

Green Startup Monitor 2018



English Version



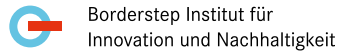
Borderstep Institut für
Innovation und Nachhaltigkeit



Editors and Project Realization

Borderstep Institute for Innovation and Sustainability (Borderstep Institut für Innovation und Nachhaltigkeit gGmbH)

German Startups Association (Bundesverband Deutsche Startups e.V.)



Borderstep Institut für
Innovation und Nachhaltigkeit



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Financial Support

German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt)



Design

loveto GmbH, Agentur für Markenentwicklung und Design

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ISBN

978-3-9814819-3-8

Citation

Please cite this publication as follows:

Fichter, K. & Olteanu, Y. (2019). Green Startup Monitor 2018. Berlin: Borderstep Institute, German Startups Association

Acknowledgement

Our sincere thanks go to the German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt) for their financial support, to our partners and to all participants.

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Greeting by the Federal Minister for the Environment **Schulze**



© BMU/Sascha Hilgers

Dear Readers,

The best recipe for success concerning innovation is to combine ecological and social progress. “Green” products, processes and services are a prime example of this: They contribute to climate and environmental protection, and they improve the living conditions of the people who use them. Therefore, the demand for environmental technologies will determine the markets of the future. The global Green-Tech market is already growing rapidly. Roland Berger forecasts that the global market volume for environmental technology and resource efficiency will increase from more than 3,200 billion euros in 2016 to over 5,900 billion euros by 2025.

If one wants to keep pace in these markets, one has to rethink many business models and value-added networks; we can no longer

achieve the solutions of the future with selective optimizations. Here, we need sustainable startups: Around two-thirds of all “green” basic innovations can be traced back to startup companies. Without the relevant green business formations, for example, the renewable energy sector in power generation would not have developed in this way! And in other areas, such as mobility or the plastic pollution in the oceans, the pressure for change is becoming ever clearer.

At the same time, global competition in the technology markets continues to increase. Others have also recognized how attractive this market is. Only with sustainable, fundamentally new solutions can German suppliers continue to benefit from the growing global demand for GreenTech. Therefore, one certain

fact makes me particularly optimistic about the results of the Green Startup Monitor: The fact that green startups are especially interested in internationalization – far more so than non-green startups.

The precondition for the success of sustainable business ideas, however, is not only the innovative ability but also the right framework conditions – a level playing field for sustainable innovations. The Green Startup Monitor provides important information on how we can help sustainable innovations achieve market breakthroughs.

Financial market players should increasingly take sustainability aspects into account in their decisions so that more investment in sustainable technologies, products and services

is encouraged. This is an issue not only within the Federal Government, but also on the EU level. After all, Europe and Germany are facing comprehensive structural change. If we want to shape this change proactively, we must promote sustainable startups and sustainable innovations in a more directed manner.

Only in this way can Germany remain a modern, successful industrial country.

Svenja Schulze

*Federal Minister for the Environment,
Nature Conservation and Nuclear Safety*

Greeting by the Federal Minister for Economic Affairs **Altmaier**



Dear Readers,

Our social market economy thrives on the fact that there are people who are willing to take their fate into their own hands and put all their eggs in one basket in order to become founders. They help to ensure that economic development moves ahead and that Germany retains its leading position in the world.

The Green Startup Monitor, an unprecedented concept, classifies more than a quarter of the innovative startups as “green”. With resource- and environment-friendly products, innovative processes and new business models, they provide impulses for a continuous renewal of our economy. At the same time, they prove that ecology and entrepreneurial solutions do not have to be opposites; they can work together to promote our country.

That is why Germany needs a new entrepreneurial spirit and more people who can put their ideas, creativity and skills into practice in their own startups. With the “GO!” startup offensive launched by me, we are supporting the step into self-employment. The decisive factor is that we use customized instruments to provide targeted support to courageous founders so that they can make a successful start in entrepreneurial independence. After all, the startup scene is diverse and heterogeneous. The Green Startup Monitor is, in any case, an excellent instrument that can be used to shed more light on the “green” startup scene in Germany and to make it more visible overall.

Furthermore, I am also keen on the social and political appreciation of entrepreneurial independence and the communication of

economic knowledge and entrepreneurial thinking. In the spirit of a new startup culture and a strengthened entrepreneurial spirit, we will above all motivate more young, qualified people to further develop their own ideas and implement them entrepreneurially. On the political side, we need to reduce administrative hurdles and bureaucratic effort and speed up digital processes.

Finally, the Federal Government's sustainability strategy is a guiding principle for all funding programs of the Federal Ministry of Economic Affairs and Energy. Just to name two examples: In the “EXIST – Existenzgründungen aus der Wissenschaft” (“startups out of the science sector”) funding program, which we increased significantly this year and which is co-financed by the European Social Fund, ecological sus-

tainability is a cross-cutting objective. Secondly, through the High-Tech Startup Fund, – which is largely financed by the Federal Ministry of Economic Affairs and Energy – numerous cleantech startups, more than two-thirds of which are classified as “green” in the Green Startup Monitor, have already received funding.

I would like to thank the authors very much for the Green Startup Monitor. I am sure that it will make its contribution to the further development of “green” startups in Germany.

Peter Altmaier

Federal Minister for Economic Affairs and Energy

Foreword by the Initiators



Prof. Dr. Klaus Fichter
Founder and Director
Borderstep Institute for
Innovation and Sustainability
Image: Joerg Frank/Borderstep



Florian Nöll
Chairman
German Startups Association
Foto: Bundesverband Deutsche Startups



“Green Startups” are not only innovative and growth-oriented but also sustainable. With their products and services, they make an important contribution to meeting the major sustainability challenges of our time in an effective and entrepreneurial way, whether it is turning energy systems around, climate protection, avoiding plastics in the oceans or implementing a sustainable circular-flow economy. However, the term “green” does not only cover ecologically sustainable products and services but also a broad spectrum of diverse sustainable solutions to social challenges – for example, in the areas of education, nutrition or health. The innovative solutions offered by green startups thus cover the entire range of the Sustainable Development Goals: The global goals of the United Nations to secure sustainable development that came into force in 2016.

Green startups have also become a central economic factor. As studies by the Borderstep Institute show, they have created well over a million new jobs in Germany over the past ten years. They are not only active in the energy industry, the mobility sector and classic environmental technology markets but can also be found in all sectors: From agriculture to the financial sector. In order to better connect the innovative founders in the cross-sectional sector “Green Economy”, the German Startups Association launched the “Green Startups Platform” in 2017. With its diverse networking activities, it has since provided green startups with greater visibility and a voice among politicians, investors and established companies.

Green startups also play a key role in promoting structural change. While established companies generally have their strengths in improvement innovations, it is startups that



introduce fundamental environmental innovations to the market as pioneers. In the transformation bringing us towards a climate-neutral economy, the innovative startup teams are the main drivers of change. As the results of the Green Startup Monitor (GSM) show, green startups predominantly rely on digital business models. In other words, they are making particular use of the opportunities offered by digitalization to implement new sustainable solutions.

The Green Startup Monitor also shows that green startups have to struggle with particularly high barriers in many markets and are often not rewarded for their outstanding sustainability performance. In some cases, they are even disadvantaged in regard to startup promotion programs. The GSM, therefore, makes suggestions on how this imbalance can be remedied and how the economic and

sustainable potential of green startups can be better utilized.

In view of the economic and ecological importance of green startups, it is essential to have a monitoring instrument available that makes the share of this type of startup in the startup scene, special characteristics and achievements and also specific challenges visible in politics and startup promotion programs as well as to investors and established companies. We are, therefore, pleased that the Green Startup Monitor – published by the Borderstep Institute for Innovation and Sustainability and the German Startups Association – provides us with a sound factual basis for the policy debate on the respective economic and environmental aspects. We would like to thank the German Federal Environmental Foundation (DBU) for its financial support of the Green Startup Monitor.

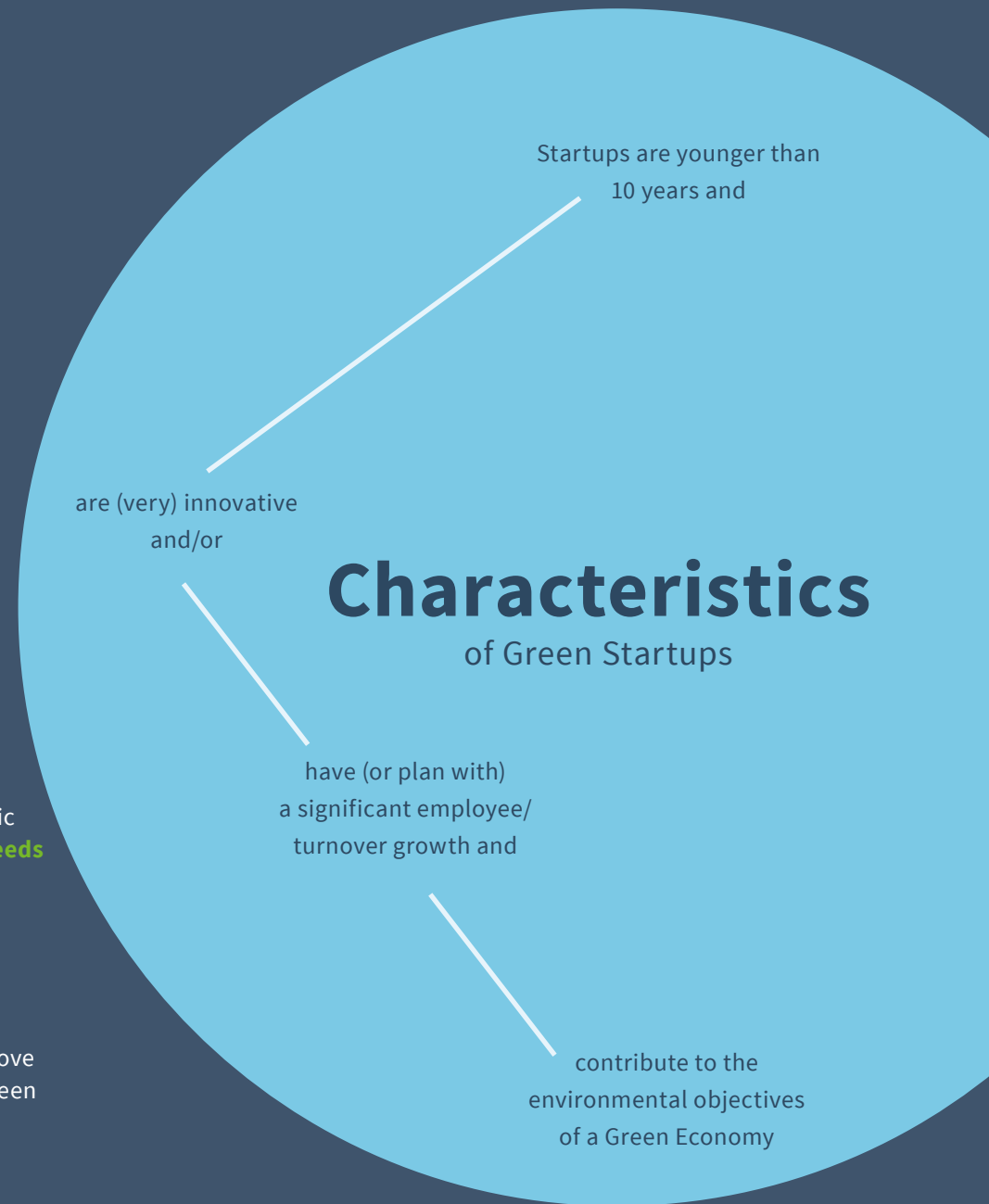
Prof. Dr. Klaus Fichter

Director, Borderstep Institute

Florian Nöll

Chairman, German Startups Association

The Green Startup Monitor



10

Key Facts of the GSM 2018

Two out of three German startups strive to achieve a positive **social or environmental impact**.

26% of German startups can be considered green because their products, technologies and/or services **contribute to the environmental goals of a Green Economy**.

Green startups are planning with a **similar revenue and employee growth** as non-green startups.

Green startups want both, to be **financially successful** and to achieve a **positive environmental and social impact**.

Green startups assess their **innovativeness higher** than non-green startups.

Green startups have **far fewer problems recruiting IT professionals**, despite the general shortage of specialized staff.

The percentage of **female green founders** is slightly **higher** than that of non-green startup founders (yet at **18%** still low).

Two out of three startups in the sectors of **energy production, chemicals, agriculture and mobility** are green.

Green startups are more likely to encounter **challenges with attracting financing** than non-green startups.

Particularly innovative and growth-oriented green startups call for **political support** for **exchange with established companies**.

Der Green Startup Monitor

(DE)



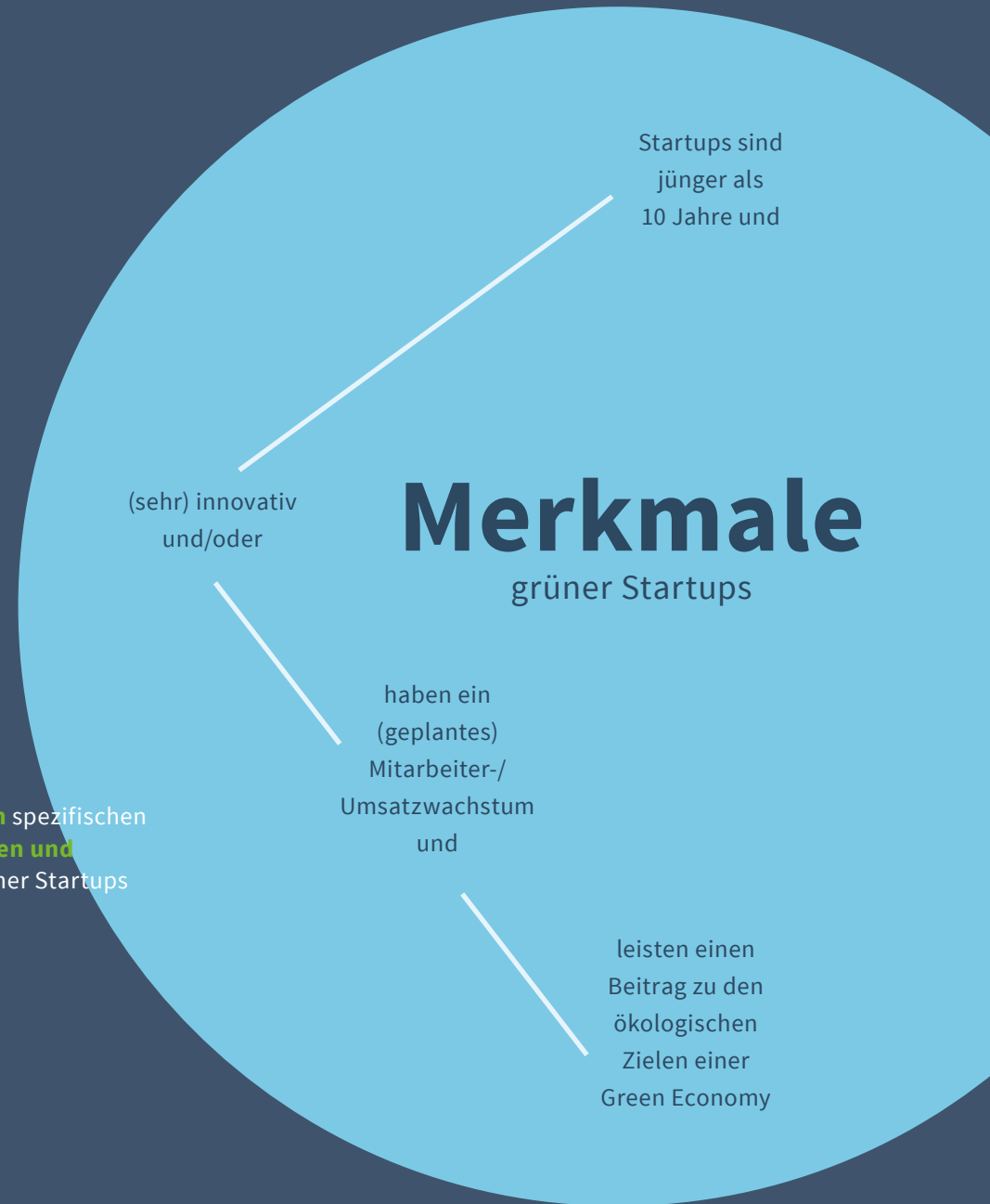
Aufzeigen der Bedeutung grüner Startups im deutschen Gründungsgeschehen und als Innovationstreiber einer Green Economy



Identifikation von spezifischen **Herausforderungen und Bedürfnissen** grüner Startups



Empfehlung von Maßnahmen zur Verbesserung des Gründungs- und Marktumfelds grüner Startups in Deutschland



Startups sind jünger als 10 Jahre und

(sehr) innovativ und/oder

Merkmale grüner Startups

haben ein (geplantes) Mitarbeiter-/Umsatzwachstum und

leisten einen Beitrag zu den ökologischen Zielen einer Green Economy

10

wichtige Fakten aus dem GSM 2018

Zwei Drittel aller befragten Startups streben danach, eine **positive gesellschaftliche oder ökologische Wirkung** zu erzielen.

26 % aller Startups können als **grün** eingestuft werden, weil sie mit ihren Produkten, Technologien und/oder Dienstleistungen einen **Beitrag zu den ökologischen Zielen einer Green Economy** leisten.

Grüne Startups planen ein **ähnliches Umsatz- und Mitarbeiterwachstum** wie nicht-grüne Startups.

Grüne Startups wollen sowohl **betriebswirtschaftlich erfolgreich** sein, als auch eine **positive ökologische und gesellschaftliche Wirkung** erzielen.

Grüne Startups schätzen ihre **Innovativität höher** ein als nicht-grüne Startups.

Grüne Startups haben trotz des allgemeinen Fachkräftemangels **deutlich weniger Probleme, IT-Fachkräfte zu rekrutieren**.

Der **Frauenanteil** unter grünen Startup Gründern ist **etwas höher** als bei nicht-grünen Startups, mit **18 %** jedoch trotzdem gering.

Zwei Drittel der Startups in den Bereichen **Energieerzeugung, chemische Erzeugnisse, Landwirtschaft und Mobilität** können als grün eingestuft werden.

Grüne Startups sehen in der **Kapitalbeschaffung** deutlich **häufiger eine Herausforderung** als nicht-grüne Startups.

Besonders innovative und wachstumsorientierte grüne Startups wünschen sich von der Politik **Unterstützung** beim **Austausch mit etablierten Unternehmen**.

Green startups introduce themselves



Thermondo



Thermondo
Der Heizungsbauer.

Thermondo was founded in 2012 because we realized that the energy revolution could only work with tangible solutions. This includes increasing efficiency, expanding decentralized energy supply and switching to environmentally friendly technology.

Today, we are the leading heating installer for one- and two-family homes and have already enabled more than 15,000 homeowners to heat with less CO₂ emissions. We only use efficient heating technologies such as condensing boilers, solar thermal systems and domestic hot water heat pumps.

Our customers save heating costs and at the same time make an important contribution to the environment. With an efficient heater, they can reduce their CO₂ emissions by up to 30%.



Coolar



COOLAR

Coolar has developed an innovative, completely water-based cooling system that allows a refrigerator to be operated with heat from low-emission heat sources such as solar thermal systems, district heating from cogeneration, or waste heat.

This allows Coolar to improve energy efficiency in industrialized countries while providing the most robust, reliable and sustainable solution for medical and vaccine cooling in regions without a reliable power grid. The use of robust thermal energy storage solutions instead of short-lived and environmentally harmful batteries guarantees longevity and reliability.

Combined with our technology, an average of 60% of CO₂ emissions and 75% of operating costs in Germany could be saved compared to when using conventional refrigerators. In addition, the system does not contain any climate-damaging refrigerants, which are currently the most important single factor in global warming.



Seedforward



SeedForward is an agricultural innovation startup focused on developing solutions for climate-friendly and sustainable agriculture. Due to increasing regulatory restrictions on fertilizers, pesticides and seed treatments, many farmers have limited prevention and treatment options to achieve stable earnings.

For this reason, the first marketable product which we developed is an organic seed treatment. It is based on a unique composition of natural materials and has a positive effect on the resistance and efficiency of plants as well as on the soil ecosystem. Although this is only part of the overall solution, it allows farmers to stabilize their harvests and often reduce fertilizer use.



Ono



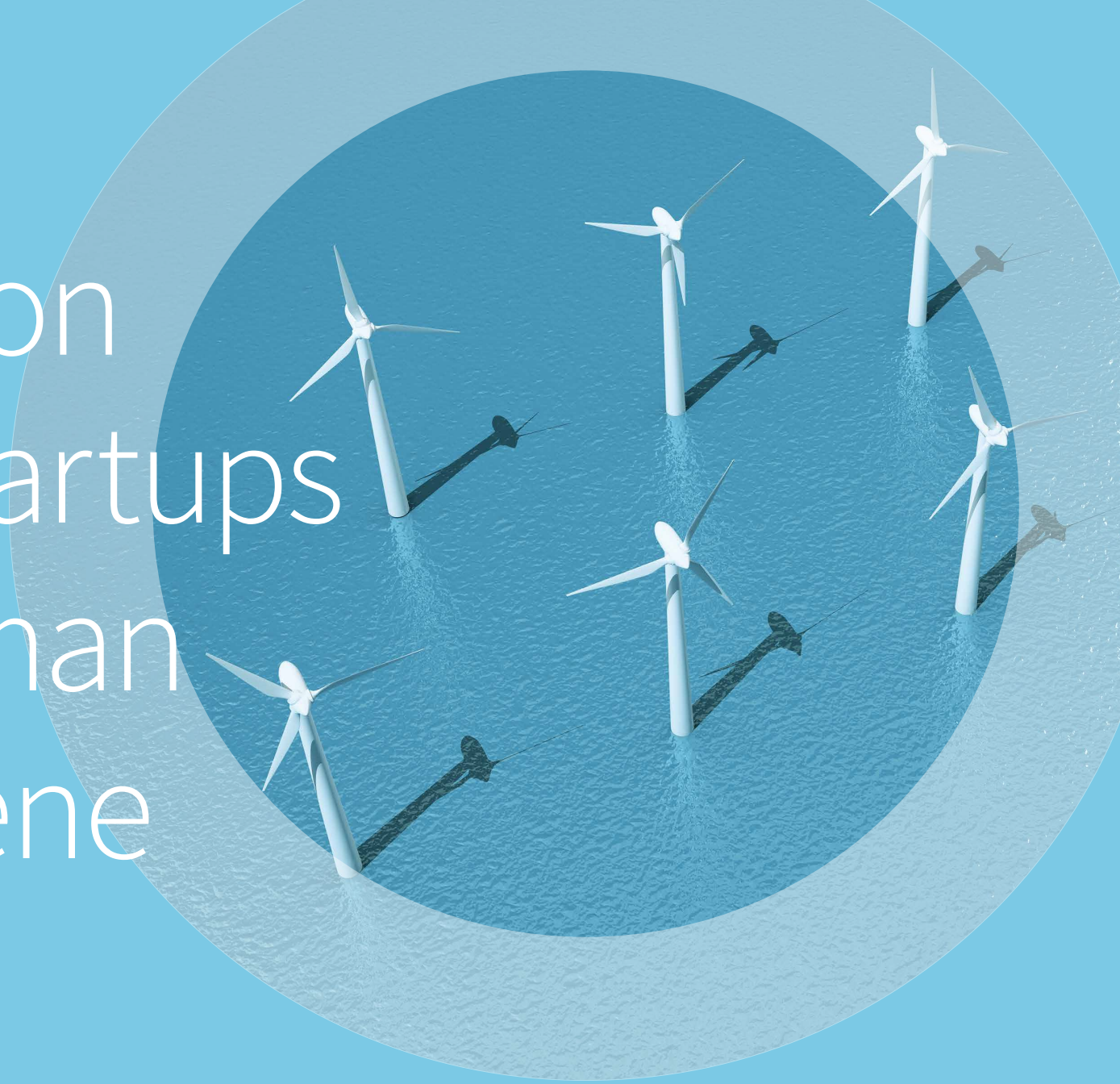
ONO

Delivery traffic is booming. Far more than 10 million parcels are transported daily in Germany. The trend is rising rapidly. This is already bringing cities, their infrastructures and traffic to the absolute limit – not to mention the environment: 500,000 mostly diesel-powered delivery vehicles are trying to cope with the volume of deliveries in Europe; this results in over 6 million tons of CO₂ per day.

ONO is more than an alternative. The revolutionary eCargobike, a hybrid of electric bicycle and van, offers solutions: Whether they be for people and the environment, traffic and infrastructure, or in terms of efficiency and profitability for logistics companies on the “last mile”.

1

Classification of green startups in the German startup scene



1.1

What is a green startup?

Startups are younger than 10 years, are (very) innovative and/or have a (planned) significant employee/sales growth. **“Green”** startups are characterized by the fact that their products, technologies and/or services contribute to the ecological goals of a Green Economy.



“The sustainability megatrend has also reached the business world, and entrepreneurs in particular are frequently personalities who want to make a difference.”

Dr. Irina Tiemann

Business Innovation

EWE Aktiengesellschaft

“Startups” represent a subset of new business formations of greater economic significance¹ and are defined here on the basis of the characteristics proposed by the German Startups Association.² In this sense, “startups” can be characterized as high potentials because, with their innovative products and business models, they have a special significance with regard to economic impact factors such as the creation of new jobs (Kollmann, Stöckmann, Hensellek, & Kensbock, 2017, p. 16), on the one hand, but also a special potential for ecological aspects such as the reduction of greenhouse gas emissions (Fichter & Clausen, 2013, p. 275), on the other.

It can be assumed that around 23,700 startups were operating in Germany in the year 2018.³ Based on the results of this Green Startup Monitor, it can be assumed that around 6,000 of these startups can be classified as green.

1

Startups with *greater economic significance* include all legal entities and partnership companies. Incorporations of natural persons must meet specified criteria (commercial register entry, craftman’s card or at least one employee) in order to qualify (Statistisches Bundesamt, 2018, p. 545).

2

A detailed derivation of the startup term can be found in the German Startup Monitor 2018 (Kollmann, Hensellek, Jung, & Kleine-Stegemann, 2018).

3

For the derivation of the number of startups in Germany, see Chapter 6.

1.2 Why are green startups particularly important?

In order to achieve the sustainable development goals and solve key challenges such as climate change, biodiversity loss and water scarcity, entrepreneurial approaches are increasingly recognized as important by national and international policies (United Nations, 2015). In 2014, the European Commission published the Green Action Plan for SMEs. The plan is designed to help startups and other companies take advantage of the business opportunities offered by the transition to a Green Economy (European Commission, 2014). Germany's new High-Tech Strategy 2025 also underscores the importance of the topic and provides new impulses.

It demands the integration of sustainability aspects into the strategic orientation of all startups and respective support programs with the aim of accelerating the transformation towards sustainable economic development. The climate-relevant potential of innovative technology and knowledge-based startups is particularly highlighted (Bundesministerium für Bildung und Forschung, 2018). Also, the new energy research program of the Federal Ministry for Economic Affairs and Energy (Bundesministerium für Wirtschaft und Energie, 2018, p. 19) emphasizes the importance of startups for energy system transformation and has created its own "Research Network Startups" with the aim of integrating them into energy research.



2

How relevant are green startups in the German startup scene?



2.1 A quarter of German startups can be classified as green

A good quarter of the startups participating in the German Startup Monitor can be classified as green.⁴ The Green Startup Monitor thus compares the responses of 295 green startups, founded by 728 founders and with currently (according to their own account) 3,480 employees, with the responses of 863 startups that do not contribute to a Green Economy.

The participating green startups are between 0 and 10 years old. On average they are quite young at 2.5 years. Three out of four (76%) were founded in 2015 and later. Every second green startup in the data set is in the “*Startup Stage*”, meaning it has developed a market-ready offer and is recording its first sales or users. The other half of the companies are spread almost equally between the “*Seed Stage*” (no sales/no users yet) and the “*Growth Stage*” (strong sales/user growth). Only three out of every hundred green startups are in a later development phase.

4

For the demarcation between green and non-green startups, as well as between this GSM 2018 and the Green Economy Gründungsmonitor (GEMO), see Chapter 6. 1,158 startups in the data set responded to all three questions relevant for the classification and could, therefore, be included in the analysis.

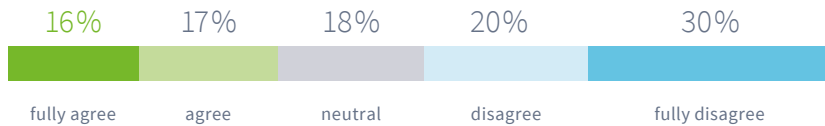
“Green startups are still considered a niche development. A mistake!”

Dr. Matthias Wittstock,
Wittstock Consulting
(Former Head of the Startup Department
at the Federal Ministry for
Economic Affairs and Energy)

→ Self-assignment of startups to the Green Economy

based on responses of 1,348 startups

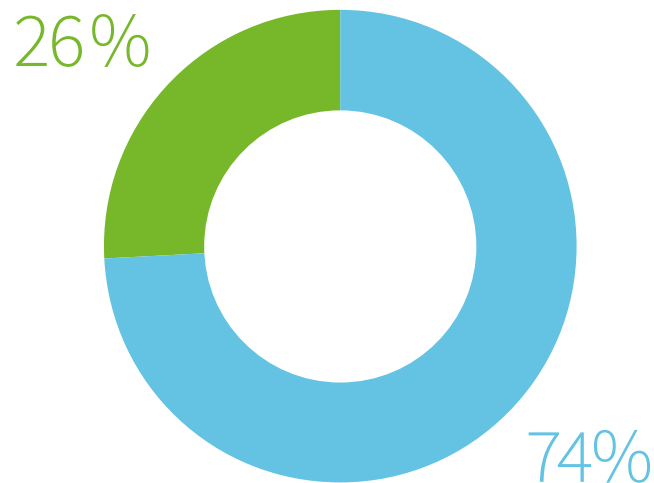
Our products/services can be assigned to the "Green Economy" because they purposefully contribute to environmental protection, climate protection and resource conservation.



→ Distribution green startups / non-green startups

based on responses of 1,158 startups

■ green startups ■ non-green startups



2.2 Locations and startup hotspots

Measured in absolute terms, most green startups can be found in the federal states of North Rhine-Westphalia, Baden-Württemberg and Berlin.⁵ The German Startup Monitor bundles various locations into five so-called “Startup Hotspots” (Kollmann, Hensellek, Jung, & Kleine-Stegemann, 2018, p. 23) for an easier overview. As is the case for all startups, the green startups hotspots are headed by Berlin (14%), followed by the Rhine-Ruhr metropolitan region (10%), Stuttgart/Karlsruhe (7%), Hamburg (6%) and Munich (5%).

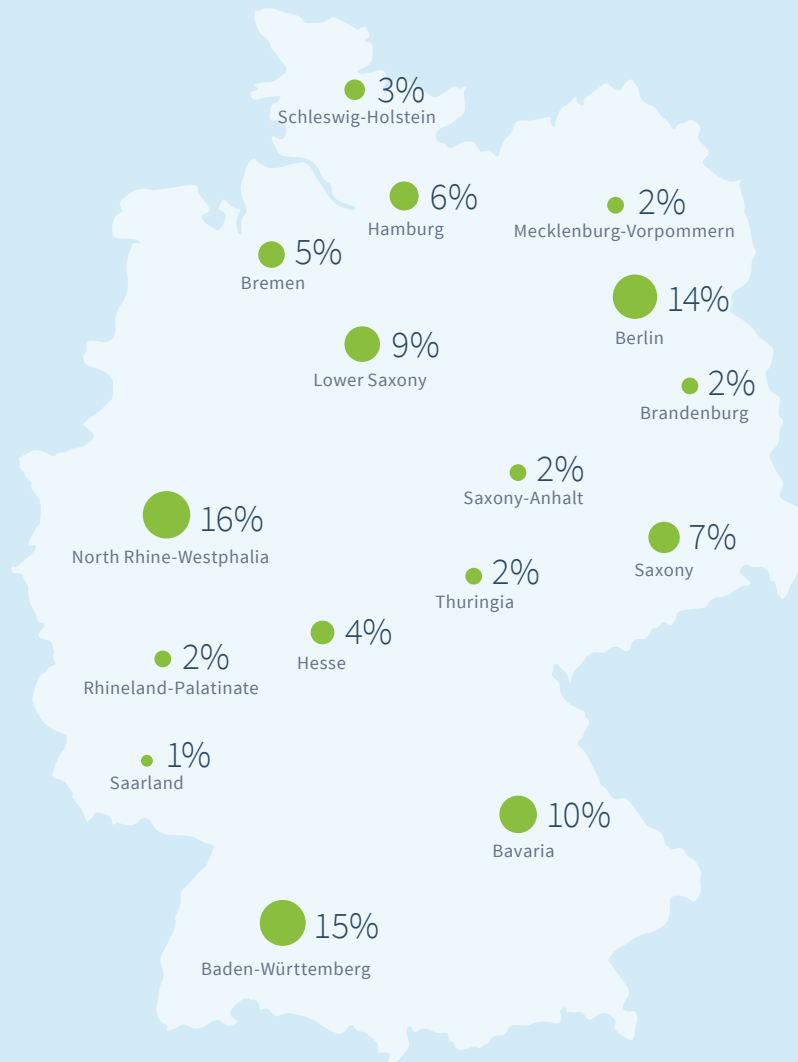
In four federal states, green startups account for over a third of all startups: Saxony, Brandenburg, Thuringia and Schleswig-Holstein. It is noticeable here that although the new federal states Saxony, Brandenburg and Thuringia only host a small share of the absolute number of green startups in the data set, there is a clearly above-average trend towards green startups in these states. Looking at startup hotspots, the Stuttgart/Karlsruhe region leads with the highest proportion of green startups (27%), followed by Berlin (24%), the Rhine-Ruhr metropolitan region (23%), Hamburg (23%) and Munich (21%).

5

The figures on federal states and startup hotspots presented here reflect the distribution of green startups in the data set. They therefore provide an interesting insight into the distribution of those green startups that have been invited to participate in the survey and have decided to do so. This distribution is a trend, and it is not possible to draw conclusions about the exact distribution of all green startups.

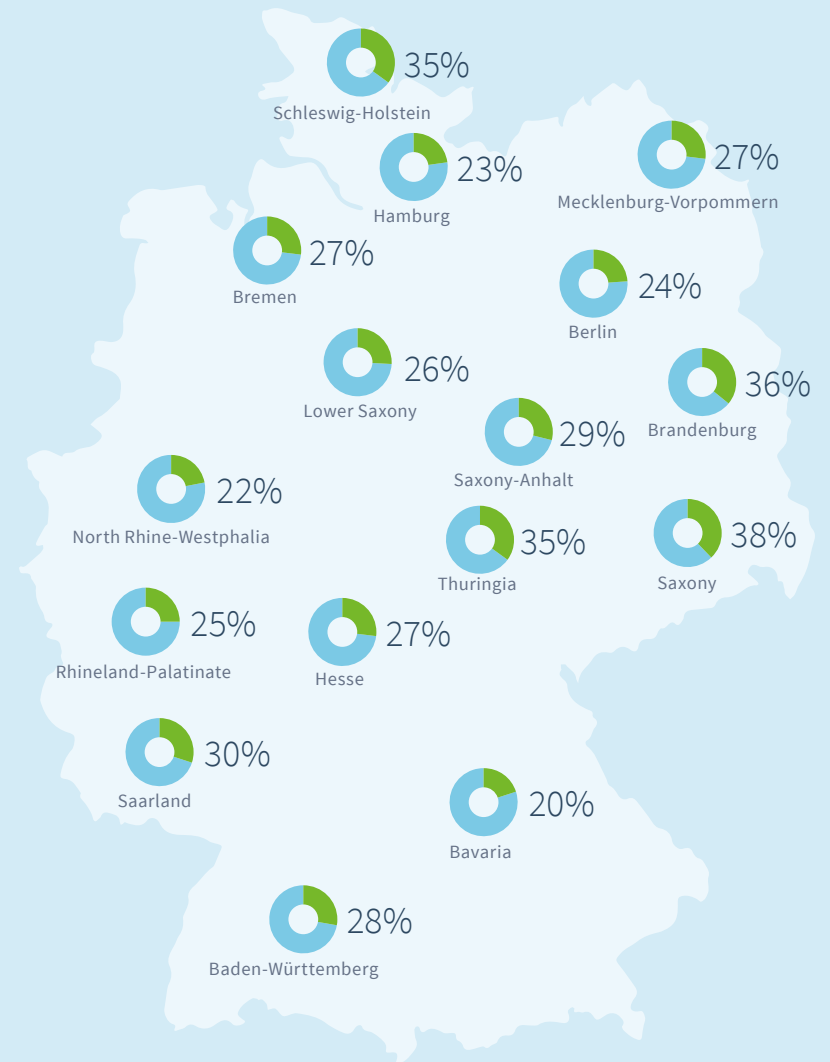
➔ Distribution of green startups across federal states

based on responses of 295 startups



➔ Proportion of green startups among all startups in the respective federal state

based on responses of 879 non-green und 295 green startups



2.3 Industries and technology categories

Every fifth green startup is active in the information and communication technology sector. This means they deal with intermediate or end products or services “that enable information search and processing as well as communication between people electronically” (Schnorr-Bäcker, 2016, p. 35). Thus, startups from the information and communications technology sector account for the majority of green startups. In comparison to the general startup scene, where it is one-third of the startups that assign themselves to this sector (Kollmann, Hensellek, et al., 2018, p. 25), the share is, however, notably lower.

With great distance from the information and communication technology sector follow the food, energy and consumer goods sectors. The energy sector in particular, with a share of 8%, is of distinctive importance for green startups compared to the general startup scene in Germany, in which only 3% assign themselves to it (Kollmann, Hensellek, et al., 2018, p. 25). When considering only the subgroup of espe-

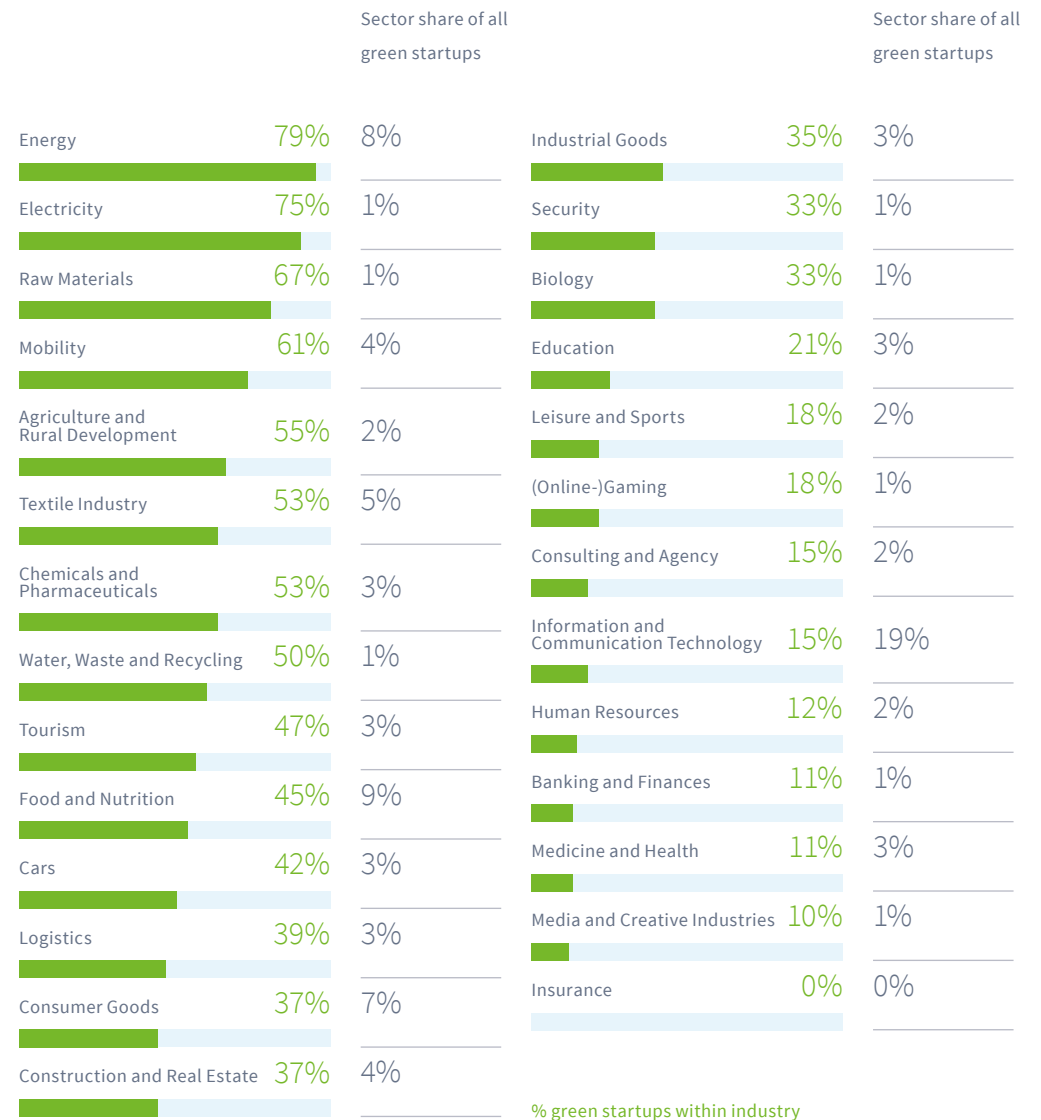
cially growth-oriented startups,⁶ the share of green startups in the information and communication technology sector increases to 27%. Growth-oriented green startups do, therefore, engage in this sector over proportionally.

Within their respective sector categories, green startups dominate in six. In the energy and electricity sectors, almost eight out of ten startups can be classified as green. This is also the case for seven out of ten startups in the raw materials sector and six out of ten in the mobility sector.

Green startups also make up the majority of startups in agriculture, textiles, chemicals and pharmaceuticals, and even in the area of (online) gaming, around 18% classify themselves as green. Banking, finance and insurance startups hardly ever focus on ecological sustainability. It remains to be seen whether, for example, the European Commission's Sustainable Finance Initiative will have an impact on this in the future.

→ Sector distribution and share of green startups per sector

based on responses of 855 non-green and 293 green startups



Regarding technology categories,⁷ the self-assignment of startups shows that green startups dominate in four categories. In the areas of EnergyTech, ChemTech and AgriTech, seven out of ten startups are green. This also applies to six out of ten Future Mobility startups. The distribution across technology categories is thus similar to the distribution within the industries described above and hence underlines the importance of green startups in technical and industrial areas. The innovations of these startups thus make a major contribution to the ecological goals of a Green Economy.

6

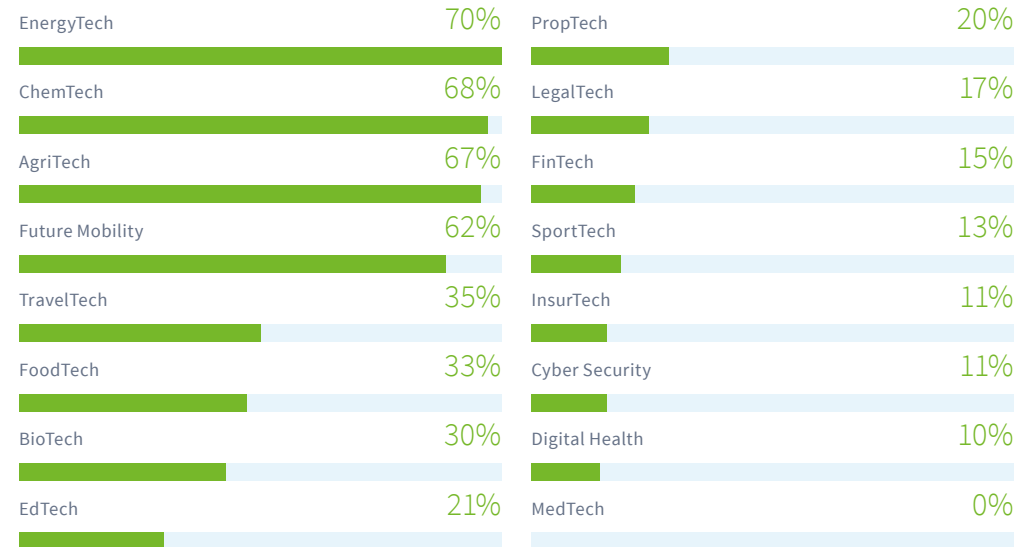
Demarcation based on the answer *very important* to the statement: Which corporate strategies are currently important for your startup? Rapid growth.

7

EnergyTech: Innovative processes for energy generation, ChemTech: Innovative chemical products, AgriTech: Efficiency-enhancing processes in agriculture, Future Mobility: Solutions for the mobility turnaround, TravelTech: Technical solutions in the travel industry, Food Tech: Technical solutions for production, supply chains and distribution channels in the food industry, BioTech: Application of technology to living organisms, EdTech: Efficiency-enhancing use of technology in education, PropTech: Digital services and technologies in the real estate industry, LegalTech: Technical solutions for legal work processes, FinTech: Technical financial innovations, SportTech: Technical solutions for sports, InsurTech: Use of modern technologies in the insurance industry, Cyber Security: Hardware and software solutions to prevent unauthorized access to information, Digital Health: Digital solutions for health care, MedTech: Products, equipment and processes for the prevention, diagnosis and therapy of diseases.

➔ Share of green startups among all startups across technology categories

based on responses of 661 non-green and 250 green startups



“Startups in the two fields of energy and mobility typically have the more scalable business models – and, in individual cases, grow to the level of world market leaders.”

Dr. Jörg Lefèvre
Head of Division
German Federal Environmental Foundation



StartGreen Award

The national premium award for green startups in Germany



www.start-green.net/award/

The StartGreen Award bolsters up founders in the Green Economy. It supports innovative startups and exemplary start-up promotion programs in the field of Green Economy and sustainability and makes them more visible. Patron of the StartGreen Award 2018 was the German Minister for the Environment, Svenja Schulze.

In 2018, the leading award for sustainable solutions in Germany was presented for the fourth time in a row. The focus was on linking green startups, companies, investors, funding institutions and political pioneers to promote a Green Economy.

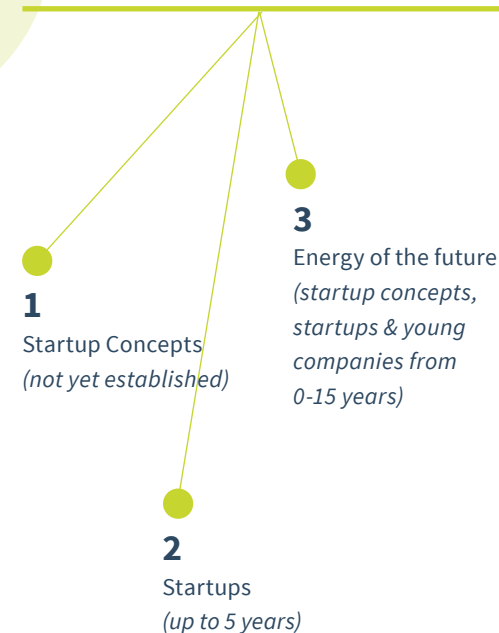
The green startup community had the opportunity to participate in a prior public voting to determine who most deserved the award. In the final pitch in front of a jury of experts, the finalists competed for financial and non-financial rewards worth more than 60,000 Euros. In addition to a prize of 5,000 Euros per category, the main partner, SDG Investments, offered to register all finalists in the award categories “Startup” and “Energy of the Future” on the SDG Investments platform (equivalent to 5,000 Euros each).

All applications in the category “Startup” also had the opportunity to qualify for the Cleantech Open Ideas Challenge in California. The international competition for cleantech companies in 2019 takes place in San Francisco (USA). The three selected winners of the German preselection were nominated for the final. In addition to having travel costs covered, the teams won a coaching package and mentoring for the preparation of the competition as well as intensive on-site support. This prize was made possible by the main partner RKW Kompetenzzentrum.

This year saw the second time that pupil companies focusing on sustainable solutions were also honored (StartGreen@ School Award).

The StartGreen Award is an initiative of the Borderstep Institute. The prize has been awarded since 2015.

The StartGreen Award 2018 was awarded in three categories.





StartGreen Award WINNER 2018

CATEGORY *Startup Concept*

ME Energy
(Berlin)

Flexible, nationwide charging infrastructure for electric cars

The founders from Berlin want to turn electromobility into something that's accessible for everyone. To this end, they are developing fast-charging columns that can be set up anywhere, without connection to the power grid or infrastructure requirements. They function independently of car types and charging infrastructure. This is of particular interest to people in rural regions, who were previously largely excluded from switching to e-cars.



CATEGORY *Startup*

Nuventura
(Berlin)

The world's first medium-voltage switchgear without SF₆ greenhouse gas

The startup from Berlin has developed the world's first gas-insulated medium-voltage switchgear up to 36 kV. With it, the greenhouse gas SF₆ can be replaced by air without sacrificing the advantages of SF₆ systems. SF₆ is the strongest greenhouse gas there is. The actual annual emissions of SF₆ correspond to the annual CO₂ emissions of about 100 million cars. Nuventura wants to render SF₆ use unnecessary with its technology.



CATEGORY *Energy of the Future*

Solmove
(Potsdam, Brandenburg)

Smart road surfaces for clean e-mobility

The founding team of SOLMOVE from Potsdam (Brandenburg) develops smart roads. The SOLMOVE "solar carpet" is an innovative road surface that generates electricity, defrosts snow and generates data. In this way, clean energy can be generated without consuming land and used for electric mobility. A further advantage is that the modules can simply be glued onto the existing surface and transferred to the recycling process for solar systems after undergoing wear and tear.



Images © Rolf Schulten/Borderstep

German Preselection for the Cleantech Open Ideas Challenge in California
WINNER 2018

Paprfloor

The company from Weil der Stadt (Baden-Württemberg) has developed a floor covering made of recycled paper. Compared to classic trade fair floors, the paper floor reduces CO₂ emissions by up to 10kg per m². The use of paper also saves large amounts of hazardous waste that are typically generated by disposing of the conventional floor.

Manyfolds

With the software from this startup from Munich (Bavaria), 3D furniture design becomes a 2D cut pattern. Mainly corrugated and honeycomb board is used, so that the furniture is cheap, requires only a fraction of the energy and material to produce compared to conventional furniture and can be produced with highly automated processes.

Nuventura

The startup from Berlin has developed the world's first gas-insulated medium-voltage switchgear up to 36 kV. With it, the greenhouse gas SF₆ can be replaced by air without sacrificing the advantages of SF₆ systems. SF₆ is the strongest greenhouse gas there is. The actual annual emissions of SF₆ correspond to the annual CO₂ emissions of about 100 million cars. Nuventura wants to render SF₆ use unnecessary with its technology.



StartGreen@School Award
WINNER 2018

Schmids Druck Studio

Carlo-Schmid-Oberschule (Berlin)

Schmids Druck Studio prints on sustainable textiles. Through the digital printing process, multi-color prints can also be made to orders in small quantities. In addition to textile printing, cups, thermo cups and mobile phone covers are also printed. All textiles are fairly produced and consist of organic cotton and recycled yarns.



Images © Rolf Schulten/Borderstep

3

To what extent
do green and
non-green
startups differ?

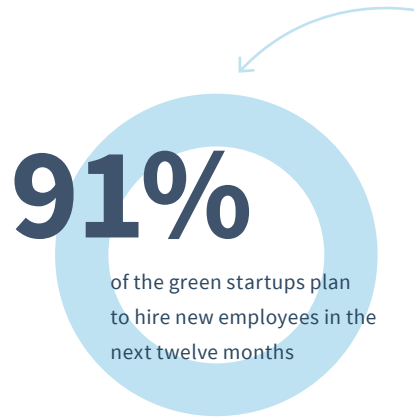


3.1 Growth of green startups on an equal footing with other growth companies

For the year 2018, more than half (54%) of the startups in the dataset reported having generated sales or having expected to do so in 2018. Generally, green startups achieve the same turnover as non-green startups and employ the same number of employees. Both the green and the non-green revenue-generating startups are planning to double their turnover on average for 2018 compared to the previous year.

This planned growth is, however, seen as far less of an important challenge (36% vs. 46%) by green startups. Consequently, two thirds of the green startups see themselves in a good, competitive market position with their innovative products and services.

3.2. Green startups find it easier to find employees



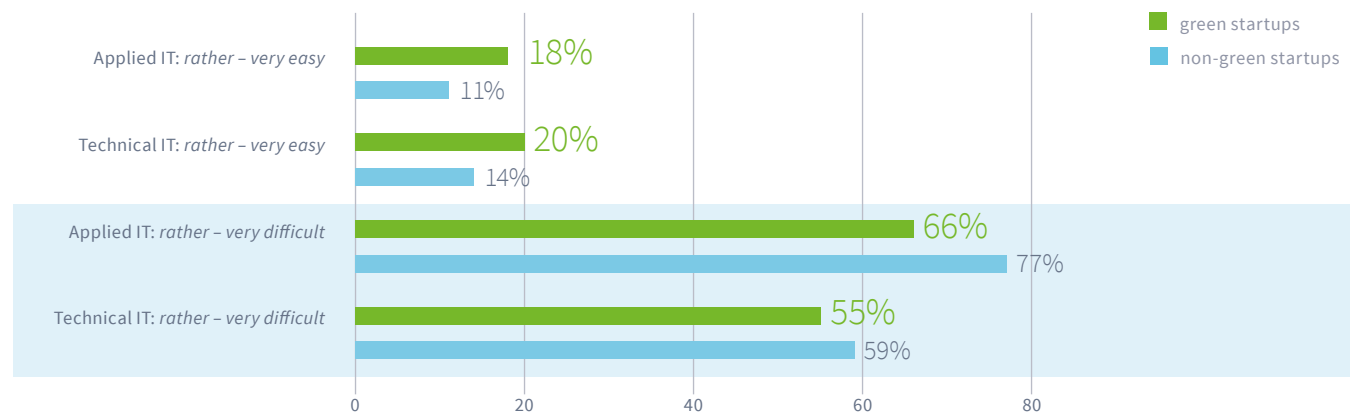
Three out of four green startups currently have employees who are not part of the founding team. On average, each of these green startups has created 13 jobs.

Three out of four (74%) of the hiring green startups state that they employ between one and nine people. Every fifth (22%) has between ten and 49 employees. 4% of the hiring green startups even employ 50 employees or more. Over the next twelve months, 91% of the green (and 87% of non-green) startups plan to hire new employees. On average, green and non-green startups are planning seven new hires.

When asked about the challenges of recruiting employees, difficulties emerge primarily in the IT sector: Every second green startup reports that it is rather difficult to find personnel in the technical IT sector (55%). Two out of three green startups (66%) have difficulties filling positions in the field of applied IT. Compared to non-green startups, however, these difficulties are less pronounced. In addition, significantly more green than non-green startups report that it is easy to find employees for these areas. Green startups thus appear to be attractive employers for sought-after occupational groups.

IT Recruitment Challenges

based on responses of 645 non-green and 226 green startups, resp. 707 non-green und 235 green startups



3.3

Green startups see themselves as more innovative

Green startups see themselves as more innovative than non-green startups:⁸ Six out of ten green startups see themselves as *innovative*, 14% as *very innovative*. This applies in particular to green startups in the start-up phase. Here, about three quarters see themselves as *innovative* or *very innovative* (vs. 64% of non-green startups). Green startups are thus particularly frequently bringing new ideas to the market.

In the *very innovative* subgroup,⁹ all startups in the automotive, transport, chemical and pharmaceutical, safety, food and nutrition and food sectors are green. The Greens among the *very innovative* startups also dominate the technology categories Future Mobility (89%), ChemTech (75%) and Energy-Tech (63%).

8

Based on an index of responses to the four dimensions: business model, technology, processes and products/services

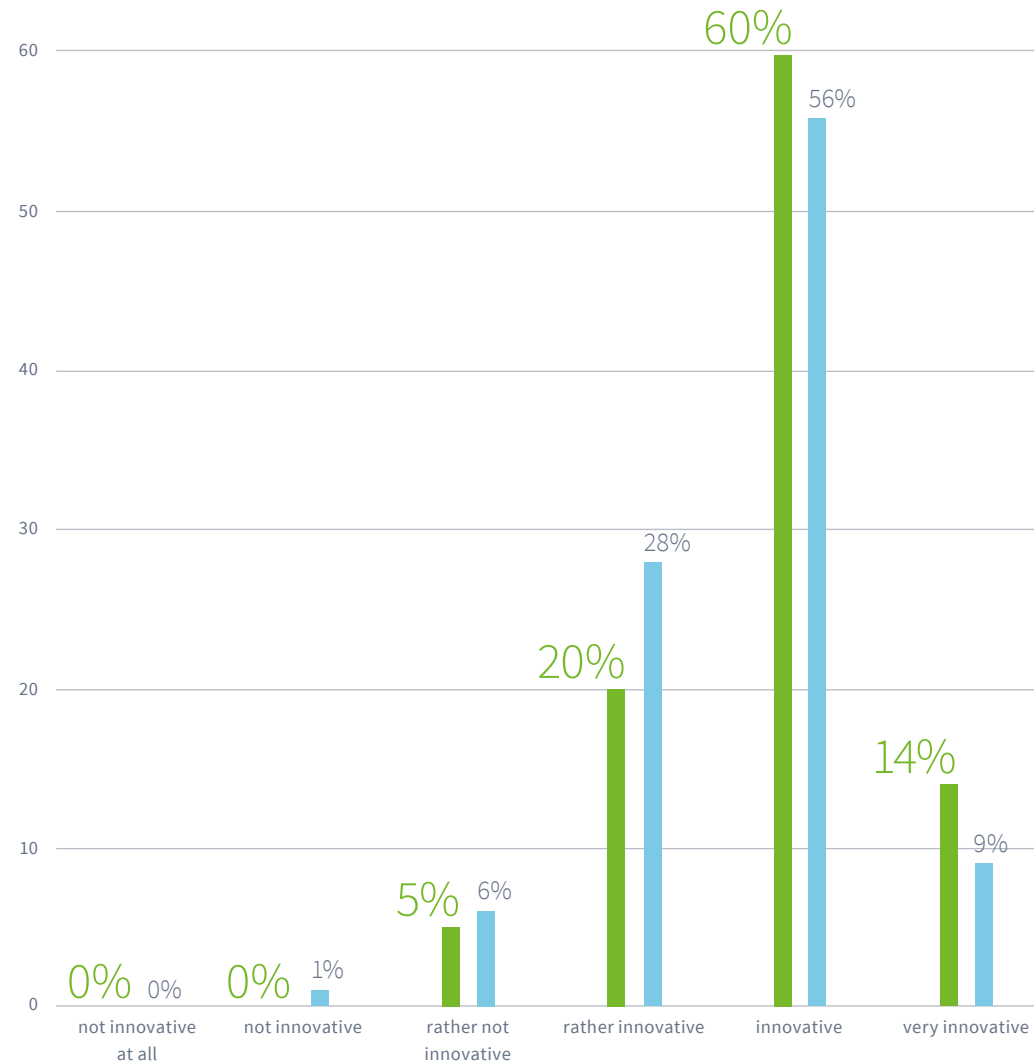
9

The *very innovative* index category describes startups that have classified themselves as very innovative on average in all four dimensions (business model, technology, processes and products/services).

→ Innovativeness

based on responses of 838 non-green and 288 green startups

■ green startups ■ non-green startups



“In our experience, the green scene is very well balanced with a high proportion of women. It is thus a logical conclusion, that there is a comparably higher number of women here who start a green company.”

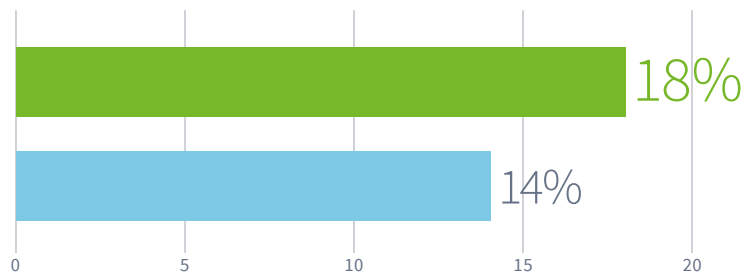
Frank Ackermann
 Cofounder
 SDG Investments



3.4 More female founders in green startups

➔ Percentage of female startup founders

based on responses of 863 non-green and 295 green startups
 ■ green startups ■ non-green startups



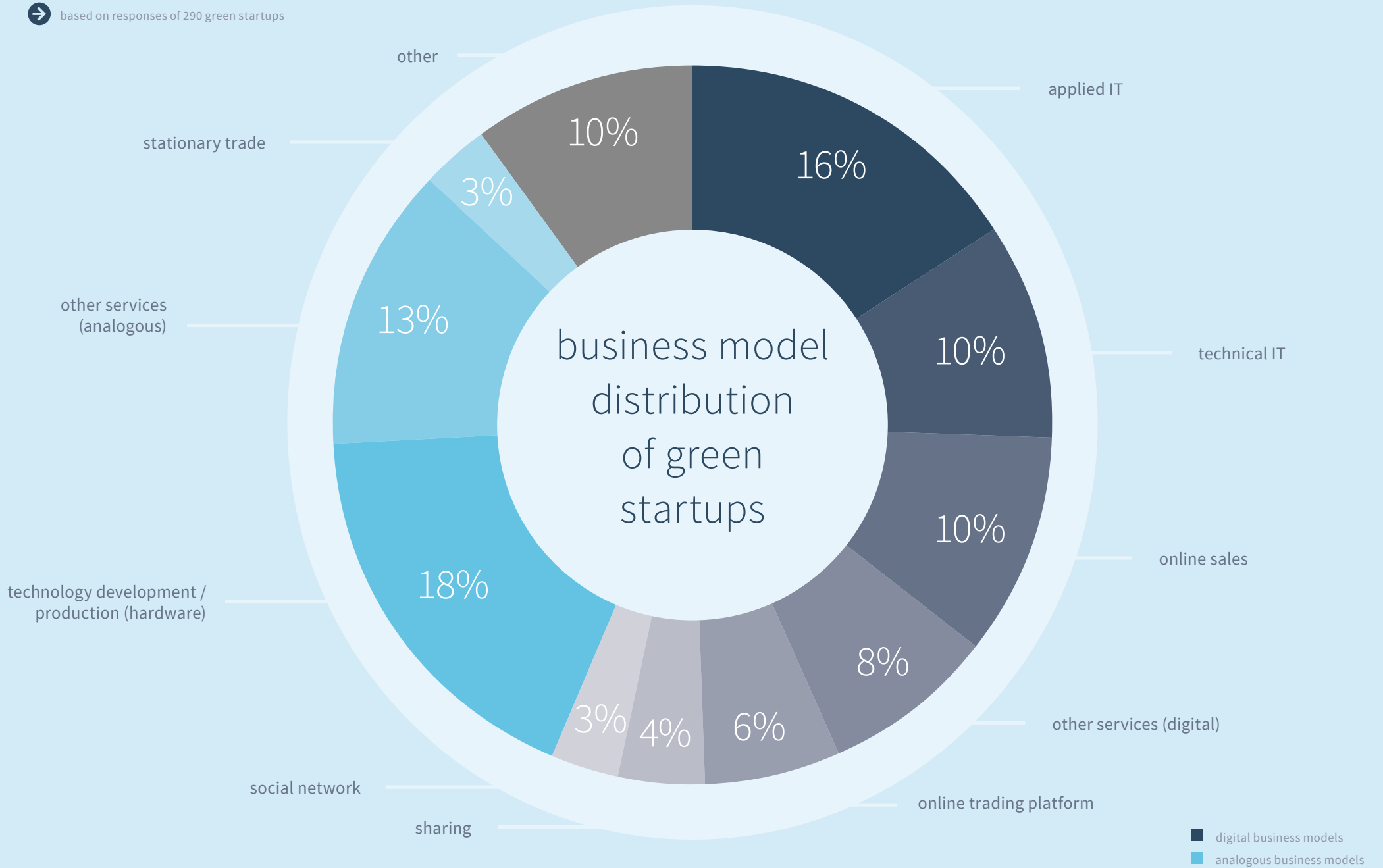
Female founders are clearly underrepresented in the German startup scene (Kollmann, Hensellek, et al., 2018; Trautwein, Fichter, & Bergset, 2018; Metzger, 2017). This difference is particularly noticeable in the area of innovative and growth-oriented startups; although the number of female founders has risen slightly every year since 2014, (Kollmann, Stöckmann, De Cruppe, Hensellek, & Kleine-Stegemann, 2018, S. 15), it currently only constitutes 15% of founders for all (green and non-green) startups.¹⁰ Green startups are founded more frequently by women than non-green startups.¹¹ However, at 18%, this proportion is nevertheless low.

Only about one out of ten green (as well as non-green) startups is founded by a purely female founding team – two out of three (64% vs. 73%) by an exclusively male team. Compared to non-green startups, green startups are founded more than twice as often by mixed-gender teams (26% vs. 11%).

¹⁰ Total share of all indicated founders

¹¹ The meaning of the symbol “+” is explained in chapter 6.3.

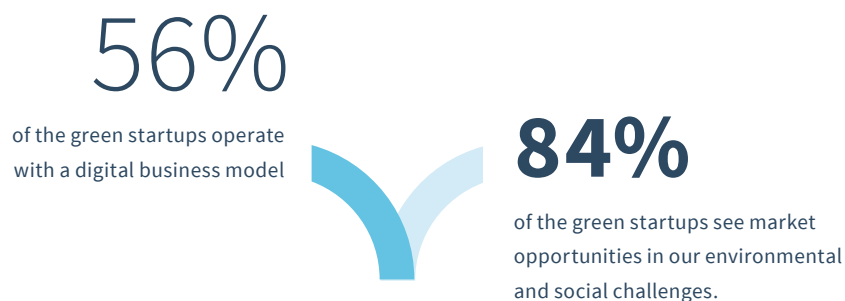
→ based on responses of 290 green startups



3.5 Green startups mainly pursue digital business models

More than half of the monitored green startups (56%) follow a digital business model. They therefore use “digital technology, the Internet and/or digitally collected data (...) to create new offers and/or improve existing ones” (Le-
rch, Schnabel, Meyer, & Jäger, 2007, p. 18). Every third green startup (34%) acts analogously, e.g. in the production of material goods, products, the provision of non-digital services or the operation of stationary trade.

There is a clear difference to non-green startups, of which only one in five (20%) has an analogous business model.



Within the subgroup of particularly growth-oriented startups, however, fewer startups are set up analogously than the above-described average: Here, only 20% of green startups are analogous (vs. 15% of non-green startups).

When considering only those startups with more than ten employees, green startups pursue business models of applied IT¹² (18% vs. 34%) or other digital services (9% vs. 17%) only half as often. Twice as frequently as non-green startups, they are dedicated to (hardware) technology development or production (23% vs. 11%); three times more frequently, they are dedicated to online sales (9% vs. 3%).

¹² Development and improvement of computer-based solutions for everyday life and science.

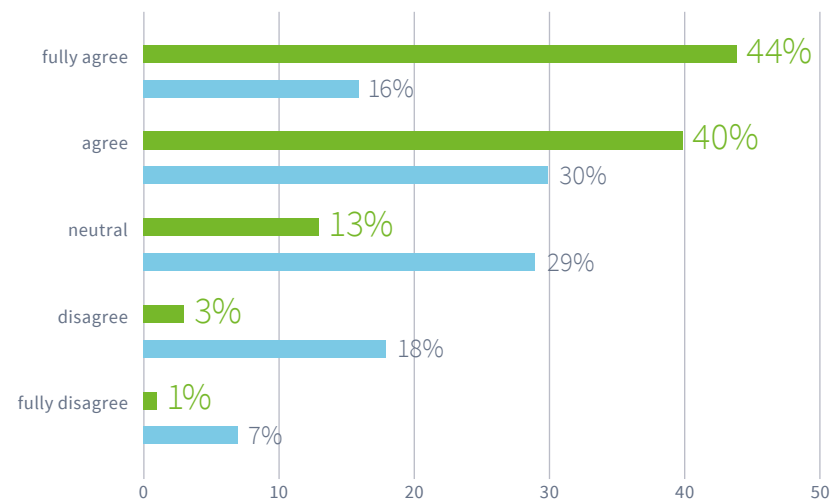
3.6 Green startups see ecological challenges as entrepreneurial opportunity

Green startups not only actively address the ecological and social challenges of our time, but they also see additional market opportunities in them: More than eight out of ten green startups agree or fully agree with this statement. With their innovative and sustainable products and services, green startups are thus penetrating new markets. These are markets that have arisen, and will continue to arise, as a result of current environmental challenges such as climate change, the loss of biological diversity and water scarcity.

➔ “Environmental or social challenges open up additional market opportunities.”

based on responses of 764 non-green and 267 green startups

■ green startups ■ non-green startups



3.7 Same company goals and tasks, but additional positive ecological impact

More than two-thirds of all green and non-green startups in the data set stated that achieving a positive social or ecological impact is important to them. Pursuing not only financial profit but also social or environmental added value is therefore an integral part of the objectives of not only the green startups but of two out of three of all startups.

For a majority of the other corporate goals and management tasks surveyed, there are no significant differences between green and non-green startups: Growth and profitability are very important goals for a quarter of them respectively. The goal of a successful exit, on

the other hand, is very important to only 4% of the surveyed green founders. Product development is a very important task for almost half. Almost one third name organizational development, the strengthening of corporate culture and the motivation and promotion of employees as currently very important management tasks.

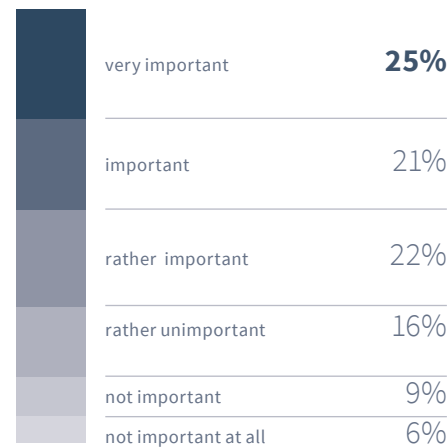
An exception is internationalization, which green startups are particularly interested in. A good half of the non-green startups consider it as rather to very important, while this is the case for over two thirds of the green ones. When only looking at the particularly

growth-oriented green startups, this percentage increases to 86% (vs. 66%). For the concrete (further) internationalization in the coming twelve months,¹³ almost all of the green startups name the EU. Disproportionately often, they are planning an internationalization into non-EU Europe, Asia, Africa and South America.

13 multiple choice

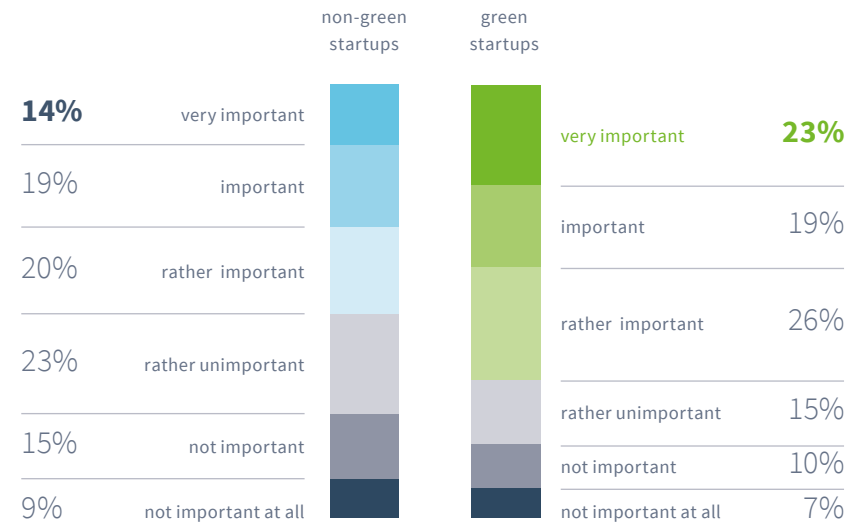
➔ “Achieving a positive social or ecological impact is currently an important corporate goal”

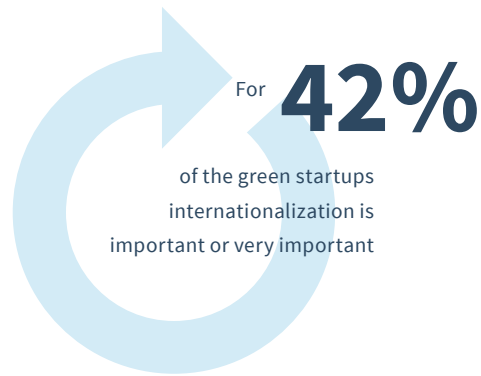
based on responses of 1,158 startups
(863 non-green and 295 green)



➔ Corporate objective internationalization

based on responses of 855 non-green and 294 green startups

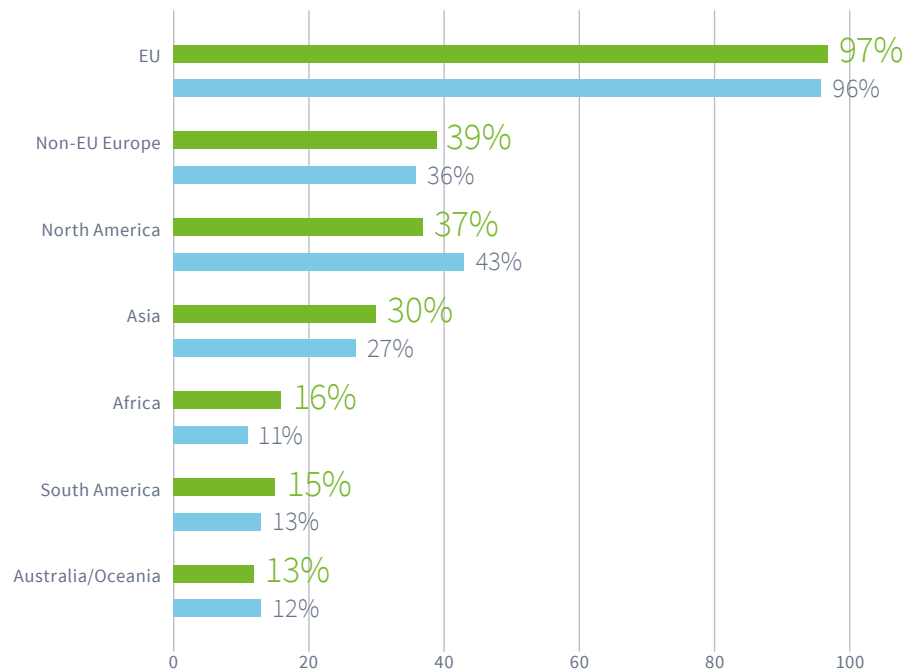




➔ Planned (further) internationalization

based on responses of 731 non-green and 245 green startups

■ green startups ■ non-green startups



3.8 Same key performance indicators with the addition of positive environmental impact

When asked about their key performance indicators, two out of three of *all* participating startups (62%) agree or fully agree with the statement *Positive ecological and social impact is important for us*. The tendency of all startups towards more impact already described in Chapter 3.7 is, therefore, not only expressed in their strategic orientation, but also translated into operational decision-making.

Regarding the classic key performance indicators, most of the green startups focus above all on sales growth (91%), followed by profitability (83%) and the competitive position (79%).¹⁴ With this focus, they do not differ significantly from non-green startups.¹⁵ Green startups therefore see themselves as equally growth-, profit- or competition-oriented but integrate the positive ecological and social impact much more frequently as an additional key performance indicator into their operational management targets.

14

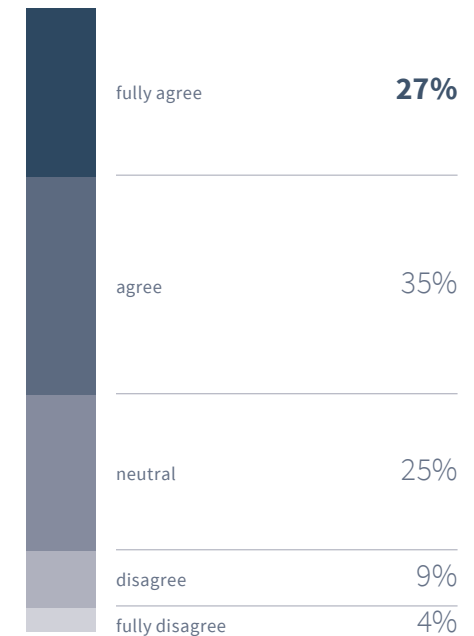
Percentages of green startups that (fully) agree with the statements (multiple choice): (i) Sales growth is important for us, (ii) profitability is important for us, (iii) Our position relative to the competition is important for us

15

With a deviation of only one to two percentage points each.

➔ Key performance indicator: Positive ecological and social impact is important for us

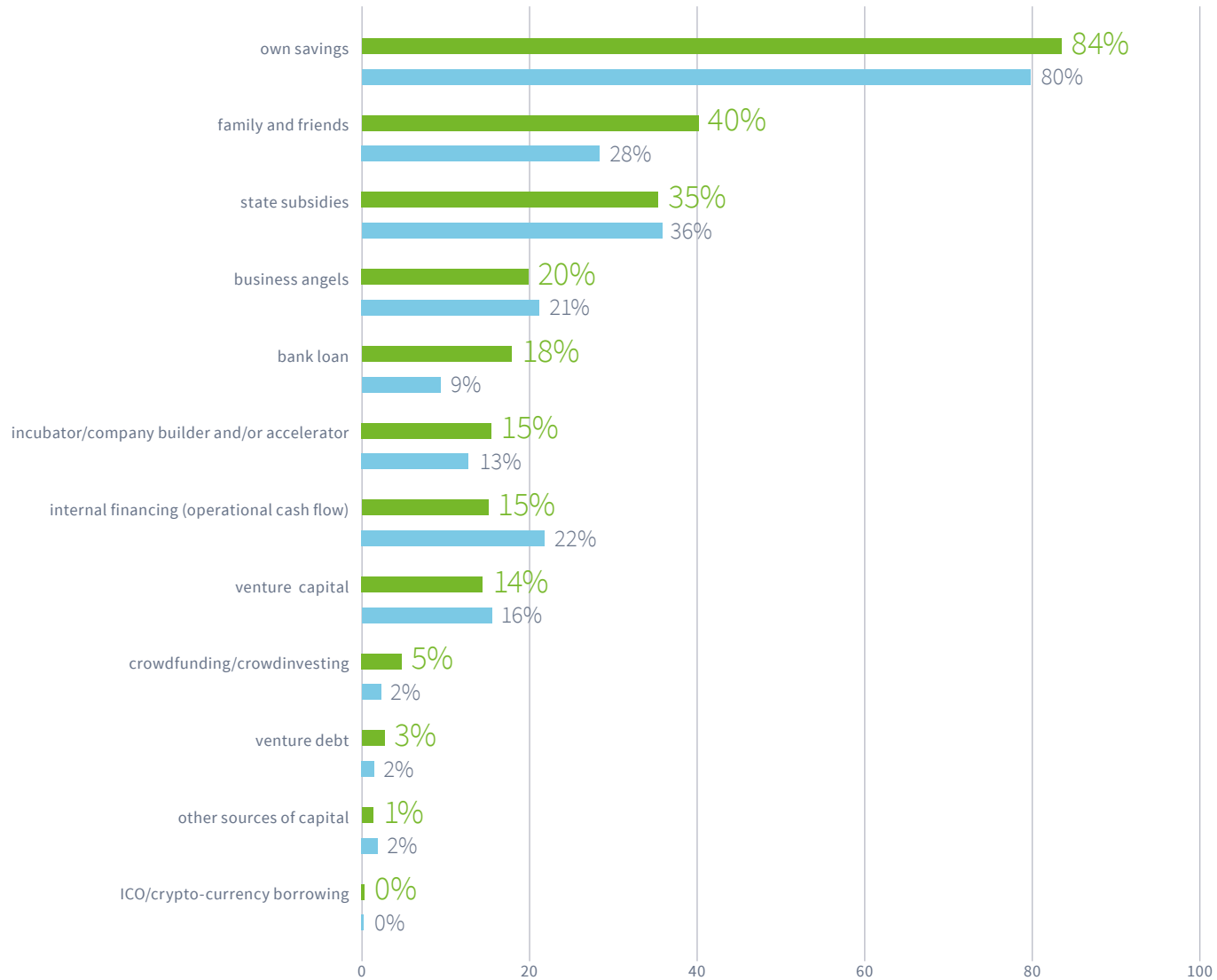
based on responses of 1,198 startups (903 non-green and 295 green)



→ Sources of capital

based on responses of 862 non-green and 291 green startups

■ green startups ■ non-green startups



3.9

Capital more frequently from family & friends, the crowd and through bank loans

Eight out of ten of all (green and non-green) startups in the dataset finance themselves from savings.¹⁶ One-third do this with state subsidies and through capital from family and friends. Green startups finance themselves comparably more frequently through family and friends. Entrepreneurial ideas with an ecological impact thus seem to be more enthusiastically funded with capital provided by the founders' circle of close acquaintances. Also, capital acquired through bank loans and incubators, company builders and accelerators is comparatively more frequent among green startups. While financing through crowdfunding and crowdinvesting is rather minor overall, green startups use it 2.5 times more frequently than non-green startups. The higher attractiveness of an investment in a startup company with an ecological impact is hence also reflected outside the direct circle of families and friends. Internal financing via the operational cash flow, on the other hand, is comparatively less common.

16

Multiple choice

“Green startups should approach established companies actively and with self-confidence in order to tackle the important issues of our society together.”

Dr. Irina Tiemann
Business Innovation
EWE Aktiengesellschaft

3.10 Cooperation more often for the purpose of technology knowledge and expertise, fundraising and acquiring data

Green startups actively cooperate with promising partners. Almost half (49%) of them profit from interactions with other startups, two thirds (62%) from cooperations with established companies. The latter partnerships

thus have a special importance. Cooperations with established companies mainly have the purpose¹⁷ to improve customer and market access. In comparison with non-green startups, green ones more frequently use cooperations to receive and exchange technological knowledge and expertise,¹⁸ for fundraising and for data exchange.*

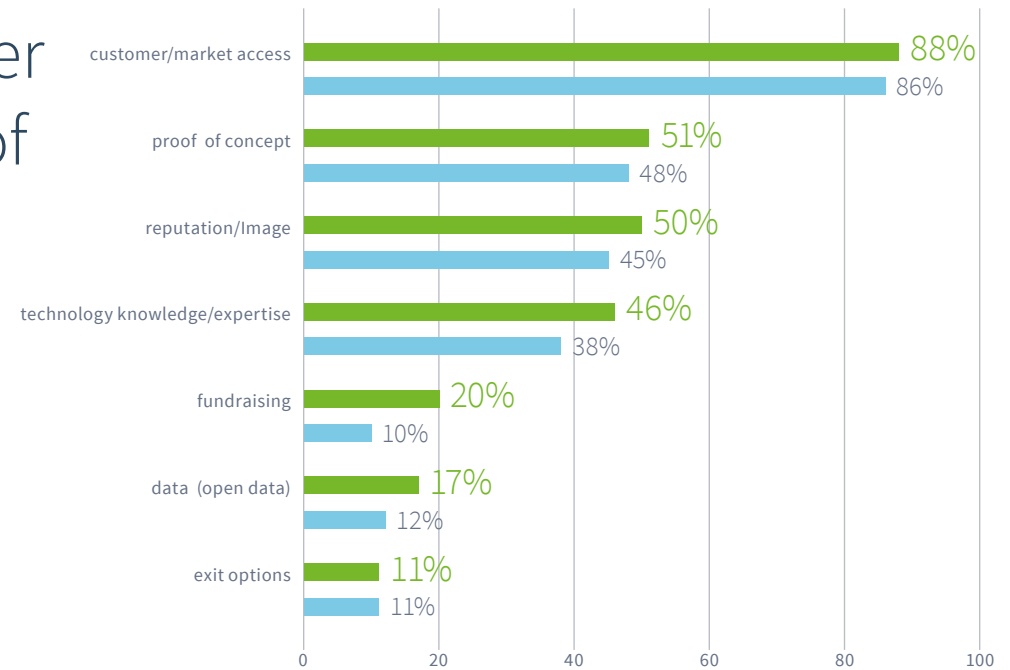
¹⁷ Multiple choice

¹⁸ The meaning of the symbol “+” is explained in chapter 6.3.

➔ Objectives pursued in cooperations with established companies

based on responses of 506 non-green and 179 green startups

■ green startups ■ non-green startups



62%

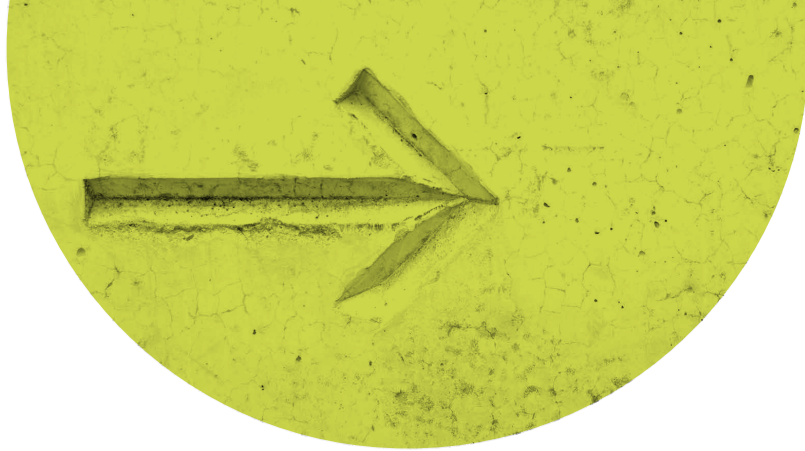
of the green startups benefit from interactions with established companies

StartGreen and the Green Startups Platform

Support for Green Entrepreneurs

Comprehensive support for the green startup scene through the complementary offers of the information and networking portal StartGreen and the Green Startups Platform of the German Startups Association.





StartGreen



StartGreen is the digital information and networking portal for green entrepreneurs in Germany. It is aimed both at founders and those interested in starting a business and at actors, initiatives and institutions that support, promote, finance or otherwise participate in green startups. In addition to investors, this includes, in particular, startup-supporting institutions such as startup centers and incubators, startup and business plan competitions, startup consultants, universities and research institutes, support programs and also multipliers from relevant industries.

www.start-green.net

The Green Startups Platform of the Startup Association



The Green Startups Platform was founded in July 2017 and currently connects about 250 startups, young and established companies, investors and important players from the Green Economy. With various activities such as networking events, communication campaigns, political representation of interests and cooperation projects, the platform supports its members in successfully bringing new ideas and innovations to the market, networking with industry and startups and showing investors attractive financing options.

www.deutschestartups.org/greenstartups

Green Deals

The top 10 of the years 2017 and 2018



On the platform StartGreen, the Borderstep Institute collects and publishes all green deals made in Germany as well as internationally and which are publicly known. The aim is to increase market transparency for startup teams and investors. The ten largest deals of the years 2017 and 2018 are presented in the following overview. A much more comprehensive list, also from previous years, can be found on StartGreen.¹⁹

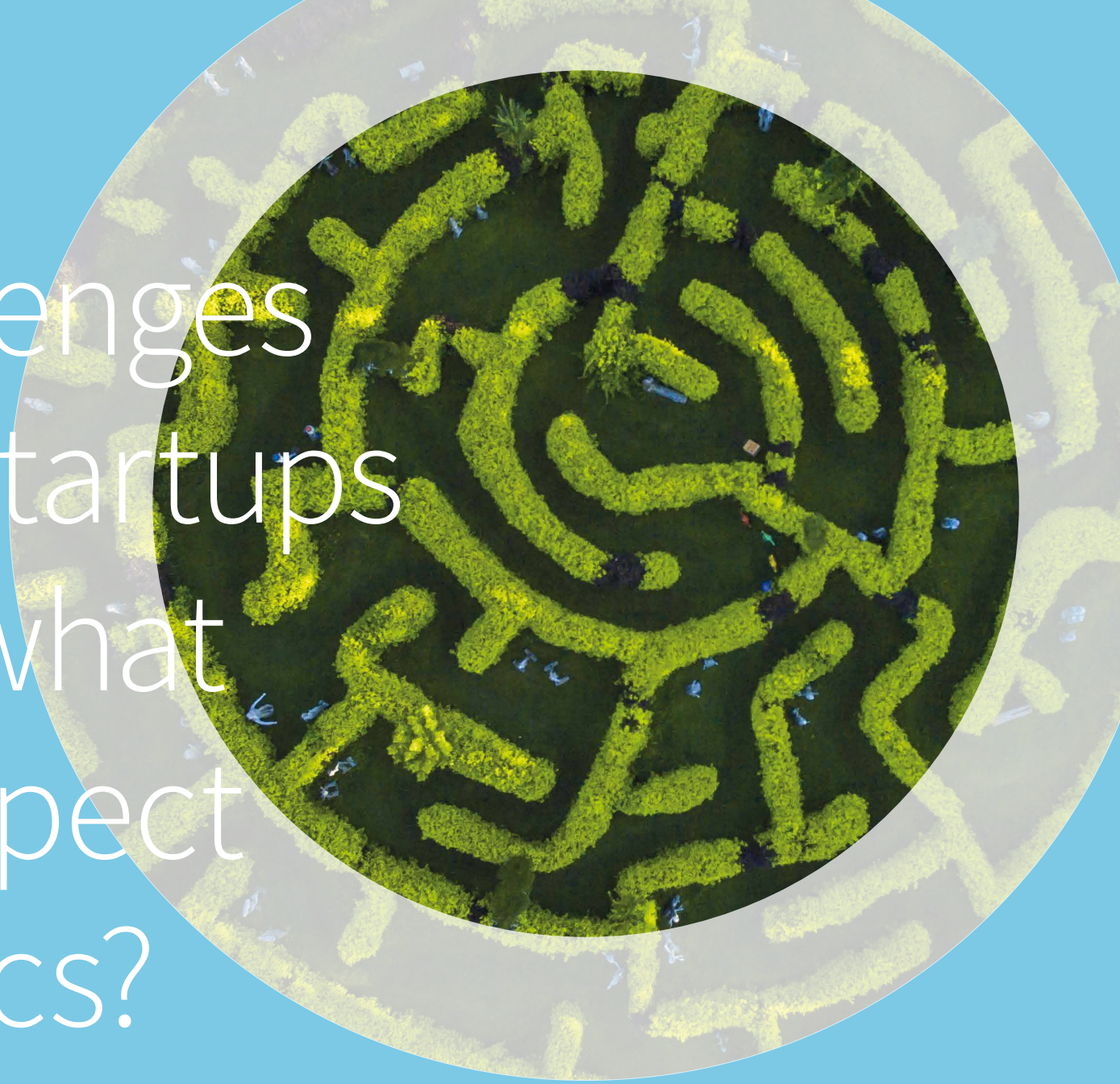
¹⁹

The web portal StartGreen was created as a project of the initiative StartUp4Climate, which was funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) as part of the National Climate Initiative. The portal is operated by the Borderstep Institute for Innovation and Sustainability.

	Organization	Investment stage	No. Investors	Deal amount (in € million)	Date
1	Lilium GmbH	Startup	4	76	Sep 17
2	sonnen GmbH	Growth	1	60	May 18
3	tado° GmbH	Growth	7	43	Oct 18
4	Cityscoot	Startup	4	40	Feb 18
5	Ecolintense GmbH	Growth	2	22	May 17
6	Thermondo GmbH	Growth	3	21	Nov 17
7	InFarm – Indoor Urban Farming GmbH	Startup	6	20	Feb 18
8	Heliatek GmbH	Startup	7	15	Sep 17
9	Save by Solar	Growth	1	12	Dec 17
10	unu UG	Startup	5	10	Oct 18

4

What challenges do green startups face, and what do they expect from politics?



4.1 Green startups face challenges with raising capital

56% of the green startups name sales as one of the three biggest challenges at present, followed by product development (50%) and raising capital.²⁰ Green startups clearly name the latter more frequently (39% vs. 29%). As a result, four out of ten green startups see themselves facing difficulties. In particular, the green startups that classify themselves as innovative cannot sufficiently cover their capital requirements. The development phase in which the startups find themselves in also has a significant impact on the weight of capital procurement among all challenges: Raising capital is less frequently cited by green startups in late development phases, but by four out of ten green startups in the startup stage (42% vs. 31%). For green startups in the seed stage, difficulties in raising capital are particularly pronounced: Two out of three of these very young green startups report corresponding difficulties. This applies to only about half of the non-green startups in the same development phase (65% vs. 47%).

56%

of the green startups name sales as one of their biggest challenges

50%

of the green startups see product development as one of their greatest challenges

“Many potential investors do not share the green values of these founders and/or consider green startups to be less fast-growing – which is why they are more reluctant to offer them capital than other startups.”

Growth, on the other hand, is much less of a challenge for green startups than for non-green ones. With similarly planned sales and employee growth (see 3.1 and 3.2), green startups obviously see themselves better positioned here. Recruiting personnel is also much less frequently seen as a challenge. This underlines the attractiveness of green startups for employees already discussed in Chapter 3.2.

Compared to non-green startups, green startups thus experience many more problems with raising capital. However, technology-based green startups in particular tend to have a higher capital requirement than non-green startups (Trautwein et al., 2018, p. 5). The difficulties described thus hinder and jeopardize the full exploitation of their transformational potential towards a sustainable economy.

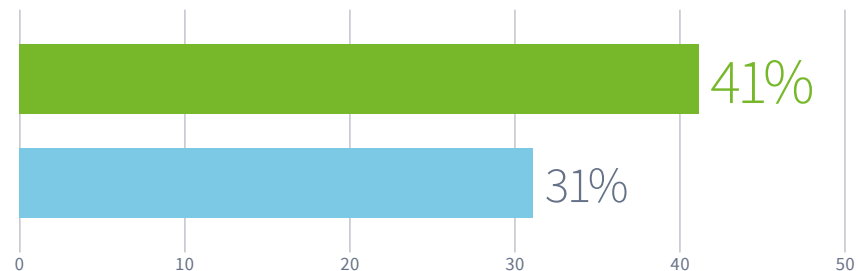
20

Multiple choice

Challenge: Procurement of capital (innovative and very innovative startups)

based on responses of 522 non-green and 166 green startups

■ green startups ■ non-green startups

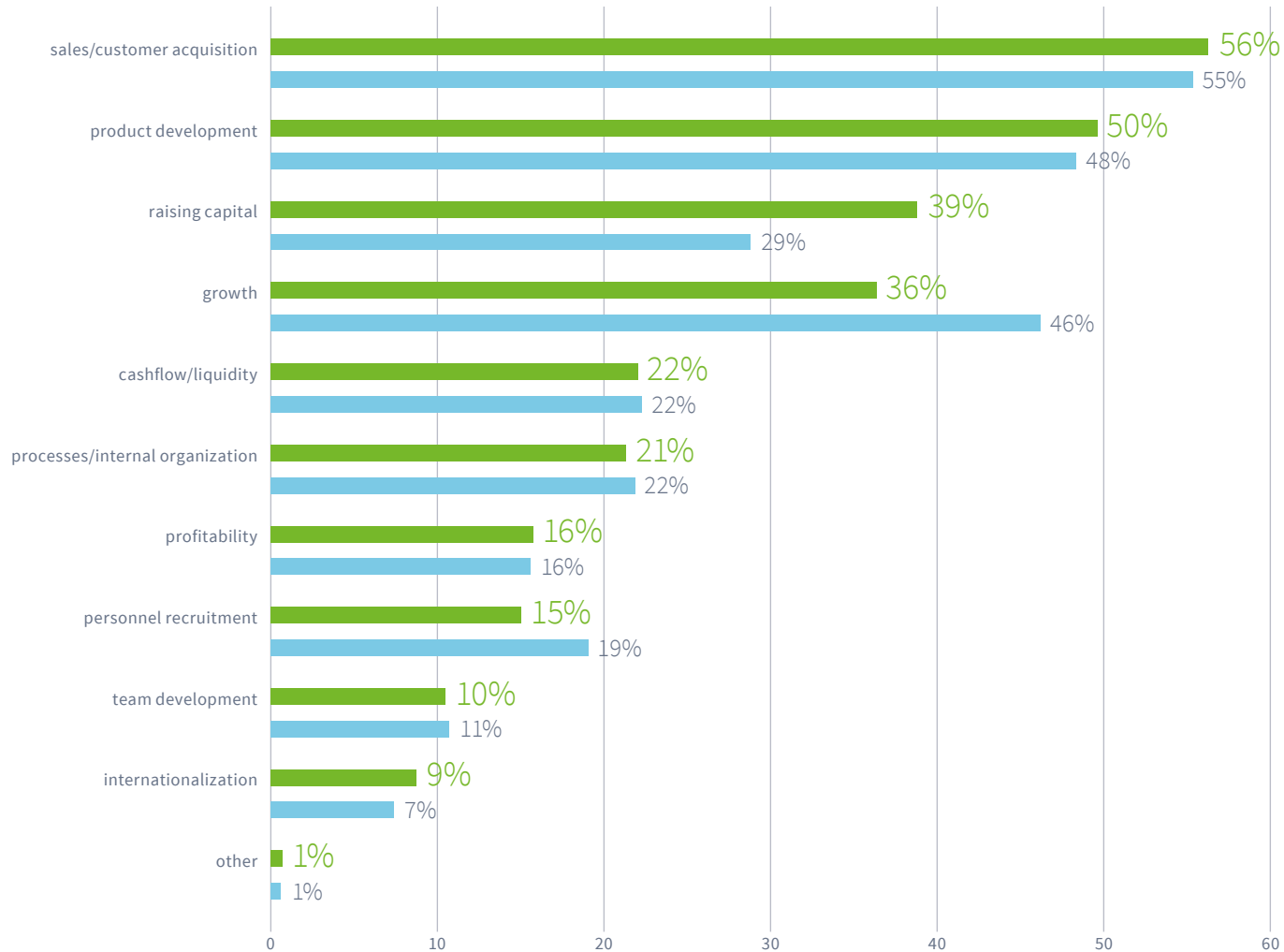


Prof. Dr. Rolf Sternberg
Leibniz University Hannover

→ Challenges

based on responses of 836 non-green and 285 green startups

■ green startups ■ non-green startups



“It can be assumed that the motivation to work for a company that pursues socially valuable as well as entrepreneurial goals tends to be higher.”

Oliver Hunke

*Head of Division “Innovative Startups”,
Federal Ministry for Economic Affairs and Energy*

4.2

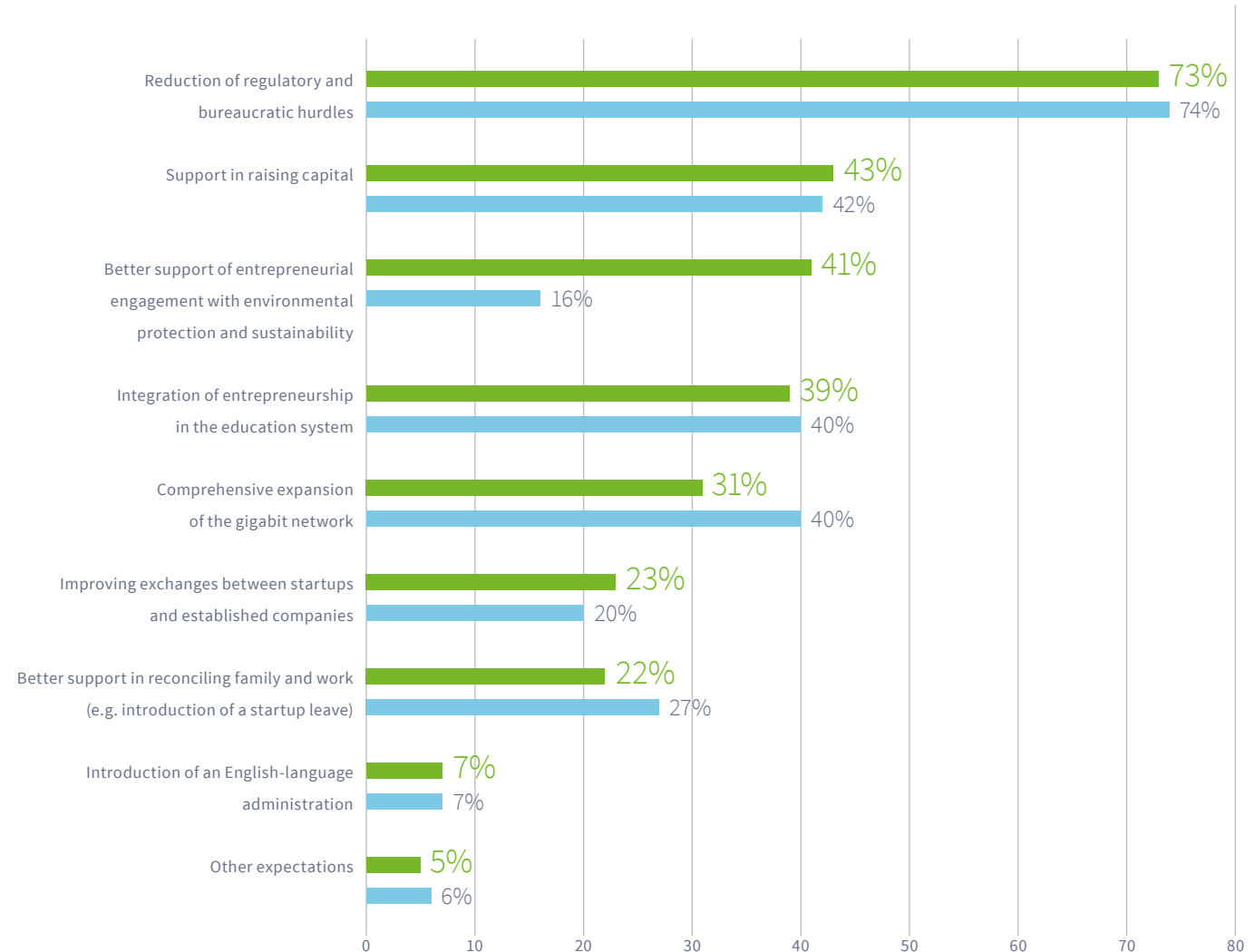
Green startups call for financial support, exchanges with companies, non-EU staff and direct investment

Three out of four green startups would like to see a reduction of regulatory and bureaucratic hurdles, four out of ten support in raising capital. Significant differences between green and non-green startups don't exist with regard to these topics. Over 40% of green startups ask for better support of their entrepreneurial engagement with environmental protection and sustainability. As expected, green startups expect this more often than non-green startups. A nationwide expansion of the gigabit network, on the other hand, is less called for by green startups.

→ Political expectations

based on responses of 782 non-green and 269 green startups

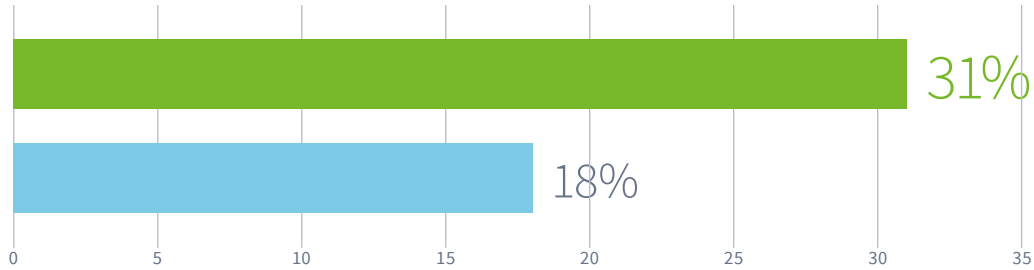
■ green startups ■ non-green startups



➔ **Expectation: Improving exchanges between startups and established companies (innovative and growth-oriented startups)**

based on responses of 287 non-green and 111 green startups

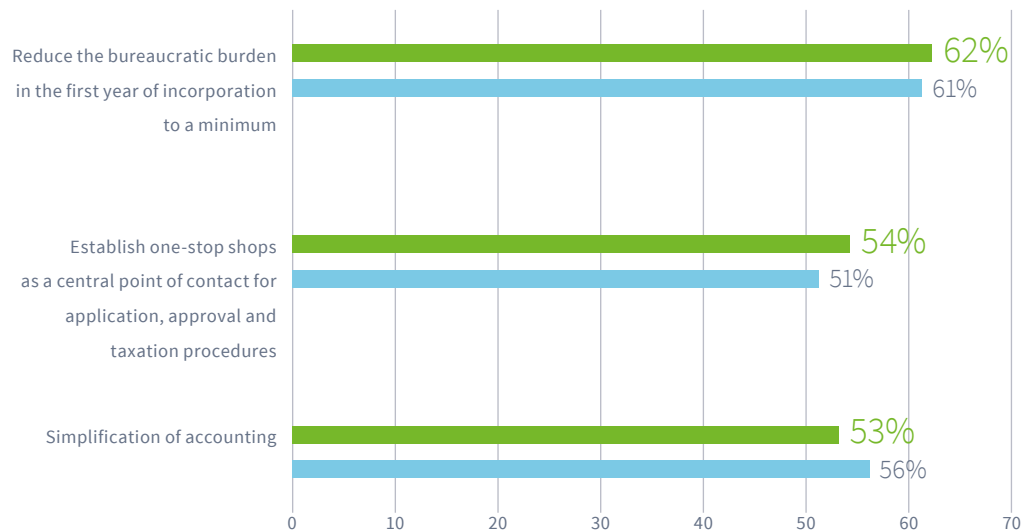
■ green startups ■ non-green startups



➔ **Measures to reduce bureaucracy**

based on responses of 744 non-green and 252 green startups

■ green startups ■ non-green startups



41%
of the green startups call for better support of their entrepreneurial commitment to environmental protection and sustainability

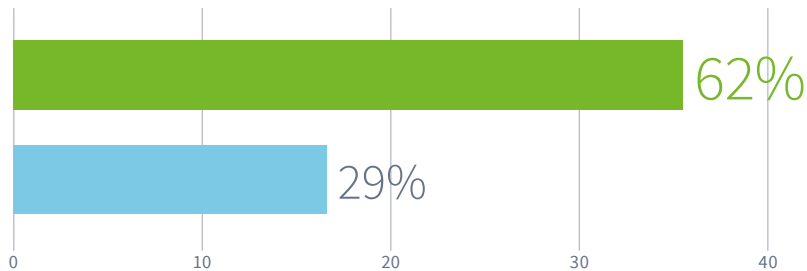
The green startups that have both a high degree of innovation and a strong growth orientation²¹ hope for an improvement of the exchange between startups and established companies: One in three of these high-potential startups would like political support in this respect.

When asked about the three most important measures to reduce bureaucracy and regulation,²² six out of ten green startups desire a reduction of the bureaucracy burden in the first year of a new venture. More than half of them demand the establishment of one-stop shops as central contact points for application, approval and taxation procedures and the simplification of accounting regulations. With these calls, green startups do not differ significantly from non-green ones.

➔ **Measures to reduce bureaucracy:
Simplification of recruitment from non-EU countries
(startups with strong employee growth)**

based on responses of 38 non-green and 13 green startups

■ green startups ■ non-green startups



“Many skilled professionals want to generate value for the environment and society with the work they do. They therefore easily identify with the goals of green startups.”

Dr. Hannes Spieth
CEO
Umwelttechnik BW GmbH

Among the startups with a strong employee growth,²³ however, green startups in particular are in favor of simplifying personnel recruitment from non-EU countries. Six out of ten green startups ask for respective political support.

With regard to improving their financing situation, green startups are especially interested in a further development of existing public measures, also for non-academics, since startups founded by academics are already being promoted, e.g. with the university-based EXIST programs. Green startups state much more frequently that they are interested in measures to increase the attractiveness of direct investments in their startups that specifically address family entrepreneurs and medium-sized companies.

21

Startups in the index categories *innovative* and *very innovative* which give the answer *very important* to the statement: Which corporate strategies are currently important for your startup? Rapid growth.

22

Multiple choice

23

Over ten new hires in the last twelve months and over ten planned new hires in the next twelve months.

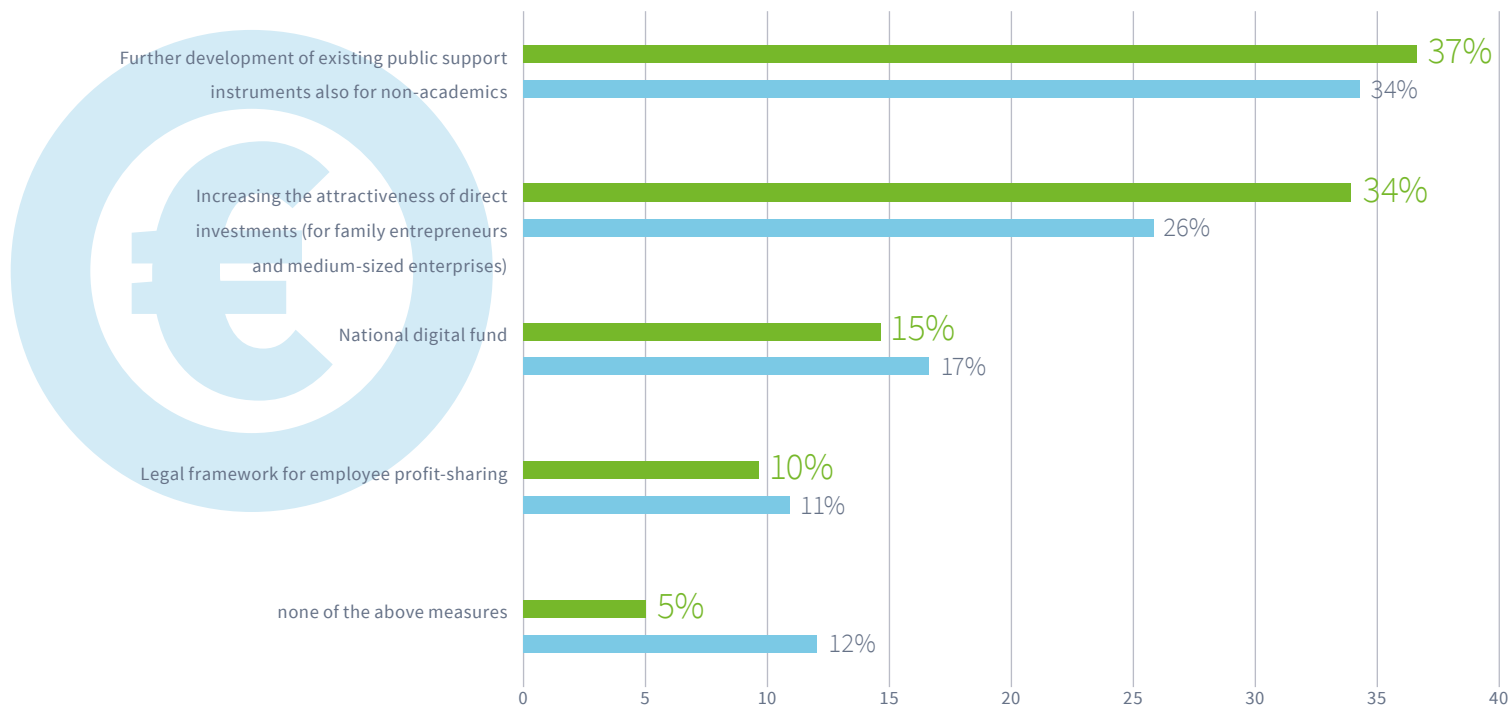
“It is a misunderstanding on the investors’ side that investments in green startups go hand in hand with a renunciation of returns. A clarification is needed here .”

Frank Ackermann
Co-Founder
SDG Investments

➔ **Measures to improve the financing situation**

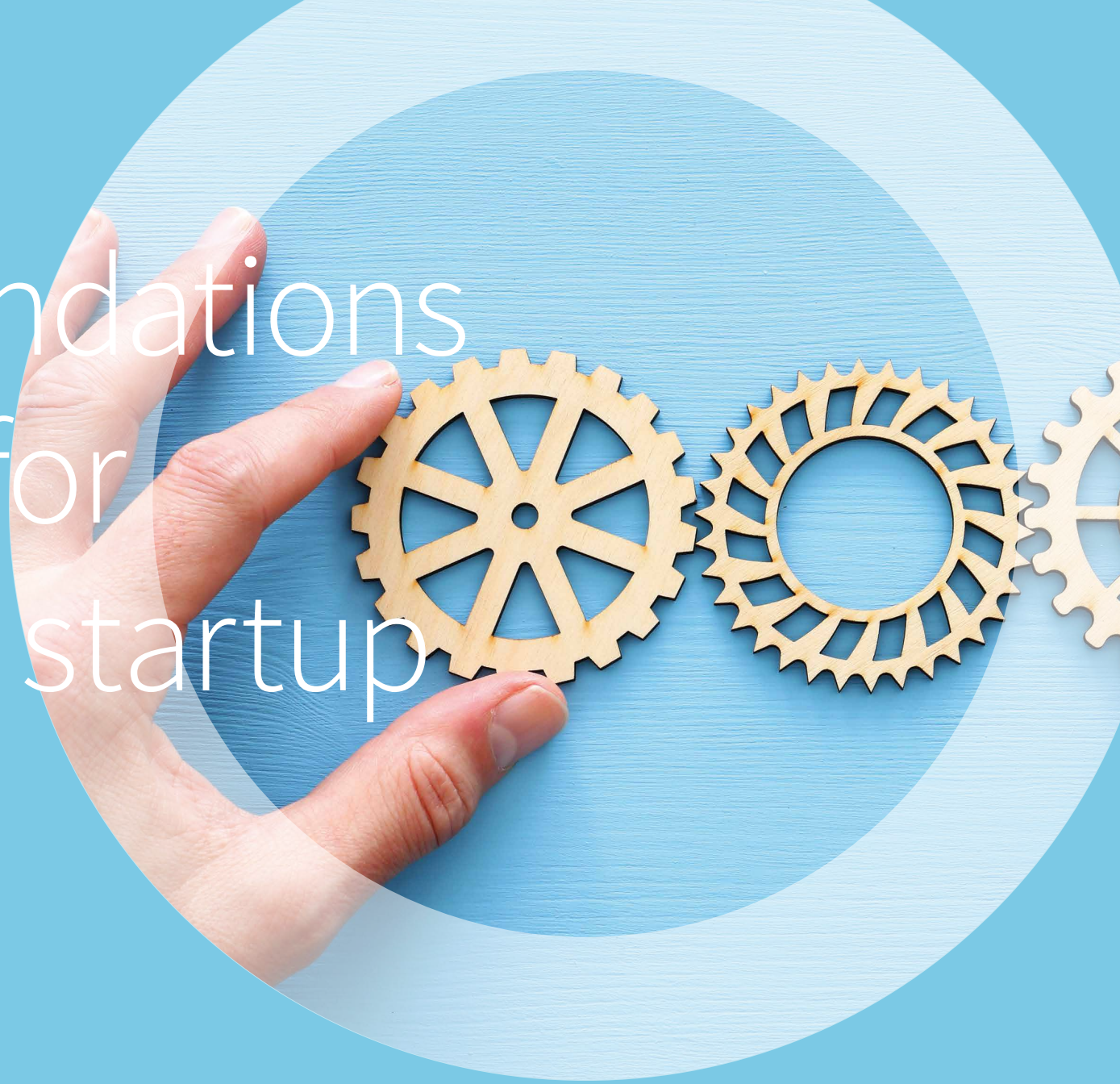
based on responses of 755 non-green and 259 green startups

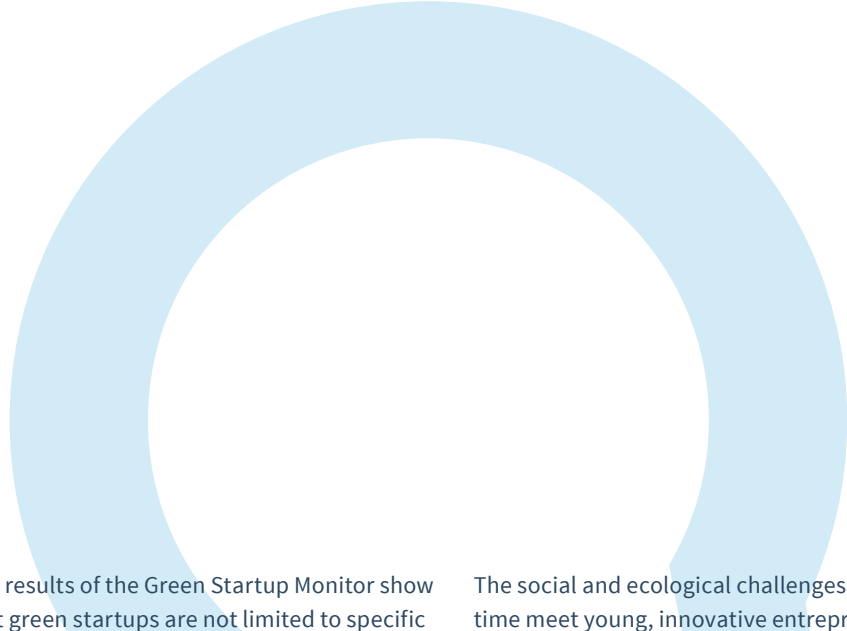
■ green startups ■ non-green startups



5

Recommendations for action for policy and startup ecosystem





The results of the Green Startup Monitor show that green startups are not limited to specific industries, technology areas or business models. Rather, they can be found in all economic sectors. Green startups represent 26% of all innovative and growth-oriented young companies. Their contribution to economic performance and job creation is therefore notable. In addition to the economic contribution, green startups make a decisive one to the ecological goals of a Green Economy and are thus a major driver of the movement towards a sustainable economic system.

The social and ecological challenges of our time meet young, innovative entrepreneurs who see and seize the entrepreneurial opportunities in them. In view of the importance of green startups for Germany as a business location, it is of utmost importance to develop their full potential. However, the results of the Green Startup Monitor show that there is still a clear need for improvement in the framework conditions from the startups' point of view. In the following, selected recommendations for action will be formulated which are intended to eliminate existing disadvantages and barriers for green startups in the future.

1

Startup promotion programs

More than two thirds of *all* surveyed startups state that achieving a positive social or ecological impact is currently an important corporate goal. However, green startups would appreciate a better recognition of their entrepreneurial commitment to environmental protection and sustainability. In this context, startup promotion programs play a central role: Equivalently to the High-Tech Strategy 2025, in which sustainability requirements are already strongly integrated, **sustainability objectives should also be explicitly taken into account in the evaluation, selection and support of startups**. The funding program *EXIST-Existenzgründungen aus der Wissenschaft (startups out of the science sector)*, for example, is

already oriented towards the cross-sectional objective of "sustainable development" due to the requirements of the European Social Fund. So far, however, only "prospects of sustainable economic success" have been demanded in the national "guidelines". On the basis of the results of the Green Startup Monitor, criteria of ecological and social sustainability should also be explicitly taken into account in the evaluation, selection and support measures of the program. Also, the **evaluation of promotion programs should explicitly include objectives and impact indicators for ecological and social sustainability**.

One example of how the recognition of the innovative and sustainable performance of green startups is hampered is the INVEST-Zuschuss für Wagniskapital (grant for venture capital). Only startups from a very limited number of sectors are eligible for this grant. Numerous green startups, e.g. with highly innovative energy and environmental technologies, are thus excluded or have the additional expense of having to justify their eligibility. This **discrimination prevents fair and equal conditions for all** and should therefore be eliminated as soon as possible.

STARTUP PROMOTION PROGRAMS



Explicit consideration of sustainability objectives in the assessment, selection and support measures

“Green startups would benefit from a stronger positive media presence: It would increase the customer demand and thus contribute to a demand-pull growth.”

Prof. Dr. Matthias Raith

Otto-von-Guericke-University Magdeburg

Green startups call for amplified exchanges with established companies as well as direct investments by family-owned and medium-sized companies. Numerous cooperations with established companies already exist, especially for the purposes of providing access to customers, markets and technology expertise as well as fundraising. As a result, the **orientation of the activities of regional economic promoters towards the opportunities of green lead markets and sustainable economic practices should be strengthened,**



e.g. through target group-oriented transfers of knowledge of GreenTech lead markets and the economic opportunities of the energy and mobility turnarounds. Targeted matching events, e.g. between established medium-sized companies and green startups, would also contribute to this. Best practice examples such as the Green Innovation and Investment Forum (GIIF) of bwcon and Umwelttechnik Baden-Württemberg could provide orientation.

2

Raising capital

Green startups state much more frequently that they experience challenges with raising capital. For those green startups that consider themselves highly innovative, this problem is of particular importance. Direct investments from family and medium-sized companies for green startups are of special interest.

In order to **solve the specific problem of raising capital for highly innovative green startups, a High Sustainability Startup Fund** tailored to this target group could be set up to support green startups with radical and disruptive technologies and business models up to the growth phase. In order to make it easier for private investors to invest in green startups, this private-public investment fund should be set up in the same way as the existing High-Tech Startup Fund, which is co-financed up to 50% by the state and pursues clear environmental and sustainability objectives.



So far, **very few business angels and investment managers have specific expertise in the area of GreenTech and sustainability.** Targeted measures to increase the number of investors with specific expertise are therefore essential. Also, the installation of a **central competence center for early-stage financing in the green economy** should be considered.

3

Overcoming the “valley of death”

Green startups would like to see better support for their entrepreneurial commitment to environmental protection and sustainability. For the purpose of a proof of concept, every second green startup already cooperates. An important starting point for improvement is **public procurement**. The state and local authorities should, for example, increasingly **procure innovative green products and services as first or pilot customers** and thus support suppliers in overcoming the “Valley of Death” of market introduction. The procurement of innovative products is often associated with uncertainties regarding their optimal function and durability. Procurement by startups as suppliers is systematically hindered by the fact that they do not have the high number of references and creditworthiness of established companies. Just as the export credit insurance through Hermes guarantees, a concept should be drawn up to cover the additional risk for the individual purchasing institution through a federal program.



Public procurement as first or pilot customer for innovative green products and services

Support programs for **those products whose market diffusion is of high priority for environmental reasons** should also be expanded. One example is KfW's promotional programs for various renewable heat technologies, which reduce the additional costs incurred by first-time customers. With increasing market diffusion, however, subsidies lead to ever increasing subsidy costs. Here, it is unavoidable to set price signals, e.g. through CO₂ pricing. This will enable an offset of competitive distortions or cost disadvantages, such as for energy-efficient products.

4

Personnel recruitment

Among those green startups with strong employee growth, there is a marked interest in simplifying the recruitment of personnel from non-EU countries. In addition, green startups are particularly interested in internationalization. Employees who are familiar with the context of the export target countries and have relevant local networks can take over important key functions here.



Lowering the barriers to recruitment of non-EU staff

The **hurdles to hiring non-EU personnel** should therefore be **reduced**. A fast and tailor-made recruitment practice is a relevant cornerstone for healthy corporate growth.

“Green startups are a strong transformation engine for sustainability. Their success depends to a large extent on the successful development of cooperation and stakeholder competences.”

Prof. Dr. Dr. h.c. Stefan Schaltegger
Leuphana University Lüneburg

6

Research design



6.1 Number of startups in Germany

A study by the Kreditanstalt für Wiederaufbau (KfW) estimates the current total number of startups in Germany at 12,500 (Metzger, 2018b, p. 1). The German Startups Association, with its clear focus on the digital economy, is currently estimating around 9,000 startups (Hirschfeld & Gilde, 2018). Both estimates refer to young companies founded in the last five years. For the 10-year perspective presented here, the approximate number of startups in Germany can be estimated on the basis of figures from the Federal Statistical Office and the KfW Startup Monitor: If the total number of business foundations with *greater economic significance*²⁴ in 2017 (125,405) (Statistisches Bundesamt, 2018, p. 529) is taken into account for the calculation, the share of *innovative startups*, i.e. those with national or worldwide market innovations (7%) (Metzger, 2018a, p. 3), is about 8,800 for 2017. If it is assumed that at least half of this group (54%) can be regarded as *growth-oriented* (Metzger, 2018a, p. 2), there

were about 4,700 *innovative and growth-oriented business foundations* ("startups") in 2017. Since the number of newly founded companies has fallen significantly over the last ten years, and thus averaged a higher number between 2008 and 2017 than in 2017 alone, the total number of startups in this period can be estimated at at least 50,000. However, not all of these startups will remain in the market for the long term. Concerning the mortality rate of German startups, various studies from industrialized countries can be taken into account which show a closure rate of 67% seven years after the foundation (Egeln, Falk, Heger, Höwer, & Metzger, 2010, p. 43). For the longer period under consideration here (ten years), a conservative rate of 75% is assumed at the end of the tenth year after foundation.²⁵ Consequently, the total estimated number of German startups in 2018 (date of the survey) can be assumed at **23,700**.

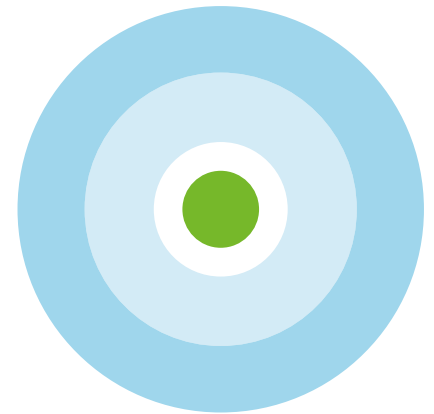
In the examined data set, 26% of the startups classified as "green". Based on the above estimate, it can therefore be assumed that around **6,000** of the startups in Germany could be classified as green in 2018.

24

Startups with *greater economic significance* include all legal entities and partnership companies. Incorporations of natural persons must meet specified criteria (commercial register entry, craftman's card or at least one employee) in order to qualify (Statistisches Bundesamt, 2018, p. 545).

25

Distribution of the closure rate weighted over 10 years with the highest closure rates in the years 2, 3 and 4 after foundation (Egeln, Falk, Heger, Höwer, & Metzger, 2010).



6.2 Data collection and analysis

The data basis of the Green Startup Monitor stems from the German Startup Monitor 2018 (DSM), which was conducted by the German Startups Association in cooperation with the University of Duisburg-Essen and its partner KPMG. The Borderstep Institute initiated and elaborated the inclusion of sustainability-related questions in the questionnaire as part of the project “*Strengthening Green Startups as a Transformation Engine*” funded by the German Federal Environmental Foundation (DBU), thus ensuring that green and non-green startups can be demarcated. Borderstep defines green startups as young, innovative and growth-oriented companies whose products, technologies and services contribute to the ecological goals of a Green Economy.

Quantitative data for the German Startup Monitor were collected via an online questionnaire in the period of 14.05.–17.06.2018. This raw data set was subsequently adjusted: The investigated data set contains 1,158 startups in the range from zero to ten years and with (planned) growth or high innovativeness; the data set features a clear demarcation between *green* and *non-green startups*.

Since the sampling method was self-selection of the contacted founders and executives, the results can be generalized to the population of all startups in Germany only to a limited extent. However, due to the wide-ranging distribution by a large number of network partners²⁶ and the high number of participating startups, an important snapshot of green startups in Germany – as well as their specific challenges and expectations of politics – emerges.

²⁶

A detailed description of the network used to disseminate the questionnaire can be found in the German Startup Monitor 2018 (Kollmann, Hensellek, et al., 2018).

6.3 Demarcation between *green* and *non-green startups*

Green startups were identified in three steps based on their self-assessment. Only those startups that (i) assign themselves to the Green Economy (filter question), for which (ii) the corporate strategy *Achieving a positive social or environmental impact* is rather to very important (plausibility check 1) and who (iii) (fully) agree to the statement *Positive ecological and social impact is important for us* (plausibility check 2) in the context of key performance indicators, were assigned to the group of green startups.

Of the original 1,550 startups in the data set, 1,158 answered all three classification-relevant questions and could thus be included in the analysis.

The scientific evaluation of the data was carried out by the Borderstep Institute. The differences between green and non-green startups were tested with suitable significance tests and are therefore highly likely (95%) to be generalizable. Some differences that clearly manifest in the data set, but for which the probability of a coincidence is statistically not less than 5%, are marked with a + in the text.

(i)

Filter Question

Our products/services can be assigned to the "Green Economy" because they purposefully contribute to environmental protection, climate protection and resource conservation.
(agree / fully agree: 32,8%)

(ii)

Plausibility Check 1

„Which corporate strategies are currently important for your startup? Achieving a positive social or ecological impact.“
(rather – very important: 68,2%)

(iii)

Plausibility Check 2

„Please assess to what extent the following statements about Key Performance Indicators (KPIs) apply to your startup: Positive ecological and social impact is important for us.“
(agree / fully agree: 62%)

6.4 Distinction between the Green Startup Monitor and Green Economy Gründungsmonitor

The Borderstep Institute issues two publications on the green startup scene in Germany. These have different focus areas:

This *Green Startup Monitor* (GSM) exclusively considers innovative and growth-oriented startups, which represent only a small subset of all startups in Germany (see explanations in Chapter 1.1 and Chapter 6.1). The sample is based on a self-selection of startup entrepreneurs and managers, who were contacted directly by multipliers and invited to participate. The data collection takes place via an online questionnaire. The self-reported raw data are then adjusted taking into account innovativeness, (planned) growth and contribution to the Green Economy. The GSM thus represents an analysis of the innovative and growth-oriented green startups in Germany.

The *Green Economy Gründungsmonitor* (GEMO), published by the Borderstep Institute in cooperation with the University of Oldenburg, examines business foundations with “greater economic significance” (Statistisches Bundesamt, 2018b, p. 3). These are not limited to “startups” in the sense of the GSM but represent a far larger group (see explanations in Chapter 1.1 and Chapter 6.1). The group of new ventures with “greater economic significance” considered in the GEMO comprises legal entities and partnership companies in accordance with the definition of the Federal Statistical Office. Foundations of natural persons must meet defined criteria (commercial register entry, craftman’s card or at least one employee). The GEMO sample is randomly drawn from Creditreform’s corporate database. It comprises 625 startups per year over a period of ten years and thus enables a retrospective

longitudinal study with generalizable results. Green startups are identified using the classification “*Environmental Goods and Services Sector*” (EGSS) of the European Statistical Office Eurostat and assigned to eight target areas of the Green Economy (Weiß & Fichter, 2015). The GEMO therefore presents an analysis of the relevant indicators and developments in green startups over the last ten years. The non-identical research designs and methods for identifying those companies whose products, technologies and services contribute to the ecological goals of a Green Economy lead to different results in the GSM and the GEMO:

The GSM 2018 identifies a current share of green startups of 26% among the innovative and growth-oriented startups on the basis of the self-reported data.

On the basis of data from the Creditreform database, the GEMO 2017 identifies a long-term stagnating mean of green foundations in Germany of around 15% (Trautwein et al., 2017).

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Editors

Borderstep Institute for Innovation and Sustainability



Borderstep Institut für
Innovation und Nachhaltigkeit

The Borderstep Institute for Innovation and Sustainability is active in the field of applied innovation and entrepreneurship research and committed to the vision of sustainable development.

Borderstep is an independent research institute focused on entrepreneurial solutions for global challenges. Borderstep's research-driven projects focus on green innovation, sustainable entrepreneurship, climate change and energy efficiency in buildings and IT systems.

Our mission is to contribute to a fundamental global transformation toward a green and sustainable economy through excellent interdisciplinary research.

We generate new, problem-oriented knowledge that galvanizes the world! We see ourselves as pioneering scientists and strive to contribute to the transformation of business processes and lifestyles to promote a green economy based on outstanding research. In the process, we strengthen and support those in society who are leading the way and innovating to make sustainability a reality.

www.borderstep.org

Selected Publications and Instruments

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Prof. Dr. Klaus Fichter is founder and director of the Borderstep Institute for Innovation and Sustainability. As a professor, he teaches at the Carl von Ossietzky University Oldenburg and holds the extraordinary Professorship for Innovation Management and Sustainability (PIN). In the Department of Economics and Law, he is responsible for the focus area Eco-Entrepreneurship and the part-time Master's program Innovation Management and Entrepreneurship.

The innovative study module “*Eco-Venturing*”, essentially developed by Klaus Fichter, received the Hans Sauer Prize, a competition on the “*Promotion of environmental innovations*”. Klaus Fichter is a member of the presidency of the German Scientific Association for Innovation, Entrepreneurship, and SMEs (FGF), the largest network of innovation researchers in German-speaking countries. He also heads the network's working group “*Sustainable Entrepreneurship*”.

Klaus Fichter is a mentor for founders in the Innovation and Founding Centre of the University of Oldenburg and scientific director of the University's Network Innovation and Founding in the Context of Climate Change (NIK). He is the author of over 200 Publications, including numerous contributions in peer-reviewed journals such as *R&D Management*, *Journal of Industrial Ecology* and *International Journal of Entrepreneurial Venturing* as well as numerous practical handouts for startup and innovation management.



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Dr. Yasmin Olteanu is a research associate at the Borderstep Institute. Her research focus is Sustainable Entrepreneurship. Within the framework of the project *Strengthening Green Startups as a transformation engine*, she stimulates a greater awareness of the importance and challenges of startups in the cross-sectoral area Green Economy and the optimization of relevant funding instruments. Beyond that, she further develops the Green Startup Monitor.

Before joining Borderstep, she gained international experience at the intersection of financial, social and environmental business objectives; as a trainer and manager in sub-Saharan Africa and as an Impact Investment Officer in Peru. In this context, she also repeatedly developed impact management concepts and was responsible for their implementation.

Yasmin Olteanu received her doctorate from the Freie Universität Berlin on the subject of “*Access to Justice in Microfinance*”. She completed her diploma and subsequent master's studies at the Berlin School of Economics and Law, the Università degli Studi di Bergamo (Italy) and the Universidade Estadual de Campinas (Brazil).

Images: Joerg Frank/Borderstep

Editors

German Startups Association



The German Startups Association is the representative and voice of the startups in Germany. Founded in September 2012 in Berlin by startup founders, it explicates and represents the interests, points of view and concerns of startup companies to legislation, administration and the public.

The Startups Association is committed to a founder-friendly Germany, promotes innovative entrepreneurship and carries startup mentality into society. It is also a network that connects founders, startups and their friends. As a federal association, it represents the entire German startup ecosystem and is also represented regionally in 15 federal states by committed founders.

Furthermore, the Startups Association covers a wide range of industries, professions and topics with various platforms and networks. The events span a wide range of topics, from the first entrepreneurial steps towards selling a company or going public. The organization of delegation trips also actively promotes the internationalization of the German startup scene. The association currently has over 1,000 members.

www.deutschestartups.org

Project Management at the German Startups Association

Dr. Alexander Hirschfeld has been working for the Startups Association since April 2018 and has since been head of the research department. In this position, he is project manager of the German Startup Monitor (DSM) and presents the results of the study at national and international events. In addition to the DSM, he also responds to various further studies, e.g. the Green Startup Monitor, which was published for the first time this year.

Alexander Hirschfeld holds a doctorate in sociology on the changes in the working world and worked as a research assistant at the Christian-Albrechts-Universität zu Kiel. He has taught and researched the relationship between business and technology at various universities in Germany and abroad – including a year as a visiting researcher at Columbia University in New York.



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Björn Kaminski has been promoting the topic of sustainability and green startups since May 2017 as the project manager for green startups in the Startups Association. Among other accomplishments, he initiated the Green Startups platform and developed own formats for the network in this context. Since April 2018, he has also been responsible for the approx. 30 platforms and networks in the association as the team leader for platforms and networks.

Björn Kaminski studied communication sciences and business administration at the Freie Universität Berlin and founded his own games company with up to 15 employees after his studies. Even during his positions as managing director of a media company and as consultant for an international e-commerce company, he never lost contact with the German startup ecosystem due to his work as a freelance startup consultant.



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Images: Bundesverband Deutsche Startups

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