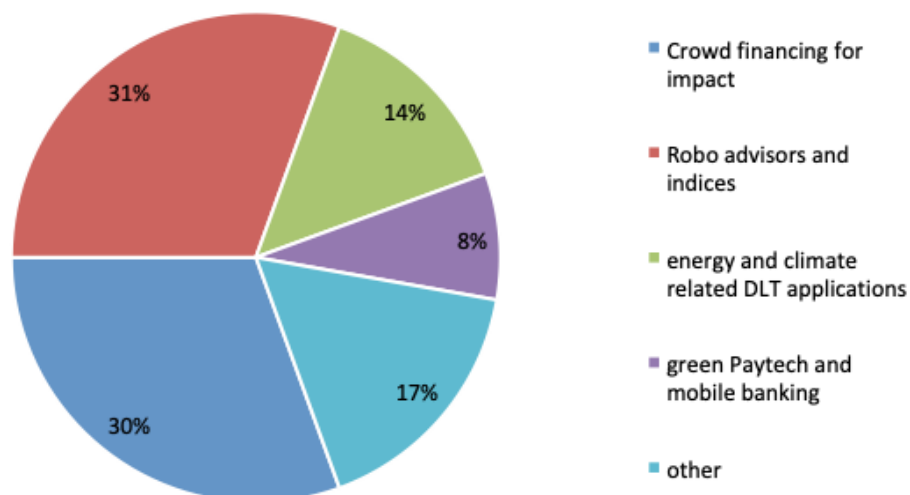


Significant trends

- In crowd financing as well as in DLT application, the majority of SDF fintechs are addressing the energy transformation (SDG7) and climate change (SDG13).
- Big data is another megatrend, especially sustainability impact data models and Robo Advisors which are integrating this data into algorithmic advice for sustainable investments and asset management.
- In green paytech, some promising German pioneers have been entering the stage.

These trends are described in more detail in the next sections.

Trends in the German SDF landscape



Germany is experienced in lowtech SDF crowd financing: Almost one third of the identified SDFs (30 percent) are classified as alternative and unregulated finance, in particular crowd lending, crowd investing, reward based crowdfunding, and donation for non-profits. Solutions come in the form of (proprietary) platforms, software-as-a service (SaaS) or white-label solutions, or widgets for third party integration. Rather low-tech but highly developed and professionalised, the technology services and solutions in this field are often integrated by incumbents or run by NFIs on a licensing basis. While crowd lending and investing is primarily applied in renewable energy and energy savings, reward based crowdfunding and donation platforms address sustainability and human rights issues more generally.

Robo Advisors, Big Data, Algorithms, AI, Machine Learning - 30+ percent of the landscape are Robo-Advisors or Indices:

The map shows that more than 30 percent of the 36 SDF solutions are either robo advisors or indices, all leveraging the increased data capabilities of fintechs to incentivise re-allocation of capital to sustainable assets or to unlock new sources of capital. The focus of most of the robo advisors is on automated portfolio management. Most of them are currently too small to channel significant amounts of capital into sustainable assets and projects, however, a few are scaling fast. A solution such as Liquid was among the top financed fintechs in Germany in 2018 and scaling across a number of markets. Liquid is not a native SDG fintech with sustainability build into its vision and mission, but rather has included a sustainable investment option into its product mix. Most robo advisors focus on democratisation of the sustainable investment space offering German citizens to use algorithmic based investing of even small amounts of their savings.

DLT is the preferred SDG 7 fintech technology: A majority of finance DLT projects in Germany appears to develop applications for the (renewable) energy sector (tokenized energy investments, off-grid PV, smart grids, e-mobility, carbon accounting, and offsetting).¹¹ The map shows five projects rooted in Germany: TheSunProtocol and Electraseedfund apply DLT for tokenized energy investments; Lition, IoTa, and Lumenaza address smart grids and automation, – all being exemplary of this new and thriving branch of “energy fintech” innovations. This type of energy fintech (‘enertech’) can generally be attributed to SDGs 7 and 13. In many cases those projects provide additional effects on other SDGs, especially when applied in emerging economies. The German development agency GIZ attests those projects a “high SDG relevance” as they help to increase resilience, incentivize renewable energies, or offer innovative financing models; and at the same time provide energy access for remote communities, facilitate inclusive peer-to-peer economies, create new sources of revenue, and foster a local, green energy production.¹²

Paytech and mobile banking – new pioneers in SDF: In the field of mobile banking and payment technologies, two German pioneers can be highlighted. Firstly, ‘Tomorrow bank’, Europe’s first ethical digital challenger bank, is offering most popular banking services on a mobile app. Secondly, Payactive which is the first and only German start-up that combines digital payment with sustainable impact donations.

¹¹ The Energy Web Foundation has its office in Berlin and plays an active, pioneering role in the local Blockchain community: <https://www.energyweb.org/>. See also the R&D project “LAMP – Landau Microgrid Project” at the Karlsruhe Institute for Technology, https://im.iism.kit.edu/english/1093_2058.php (last accessed 20th of January 2020).

¹² GIZ 2019

Categories of SDF usage in companies

The mapping shows that the 36 relevant fintechs can be classified into three broad categories regarding their SDF setup.

- A. Sustainable or SDG-related applications powered by third party fintech solutions that per se do not have an inherent sustainability approach (e.g. crowdlending platforms using crowddesk's white label solution, the ethical digital challenger bank 'tomorrow' using the banking-as-a-service infrastructure of solarisbank)
- B. Green or SDG-related technology as an optional element, product, service, or business branch within predominantly a conventional company or business model (e.g. VisualVest's 'GreenFolio'¹³, LIQID's 'Global Impact', etherisc, crowddesk's proprietary platforms 'LeihDeinerUmweltGeld' and 'LeihDeinerStadtGeld')
- C. "Native" sustainable fintechs, digital green tech startups, or Social entrepreneurs with an explicitly purpose-oriented start-up motivation (e.g. betterplace, twingle, payactive, TheSunProtocol, electrasedfund)

A majority of successfully established SDF projects can be assigned to the first category, which comprises also a big and growing share of 'newcomers'. Conventional players entering the sustainable fintech field are rare. "Native", category C-type projects appear to remain a minority in the fintech and blockchain landscape. Many startups in the concept phase show ambitions in this direction, but only a few seem to reach solid ground.

Incumbent financial service institutions SDF solutions

The mapping only samples banks of the incumbent category.

Of the 36 identified SDF solutions in the German landscape only two are developed within incumbent banks¹⁴. Most of the other banks cooperate with 'native SDF fintechs' in different manners. For example, some are using their services for creating new products, others cooperate with SDF crowdfunding platforms, and yet others establish new companies, of which they remain the owners, at least initially.

A number of the SDG native fintechs collaborate with banks for custody of assets or have banks as investors. A monitoring by the German start-up platform Gründerszene and CEBIT from March 2018 stated that 70 percent of the fintech start-ups in Germany were in some form cooperating with a financial institution¹⁵.

Hence, incumbent banks in Germany are currently not leading and shaping the sustainable digital finance space in the country. It is the native fintechs rather than the banks that are appearing from the landscape as the SDF forerunners of Germany. This seems to be different in other countries, as described in a global fintech survey of EY: "Many financial incumbents, such as banks and insurers, offer credible FinTech propositions of their own, challenging the question of what is a FinTech?" (EY 2019, p. 3). The finding of the first country test conducted by the UN Task Force and the GDFA found that in the Netherlands the incumbents are the SDF champions.

Potential explanations for German banks to be latecomers to the SDF scene include that the banking landscape is dominated by small entities with fewer resources for digital product innovation. In addition, clear political signals about sustainable finance are relatively recent in Germany compared to countries such as the UK and the Netherlands.

¹³ According to VisualVest, 25 percent of their clients decided for a 'GreenFolio' investment (20th of January 2020, via Mail).

¹⁴ Deutsche Bank Research's 'Alpha-Dig' (interactive web tool quantifying the importance of ESG issues); KfW's 'TruBudget' (a project management and monitoring tool based on DLT to make donor-financed development cooperation projects more efficient and effective).

¹⁵ https://www.gruenderszene.de/wp-content/uploads/2018/03/INFOGRAFIK_So-steht-es-um-Deutschlands-FinTechs_FINAL.png

State of Regulatory and Policy Approach to SDF

Looking at the institutional set-up and the degree of policy integration a number of trends emerge.

Regulatory Clarity and Future Fit Rules for SDF

Germany is moving fast into establishing regulatory clarity for the application of underlying technologies in finance partly incorporating a sustainability intent. The AI principles of the Data Ethics Commission position AI as a strategic tool to deliver on sustainability and introduce the idea of the individual as a data sovereign subject. The Federal Financial Supervisory Authority ("BaFin") published a "brochure on dealing with sustainability risks"¹⁶ (December 2019).

Institutional Set-up

In terms of the institutional set-up, Germany has no regulatory fintech sandbox, however, it appears that the BaFin does take on an experimental role by allowing to enable the issuance of the first regulated STO in Europe.

Degree of Policy Integration

Germany does not have a fintech strategy and no specific targets for moving fintechs into sustainability. Taking a broader look at policies related to sustainable finance on the one hand, and to digitisation on the other hand, it appears that policies related to digitisation explicitly position technology as a tool to deliver on sustainability whereas sustainable finance policies and initiatives tend not to integrate fintech and, if so, to a very limited extent. One has to look beyond both sustainable finance and digitisation policies to find the largest degree of integration. It appears that environmental policies and strategies tend to integrate the two and explicitly articulate the need to give algorithms and other core digital technologies a sustainability purpose. However, this integration is not limited to strategically position SDF as a way to deliver increased environmental finance, but rather aims at the role of digital technologies more broadly.

Degree of integration between finance, digitization and sustainability in policy

	Sustainable Finance Initiatives	Digital Policy Strategies	Environmental Policy
Digitization	✓	✓ ✓ ✓	✓ ✓ ✓
Finance	✓ ✓ ✓	✓	Unspecific
Sustainability (environmental/ social)	✓ ✓ ✓	✓ ✓	✓ ✓ ✓

There are lots of activities within the finance industry and other stakeholders concerning sustainable finance, for example the Green and Sustainable Finance Cluster Germany¹⁷ (GSFCG) and the Hub for sustainable Finance (H4SF)¹⁸ of the German Council for Sustainable Development, bringing together the activities of the various stakeholders, thus mobilising synergies that shape this transformation process. Additionally, NGOs like the WWF, German Watch, Bürgerbewegung Finanzwende, etc. are particularly active to foster ambitious sustainability criteria.

For a list of German policy and regulation used to draw the conclusions please see annex 'policy listing'.

¹⁶ https://www.bafin.de/SharedDocs/Downloads/DE/Merkblatt/dl_mb_Nachhaltigkeitsrisiken.pdf?__blob=publicationFile&v=9

¹⁷ <https://gsfc-germany.com/en/>

¹⁸ <https://www.h4sf.de/en-gb/>

Opportunity Avenues

The findings point to a number of concrete opportunity avenues to strategically leverage SDF as a tool to scale financing of the German SDG country priorities.

Accelerate German SDG 7 fintechs to fast-track financing of the energy transition

The mapping shows that SDG 7 fintechs is a dominant feature of the German SDG fintech innovation landscape. These solutions could be scaled up to accelerate the transition towards a renewable and decentralized energy system via for instance blended finance vehicles under the DLT strategy to support SDG 7 fintechs in the transition from early stage to follow-on private funding. Tax rebates could be introduced to investments into green start-ups, including into SDG 7 fintechs. In addition, the public sector could help create a warehousing mechanism for SDG 7 fintechs to lower the search costs for investors as well as to reduce the transaction costs of due diligence via bundling multiple SDG 7 fintechs. These policy measures could be designed to support the new climate protection program and law of the Federal Government. The decision to add CO₂-prices in the building and mobility sectors offers new chances for business cases for fintechs, like for example, an easy-to-handle granting of energy efficiency credits. The envisaged solution of better coupling energy flows in different sectors (buildings, mobility, industry) is a complex task. It is precisely here that integrated fin- and energy-tech companies can contribute further innovative solutions. A harmonized European regulatory and legal framework is desirable for scale-up. The Federal Government could make this a priority of its EU Council Presidency.

Green STOs as a next step to unlock citizens as financiers of the green transition

Germany is well positioned to become the first European country to issue a green STO. This can be incentivised via using public funds to offset the extra costs of preparing a Green Security Offering required to develop a green STO framework and a second opinion. It could be a pilot between a municipality and one or a number of SDG 7 fintechs where the use of proceeds is dedicated to roll-out of decentralised renewable energy. It would be able to demonstrate the cost-effectiveness of an end-to-end digitized green bond where the renewable energy asset automatically reports proof of impact data to the digital ledger and thereby to the investors on the green STO. It opens up for additional capital to finance the transition and democratise asset classes via fractional ownership. Once tested, Green STOs can be issued for other assets prioritised in the climate package, such as green buildings and clean transportation.

Fintechs innovating on financing public goods such as SDG 14 and 15

It is clear from the mapping that the public sector needs to play an active role to catalyse more fintech innovation on the SDGs related to the New Green Deal and the upcoming international Convention on Biological Diversity to be adopted in China October 2020. From the mapping it appears that SDGs 14 and 15 are currently not attracting much attention, neither by fintech innovators, nor in the national priorities. It's especially these public good type SDGs that need the public sector to help catalyse fintech innovation, as the market fails to deliver. There are already some fintech applications in Germany applied for public sector financing. For example, a crowdlending platform facilitates citizens to lend for municipal projects at moderate interest rates, enabling municipalities to finance public services at a lower cost. The BMU can use the lessons learned from these projects to kickstart new fintech experiments that, in a similar way, leverage finance for nature conservation and biodiversity supported by local communities.

Financing the SDGs with a programmed Central Bank Digital Currency

Another opportunity for public financing of the SDGs is in central bank digital currencies (CBDC), as currently discussed by central banks. A programmable CBDC would allow for distinct credit creation explicitly dedicated and addressed to the SDGs. The green digital currency would be managed according to an adapted monetary policy. Through seamless integration of sustainability data, financial as well as non-financial profitability and risks could be assessed and managed independently and processed by smart contracts. Immutable sustainability data, tokenized green bonds and a distributed-ledger based SDG-

currency could thus become the core elements constituting a global green economy. With Germany's EU presidency and Ursula von der Leyen's dedication for a European GreenDeal, KfW's pioneering work on TruBudget and the thriving German DLT- and SDF fintech environment, Germany could take the lead in building a green digital legal tender currency for Europe.

Personalize SDF Solutions - personal data for green behavioral change

German financial service institutions and public sector can collaborate with fintech to offer personalised SDF solutions. Harvesting personal data for analysis and machine learning algorithms can provide automated advice to citizens on where to invest savings for green returns, as well as specific and real-time feedback on specific behavioral changes to reduce their carbon footprint. In the landscape only two German fintechs are offering (or plan to offer) automated behavioral nudging. Provided that the respective open data standards and integration are in place, the public sector can take the lead by testing the willingness of citizens e.g. in a municipality to receive individualised carbon allowances and adjusting taxation levels automatically depending on participants' carbon impact, or directly monetize carbon emission rights in the form of a carbon currency. This might also provide new opportunities for Germany's policymakers to integrate transport and housing into the new aspired carbon trading schemes. Similarly, but in an upstream-manner, financial service institutions in Germany could also apply robo-advisor technology to develop sustainability preference profile of customers, thus responding to the changes to the Mifid II Directive in the European Union, which requires the integration of sustainability into investment advice.

Pilot Green Robo-advisory and green algorithmic investing to channel capital into underlying green smart assets using IoT

Germany has a relatively significant landscape of green robo-advisory and investment services, however, it is also clear that these do not work with asset level data harvested by IoT. Instead the robo-advisors rely on datasets from providers. According to the German 5G strategy, the country will have full 5G deployment by 2025 and it will already be rolled out in 2020 in major cities. Germany has the opportunity to catalogue green assets where IoT has the ability to open up for asset self-reporting and then trial robo-advisory based on data from the real economy. Part of the additional 500 million euro allocated by the federal government to AI could be invested in IoT, fintech integration with green asset reporting. This would be done through acceleration programs or pilots to test robo-advisory and algorithmic investing based on openly accessible green data directly from assets. In parallel, it should be assessed whether the additional energy consumption caused by these 5G IoT solutions is in proportion to the other impacts and avenues to mitigate potential negative effects. It can help pave the way for a new green data regime as well as to a new green algorithmic trading approach to test the implementation of the EU regulation on sustainable finance taxonomy.

With these opportunity avenues in mind, from a German national perspective, some cross-sectional political activities could be started to effectively foster the German SDF landscape. Local innovation hubs and accelerators specifically addressing sustainable and impact-oriented (Fintech) startups would be an essential part, complemented with public funding programs dedicated to SDFs (also in combination with other instruments and sources, like impact investing and equity-based crowdfunding). A possible cross-cutting policy could provide incentives to invest in sustainable start-ups. For continuous and systematic research and development, the subject needs to be institutionalized in universities, excellence clusters and beyond. A regulatory sandbox environment for SDF fintechs could be established for the development, launch and testing of pilot projects in Germany and EU-wide, including a strict monitoring.

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Annex

Policy Listing

New activities of German policy and regulation since 2019 concerning *sustainable finance*

The board of state secretaries proclaimed the objective that Germany should become a forerunner in sustainable finance¹⁹ (February 2019).

The Federal Ministries of Finance and for the Environment (BMF and BMU) initiated the development of a comprehensive sustainable finance strategy and hence set up a Sustainable Finance Advisory Board (SFAB)²⁰ (June 2019).

The Federal Financial Supervisory Authority ("BaFin") published a "brochure on dealing with sustainability risks"²¹ (December 2019).

The first green government bond 'Green Bund' was announced for 2020²².

German regulation and policy concerning the *digital finance*

The *Shaping Digitisation - Implementation Strategy of the Federal Government (2019)* wants to take advantage of the opportunities that digitisation offers for our prosperity and make its risks manageable. It also wants to make the many advantages of digital change tangible for people. SDGs are mentioned as cross-sectional tasks, for example climate mitigation and resources, biodiversity, sound structures in cities and country, sustainable consumption, and under sound working conditions.

The *Blockchain Strategy* of the Federal Government pursues a regulatory policy that creates incentives for investment, releases innovative forces, ensures stability and thus contributes to inclusive growth that is compatible with the sustainability goals of the German government. It also addresses the potentials and risks of certain blockchain solutions for achieving these goals (especially the energy consumption of some DLTs) (Federal Ministry of Economics and Energy, Federal Ministry of Finance 2019).

The *Law on the Implementation of the amending directive to the Fourth EU Money Laundering Directive*. As a result of the Act Implementing the Amending Directive to the Fourth EU Money Laundering Directive, crypto-custody business was included in the German Banking Act ('KWG') as a new financial service. Companies wishing to provide these services will require a licence from the regulator BaFin. The act thus creates a legally secure framework for the safekeeping of digital assets such as Bitcoin or Ethereum and digital securities (Gesetz zur Umsetzung der Änderungsrichtlinie zur Vierten EU-Geldwäscherichtlinie, 19.12.2019).

¹⁹ https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Internationales_Finanzmarkt/Finanzmarktpolitik/2019-03-05-sustainable-finance.html

²⁰ <https://www.bmu.de/en/pressrelease/sustainable-finance-committee-takes-up-work/>

²¹ https://www.bafin.de/SharedDocs/Downloads/DE/Merkblatt/dl_mb_Nachhaltigkeitsrisiken.pdf?__blob=publicationFile&v=9

²² <https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Topics/Priority-Issues/Climate-Action/2019-10-30-green-bonds.html>

German environmental guidance to digitization

The Environmental Digital Agenda of the Federal Ministry for the Environment (2019) is an agenda for environmental, climate, and nature conservation. The Ministry is working on a compass, based on this agenda, for digitisation in Germany and Europe. With a regulatory framework, this is going to become a motor for sustainability and thus also place it at the service of the global sustainability goals of the Agenda 2030.

Further activities and initiatives in Germany with relevance for SDF and sustainable start-ups

Besides these policy initiatives on digitalisation other German stakeholders published principles mentioning ethics and data self-determination, like i.a. the Data Ethics Commission of the Federal Government (2018, 2019), the German Advisory Council on Global Change (2019), and the organisers of the conference 'Bits&Bäume' (2018), a conference about a sustainable pathway of digitisation. But they do not deal with digital finance in particular.

There are several private initiatives fostering sustainable or green start-ups. One example is Start Green²³, supported by the Federal Ministry for the Environment. They offer building bridges to potential investors, networking, tools like canvas and trainings. But none of these initiatives has a focus on SDF today, as far as we know.

²³ <https://start-green.net/>

Methodology for the SDF mapping within the scope of this report

Sources:

We started our research with the German fintechs we had presented in the context of the Conscious Fintech Meetup series from 2016 onwards. We asked more than 700 followers from our community to send us their recommendations for relevant fintechs and added some candidates already known to the Sustainable Digital Finance Foundation at the start.

As a second step, we contacted the largest banks in Germany (according to their balance sheet total) and asked them whether and what kind of fintech they were developing, offering, or using.

A third step was to search for SDG- and fintech-related entries within existing data sources. We combed through some comprehensive fintech overviews for candidates that were suspectedly addressing one or more of the SDGs. We also screened several databases on impact oriented blockchain/DLT projects.

Last but not least, we sent direct inquiries to some of the critical candidates in our list; and conducted some interviews with experts in fintech, banking innovation, and blockchain technology / token design, to round off the picture.

Evaluation procedure:

In order to evaluate if a fintech fulfills the necessary criteria and conditions to enter the mapping database, and which categories matched best to describe it, we defined and applied, in principle, the following three-step procedure:

1. Is the fintech company or incumbent fintech solution “native SDG-related”?

Yes, the SDGs or a similar set of sustainability criteria is an essential part of its DNA, firmly rooted at the core of its business.	No, there is a reference but the predominant part of its business seems indifferent towards sustainable development or may even harm specific SDGs.
✓ included	→ step 2

2. Does the business obviously harm specific SDG criteria or human rights?

No, there is no obvious harm of SDGs or human rights visible on this level of evaluation.	Yes, at a closer look, the business obviously harms specific SDG criteria or human rights.
→ step 3	✗ excluded

3. Is the company’s SDG engagement structurally anchored for continuation?

Yes, the company has laid the structural basis for a continuous SDG engagement, e.g. by defining a specific branch or brand, through formation of a new company, co-venturing or equity investment.	No, the engagement is confined to an isolated intervention, a single product or service, without any long-term commitment.
✓ included	✗ excluded

Subsequently, we filled in the company details, attributed the most obvious SDG relations, selected adequate categories and summarized the most important key facts in a brief description.

Reflection on the methodology, challenges, and limitations

In our search for SDG-related German fintechs we have experienced the following challenges:

First, no definite or common taxonomy regarding environmental and social sustainability exists to date that would be attributed by the respective companies or by external players; let alone a widespread, significant label. Most companies did not explicitly mention if and how their business relates to the SDGs. Existing third party lists and data sets varied broadly in numbers, categories, attribution of sustainable impact as well as reliability of the data. In order to identify relevant companies and decide inasmuch they were matching our basic selection criteria, a deeper look into their profiles and activities was indispensable.

Second, the field of SDG related fintechs appeared as a very narrow niche but at the same time a cross-sectoral overlap between the three main topics: Sustainable Development, Digitalisation, and Finance. In our research, it was relatively easy to get insights on the combination of two of the three topics, say: fintech, or Sustainable Finance, or Technology Innovations for Sustainable Development. Finding entries that matched the cross-section of all three, as was this project's intention, showed to be much more difficult: A search on positiveblockchain.io for example, filtering German entries that would match the category 'fintech', brought zero results. The "three-dimensional complexity" of the topic not only explains the small number of relevant companies. A similar situation is apparent in policy, regulation, and guidance (see chapter *State of Regulatory and Policy Approach to SDF*).

Third, the option to choose only between 'incumbent financial institution' and 'fintech' as requested by SDFA appeared to be too narrow. Inhouse development of (sustainability oriented) fintech was the exception with incumbent financial institutions while the involvement differed gradually between purchased white label applications and equity investment in (solid) fintech startups or in tech consortia consisting of startups and established players. Perhaps our 'Categories of SDF usage in companies' (see chapter *State of the German SDG Landscape*) can point the way to a more granular classification.

Similarly, the proposed assignment of the main business segments of a SDF company or solution to a single segment sometimes was not suitable because the SDF aimed at multiple segments.

To avoid greenwashing due to superficial attribution of positive impacts, we strongly recommend assessing potential negative SDG impacts in the analysis as well, ideally monitored by a trusted partner. For a solid and reliable attribution of SDG impacts, a systematic assessment and certification would be necessary, which was far out of range for this mapping project, regarding time and budgets.

As we have experienced in the research for this mapping, "native" SDG fintechs are still very rare, globally as well as in Germany. Dealroom.co distinguishes "core" and "side" SDG companies in their fintech list to make clear if creating positive impact is a core intention of a business or just an additional approach. We would recommend to use a similar distinction or define a set of more refined attributions allowing to assess the grade of a fintech's engagement for sustainable development, ranging from "brownish" or "grey-green" to "saturated green" companies.

Imprint

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