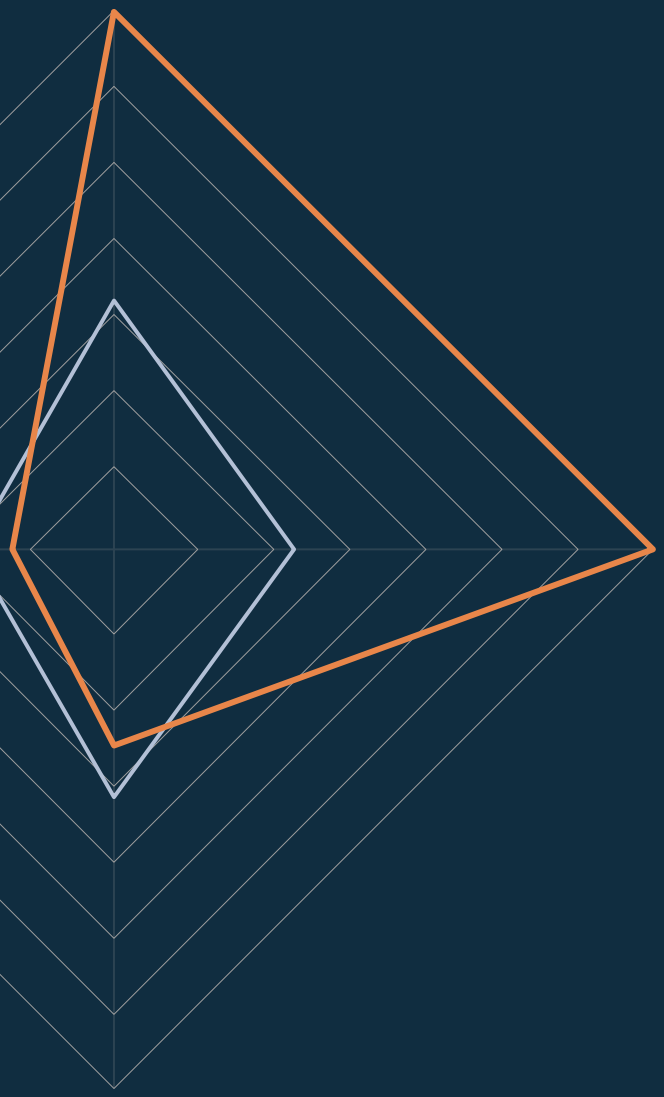
incorporate

quality based, sustainable investments



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Definition

To provide a common basis and an initial overview, we would like to define the terms and topics most relevant to our work on the following pages.

Definitions matter because the understanding of a term can vary greatly between people. For example, the concept of sustainability is often very context-dependent and might be defined differently for each individual. In this sense, “definition” describes the aim for more clarity, through the specification and intelligibility of the description of a thing (Oxford University Press (OUP)/[Dictionary.com](http://dictionary.com/) n. d.). This way, we’re able to always refer back to the specified outline later in the projects’ documentation and easily evaluate whether or not something matches our initial characterization.

General Context

A growing interest in sustainable products within regular investment types can be noticed. New sustainable banks and green ETFs are coming to the fore and are continuously gaining public interest and recognition.
The trend towards sustainability in the financial and economic world certainly makes sense. Only companies that act sustainable can survive on the market in the long term and successfully protect the environment on which they depend. For investors, sustainability can be delivered as the outcome of the investment process alongside satisfactory, long-term investment returns (Investment Leaders Group, University of Cambridge Institute for Sustainability Leadership 2014).

The trend towards sustainability in the financial and economic world results from a growing understanding, that companies and people strongly depend on the environment in which they act. For the reason that complying with sustainability legislation prevents fees, self-sufficiency and recycling of materials cuts costs, a good social strategy motivates employees and boosts productivity, etc. sustainable stocks already outperform traditional ones slightly as a study from BlackRock shows.

ESG Performance compared to Benchmark 2012-2018

	U.S.		World ex-U.S.		Emerging Markets	
	Traditional	ESG Focus	Traditional	ESG Focus	Traditional	ESG Focus
annualized return	14.4%	14.5%	7.7%	8.1%	4.3%	5.7%
volatility	9.7%	9.8%	11.5%	11.5%	14.4%	14.4%
sharp ratio	1.42	1.42	0.62	0.64	0.25	0.35
maximum drawdown	-13.9%	-13.9%	-23.3%	-22.7%	-35.2%	-33.1%
price-to-earnings	19.6	19.9	17.0	16.9	13.4	13.6
dividen yield	2.0%	2.0%	3.2%	3.2%	2.7%	2.8%
number of stocks	621	313	1,012	453	855	300
ESG score	5.4	6.5	6.6	7.8	4.4	6.1

Fig. 01 ESG Performance compared to Benchmark; Source: based on BlackRock Investment Institute 2019: 6

As we believe in the shift to sustainability in general and in the investment context, it is crucial for us to design for individuals. Because analog to sustainability in general, it has the most impact if a broad field of the population tend to it. Meaning also, even though we explored different kinds of investment, to understand the financial world, to gather opportunities, get inspired and being informed, our focus through this thesis lies on the stock market as in this lies an enormous amount of capital with which the world can and will be influenced by on or the other entity. To illustrate, the market capitalization of all stock companies has been on average around 90% of the worlds GDP, meaning while in 2018 the global GDP measured 135 trillion international dollars, all stocks together were worth around 124 trillion international dollars.

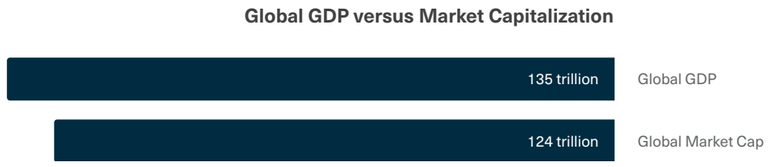

Fig. 02 Global GDP vs. Market Capitalization; Source: based on Worldbank 2018

For Impact to happen and individual investors to profit from sustainable growth of their personal finance and often the case the capital for their retirement, there needs to be the framework in place to access data and find companies to invest in. As this process and any service is far away from perfect:

Our thesis focuses on the exploration of sustainable investment options for private investors. We aim to create a system that empowers prospective investors to make informed and sustainable financial decisions. One of the system's crucial requirements is the standardized disclosure of transparent and relevant data about the performance and impact of an investment. Our research shows that only if certain information is given, investors can act responsibly and in accordance with their goals and values. The challenge is to connect the financial aspect with sustainability values and support the investor in finding companies according to them.

Sustainability

For this thesis, we adopt a definition of sustainability that refers to the consideration of not only economic but also ecological and social factors. Therefore, we have defined the term based on the parameters and features of all these different dimensions. As a guide, we have used a study that has identified the most relevant and recognized features of sustainability.

"All 24 definitions were remapped to the comprehensive definition (percent agreement among three coders was 94%). Of the 24 definitions, 17 described the continued delivery of a program (70.8%), 17 mentioned continued outcomes (70.8%),13 mentioned time (54.2%), 8 addressed the individual maintenance of a behavior change (33.3%), and 6 described the evolution or adaptation (25.0%)."
(Moore et al. 2017: 7)

Our definition of sustainability is based on this study and is therefore essentially oriented towards the continuous achievement of results. These results can be both financial and non-financial. In this sense, our work refers to a definition of sustainability in which the continuous achievement of ecological, social/governmental, and personal results is central.

Ecological

Environmental stability is probably the most common and widespread association with the term sustainability. The ecological dimension strongly focuses on the protection of ecosystems and the reduction of negative human impact on them.

It is well known that ecosystems are overloaded due to human lifestyles. For this reason, many voices call for a more conscious examination of one's patterns of consumption and appeal for a lifestyle that respects the environment.

Dealing consciously and actively with environmental sustainability might, for example, lead to changes in one's consumption, such as using public transport instead of a car or trying to reduce personal carbon emissions.

Personal

Personal sustainability is about ensuring that you achieve your personal and intimate goals and live your life in harmony with your values. This certainly requires much clarity and a profound reflection on the innermost aspirations. It is only when a certain degree of this personal clarity has been achieved that conclusions and actions can be drawn which influence and change behavior in every day or financial decisions, for example.

In our thesis, the focus is on the support of the one, as an economic individual. For example, a personally sustainable goal could be to maintain a standard of living for a longer period of time and/or at a later stage of life. As part of our work, private long-term goals, retirement opportunities, or additional passive income for the investor are also explained as part of the personally sustainable dimension.

Social

"Social sustainability can be defined as specifying and managing both positive and negative impacts of systems, processes, organizations, and activities on people and social life. The topics that social sustainability concept integrates include but are not limited to; health and social equity, human rights, labor rights, practices and decent working conditions, social responsibility and justice, community development and well-being, product responsibility, community resilience, and cultural competence." (Balaman 2019: 86)

This part of sustainability is hard to measure and compare, as human interaction and relationships cannot be evaluated that easily. Only if every stakeholder involved is fully transparent with e.g. sincere employee information, conclusions can be drawn on how socially responsible the company is.

Continuously controlling and monitoring the social conditions is key to make sure, that there is no data gap or misleading information.

Investment

We invested a lot of time into this thesis. This shows, that investment is not only the activity or procedure to take money to achieve an expected tangible profit but also to commit one's energy, time, and effort for a valuable result (Oxford University Press (OUP)/[Dictionary.com](http://dictionary.com/) n. d.).

The main reason to invest is to get a return, and speculating to profit from an increase in value later in time. The financial aspects, the minimization of risks, and the consistent rate of return remain the primary objective of investing processes (Dr. Kabisch, Thomas 2010).

Investing vs Trading vs Saving
Saving is the easiest way to make sure, that the money you don't need at the current moment is available at a later time. The money put into a savings account can often be accessed easily. That's why it is a good way to back up for unexpected needs or short-term expenses. It is generally recommended to always have savings of around half a year of income available.

Yet, due to inflation and zero-interest-rate policy, it is not recommended to let one's money lay around on a bank account permanently.

"What if you save a dollar when it can buy a loaf of bread. But years later when you withdraw that dollar plus the interest you earned on it, it can only buy half a loaf? **"** (U.S. Securities and Exchange Commission Office of Investor Education and Advocacy 2011: 11)

Investing means a higher risk but also having a more valuable long-term return, depending on the investment product. Our definition of sustainability contains a reference to time, especially to longer time frames. Investments might be seen as the opposite of trading, as trading is all about guessing the development of the market price and placing bets for ups or downs - mostly for short timespans, meaning minutes.

"The difference between trading and investing lies in the means of making a profit and whether you take ownership of the asset. Traders attempt to profit from buying low and selling high (going long) or selling high and buying low (going short), usually over the short or medium term. Investors will also attempt to profit from buying shares at a low price and selling high, but over a longer term." (IG n. d.)

We acknowledge the 'buy-and-hold' strategy not only as advantageous for longterm money multiplication, but also more sustainable personally as investors are convinced of their products and their future relevance.

Invest in vs for
Believing in the potential of a product and sensing an opportunity is essential in investments. Especially in long-term investments and if one is seeking to achieve bigger goals, it's really important to invest with conviction. This aspect can have a great influence on the decision-making process, especially the selection of a product.
On the following pages, we will go into more detail about different investment strategies and approaches.

Sustainable Investment

In the definition of investments, financial aspects, the minimization of risks and the consistent rate of return are the primary objectives (Kabisch, Thomas 2010). One may say, that the financial system and investments cannot be sustainable. By nature, these systems are an interplay of environmental, personal, and societal interests (Hauff/Jörg 2013: 7). So, if sustainable investment is to be defined, it must take this interplay of dimensions and interests into account.

To everyone, sustainable investment means something else, depending on various variables and resulting requirements, from personal values and goals to ethical and environmental needs. However, long-term thinking and the definition of personal values and goals prove to be the constants in the fluid elements of sustainable investments.

Investment Basics

This chapter focuses on giving a broad overview of investing. As it is a complicated topic and we are no professionals in investing nor the financial sector, it is essential to state, define, and clarify relevant topics.

As stated by us in the definition of investment and as confirmed by the SEC, investing means giving money away, and speculating on it being successful and increasing in value once it comes back (U.S. Securities and Exchange Commission 2011).
There are two ways of how money can work for the investor. Firstly it can go to work, meaning it earns constantly because someone is paying back for using the investor's money. Secondly, the investor can become an owner of something and sell with increased value.

There are several reasons why to invest. For individual investors, one reason might be to gain financial independence and security by building wealth. For companies and banks, ownership, loans, and debt are shared between many stakeholders creating the financial system.

Summary

What is the best investment product?
An investment product has to fit the requirements and the needs of the investor. No product can fulfill all criteria, in the same way, these are liquidity, safety, and return. These have to be balanced according to personal needs and thus ended up at a decision. For many, especially because of the high liquidity and returns, equity is the favored choice, although it is advised to always diversify the portfolio in order to reduce risk.

How does sustainability in stock investing look like?
Sustainable investing gained mainstream track since the 1960s with early movements of socially responsible investing. While at the beginning the negative screening and exclusion of unfit investments were practiced, more and more common is the inclusion of certain criteria, often in the categories of environmental, social, and governmental. The approach of ESG integration like the latter or best-in-class determination requires data to categorize and rate companies just like it has always been done with financial data. For that reason, like it is also common and practice for financial data, companies have been reporting alongside financial also non-financial data.

What are the requirements and the current state of reportings?
In many countries, public companies are obliged by law to disclose also non-financial data to the public, like in the EU under the Directive 2014/95/EU. As there is no specific approach mandatory, many organizations emerged providing guidelines and support for this non-financial disclosure, the leading provider today being GRI.
Even though the number of companies issuing reports worldwide is steadily increasing, sustainability reporting still has many issues, like the depth of the reported information, the topics mentioned, providing enough quantitative data to back up quantitative goals if they even exist. Also, the missing standardization makes it extremely hard for the individual investor to gather an overview of several companies' sustainability performance.

How can impact in stock investing be achieved?
Buying and selling stocks especially out of non-financial reasons has only a limited effect if even so, due to the proportional higher amount of investors with indifferent opinions about these matters seeking to gain personal profits through fluctuating share prices of companies getting in hardship or praise for sustainability-related actions. Through this share prices and therefore the effect on companies quickly balances itself out.

Impact can still be achieved through active shareholders communicating with companies, acting out their voting rights, and publicly discussing sustainability-related issues to influence companies this way.
As shown through research companies who experience this kind of activism are willing to change their structure, actions, and business, so corporate engagement seems to be fruitful.

What is the best strategy to invest in stocks?
The best strategy seems to be value investing, where the investor researches the company in detail, their business model, future prospects, governmental structure, preparedness for the future, etc. in order to assess if the current stock price is appropriate, too high or undervalue. Through this strategy, solid companies are determined and bought undervalue to keep and eventually sell for a higher value in the future with certainty and determination.
Gambling on short term trends in stock prices or just listening to recommendations of public analysts seems not to prove suitable and profitable for the individual investor.

Financial System

The financial system must be distinguished from the economy. The latter is characterized by manufacturing companies and consumers (Armour et al. 2016).

The purpose of the financial system is to function as an intermediary, enabling the exchange of resources between institutions with surpluses and those with deficits (International Monetary Fund 2019).

Markets are set up to guide these transactions with defined rules and guidelines. Common markets are the capital market, on which shares and bonds are traded, the money market, the commodity market, etc.
A financial system holds four essential entities:

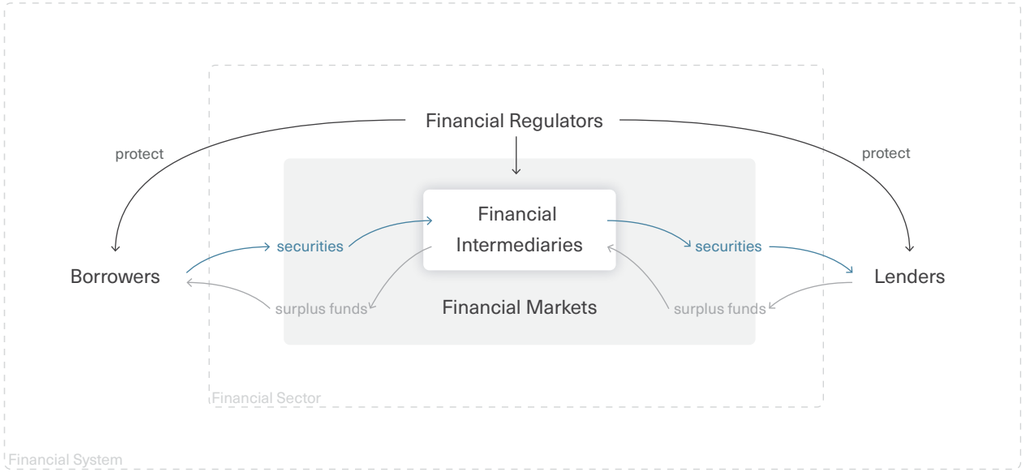

Fig. 03 Elements of the Financial System; Source: based on Faure 2013: 11

- Lenders and Borrowers
- Financial Intermediaries
- Financial Instruments
- Financial Markets

Differences in Financial Systems
However, not every financial system functions in the same way. In order to discuss the differences between different financial systems, a brief comparison of the ‚Anglo-Saxon system' and the ‚German system' will be made (Grosfeld 1994: 6).

The Anglo-Saxon system is strongly focused on securities and shares in companies. This is also where the bulk of private savings are invested, albeit not through individual investment. For retirement, for example, pension funds are quite common and often widely invested in shares. Banks play a small role because they usually only grant short-term loans to companies.

In the German system, banks are more prominent because they are active in commercial and investment banking and grant long-term loans to companies. They have close relationships with companies and hold a large number of shares. Retirement in Germany is financed by a state redistribution and private pension funds are quite rare.

The popularity of stock investments in the Anglo-Saxon system and the introduction of the Anti-Insider Trading Act, which makes it illegal to trade stocks based on confidential information, make information about companies easily accessible. Since the shares are widely spread, the market is extremely liquid. The rating and evaluation of companies is a competitive industry.

Since in the German system a large number of companies belong to banks, information is often exchanged in these close relationships. However, the majority of the companies in this system are private and have no incentive to exchange information. For the most part, it is publicly owned companies that pass on information, and often just the minimum amount required.

In the Anglo-Saxon system control of institutional investors over companies is seldom utilized, shares are rather dropped than trying to influence the company in ways investors expect the company to grow. Because of this neglected right, the boards of directors are oftentimes filled with management and in any case of a hostile takeover shareholders' influence is minimal.

In the German system, by law, management cannot sit in the supervisory board and control can be exercised in favor of the shareholders with banks and other companies holding the majority of shares, caring about their influence.

Stakeholder

Tying up on the entities mentioned, these are roughly the stakeholders involved in the investment spectrum.

Firstly lenders and borrowers can be mapped on the more specific terms, investors and issuers as well as banks. For the exchange of securities for money, markets are used as an intermediary, with the stock market being the most important and known.

Companies and investors are in direct contact concerning the transfer of information and exercising the rights shareholders have.
Financial markets constitute the basis of investing, like providing a platform accessible to all stakeholders and setting rules for a fair exchange and trade. Being listed on a stock exchange makes it easier to gain capital and public recognition also attracting rating agencies and being subject to comply with the regulations within this market.

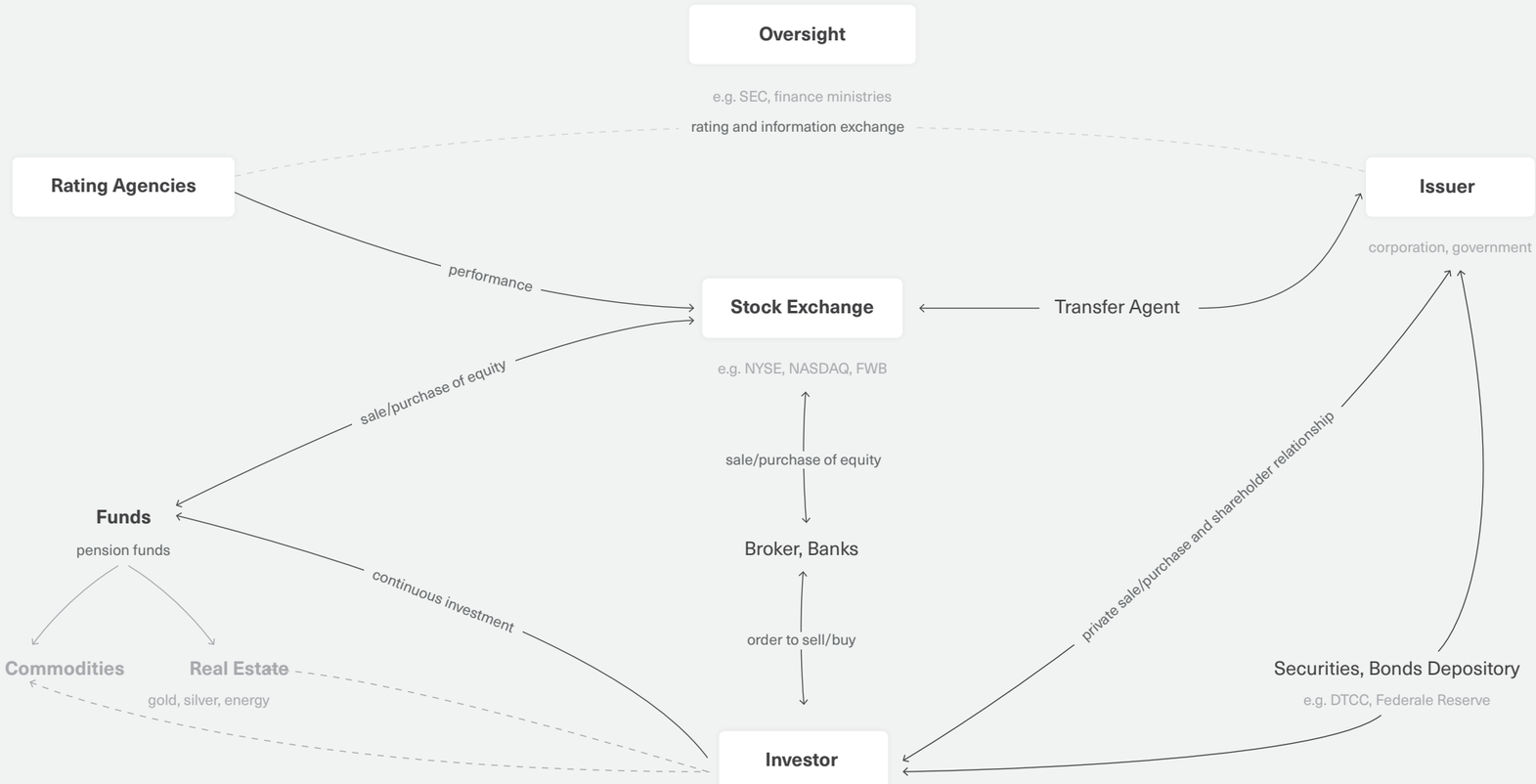

Fig. 04 Stakeholder in the Investment Spectrum; Source: own diagram

Types of Investment

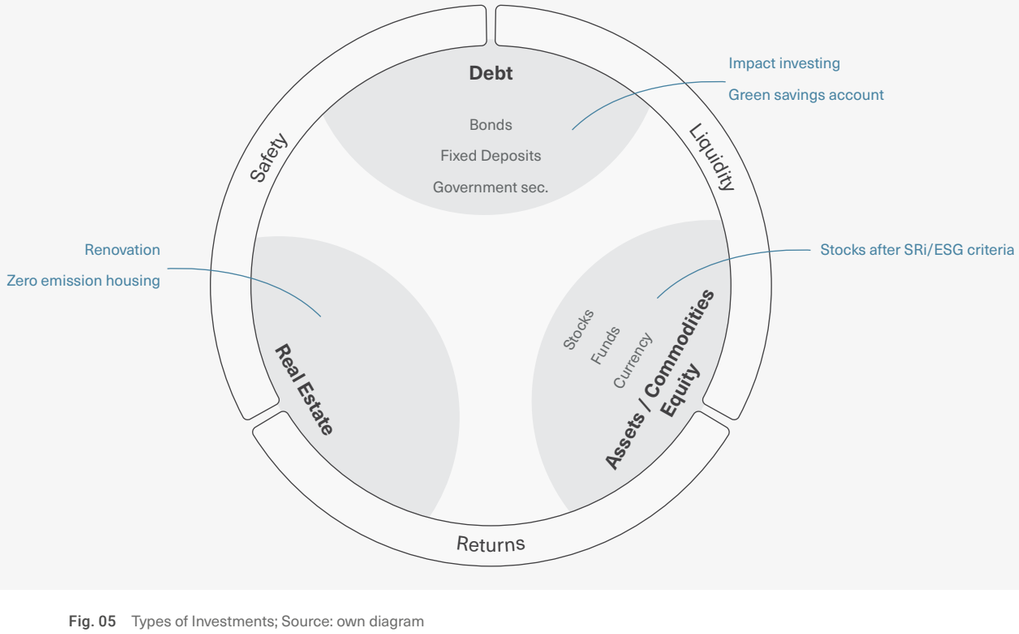

Fig. 05 Types of Investments; Source: own diagram

The three main characteristics of investments are Return, Liquidity, and Safety. However, no investment can fully meet all these three characteristics (ING DiBa AG 2018). Nevertheless, there are investment categories where two of the three elements are generally rather strong. While debt is particularly safe and liquid, equity is liquid and most profitable. Real estate is generally strong in the characteristics of security and profitability. Within these categories, however, the specific characteristics of a product can vary considerably.

As already shown in the financial system section, investments or finances are always reliant on the relationship between lender and borrower or seller and buyer. For this reason, two classes of investment can be placed on top of the three categories discussed above, namely property investment and credit investment. With property investments, the investor acquires an asset. This can be a share in a company, gold, a house, etc. The investor expects either to receive part of the profit from the investment or to sell it at a higher price than the original purchase value when exiting. In turn, when a loan is granted, the investor lends money to another party and collects interest. This can take the form of bonds, cash deposits with a bank, or P2P financing.

Equity

Equity can be explained most simply as the degree of ownership of assets after deduction of the liabilities associated with them. There are therefore many forms of equity. Probably best known are shares and stocks of a company, as well as investments in commodities in the form of real objects traded on futures exchanges. Furthermore, currencies and crypto-currencies have attracted a lot of attention in recent years.

This form of investment, which is based on the increase in the value of property, proves to be riskier than fixed-interest investments such as debts. With equity, there is no guarantee that a profitable difference between the original purchase value and the proceeds from the sale will be achieved (Paisabazaar 2020).

Stocks

Companies can raise new funds by offering shares of themselves on a stock exchange. Often this is met with high expectations for newly listed companies. This is referred to as Initial Public Offering (IPO). However, not all of this is exclusive, as the companies may also offer additional shares at a later date in case additional funds are required.

For this one transaction only, the prices are set by the issuer of the share. The shares are traded on the secondary market from this point on so that prices are heavily dependent on supply and demand.

Types

There are three main rights and privileges in which the shares differ from each other: Dividend entitlement, voting rights, and entitlement to the capital on liquidation (Catchpole 2019).

Dividends may be freely distributed by the Company to a class of shares. Either a fixed amount can be set, privileges can be granted in the order of payment to higher classes of shares, or no dividends can be paid at all.
Regarding voting rights, most shares either carry the right or not. In some rare cases, there may be additional voting rights associated with a particular class of shares.
The allocation of capital in the liquidation of a company is a given right to each share. Therefore, shareholders are owners of a company. However, different classes may have the privilege of being paid first and fully before the lower class of shares.

While there is no law on how shares should be referred to, conventions led to the following common terms.

Preferred shares are entitled to dividends, usually before any other class, and parallel to the capital. In general, no voting rights are associated with this class.

Ordinary shares generally have one vote per share and are subordinate to preference shares in terms of the preferential right to dividends and capital payment.

Finally, deferred and non-voting shares are available, which either have the lowest rank in terms of payouts and/or do not carry voting rights.

Purchase (Yochim 2020)
When buying shares, a broker is required as an intermediary between the buyer and the stock exchange. In some cases, however, employees buy the shares directly from the company because they are sold on a stock exchange where only members can sell and buy. Brokers execute an individual's orders for a commission and take care of the signage in the electronic books and the issue of a receipt. Brokers differ in the amount of commission they take and the support they offer. Banks offer advisory services, but charge higher fees per trade. Online brokers are cheaper but usually offer fewer support services.

Since the market fluctuates greatly, shares cannot simply be bought at the price shown. For this reason, most brokers have established a buying and selling system that regulates the handling and offering of purchases and sales to individuals. Market orders intend to execute the purchase immediately. However, depending on fluctuations in stock and quantity, the purchase prices may differ from the price indicated when the order was placed. In this case, there is the possibility to place a limit order. This ensures that you stay below the price limit, but can also lead to a partial purchase.

Ask	For buyers: The price that sellers are willing to accept.
Bid	For sellers: The price that buyers are willing to pay.
Market order	A request to buy or sell instantly at the best available price.
Limit order	A request to buy or sell only as long as a specific price or better is met.
Stop-loss order	Once a specific price is met, a market order is executed.
Stop-limit order	Once a specific price is met, limit order fills all the possible trades.

Fig. 06 Stock Trading Terms; Source: based on Yochim 2019

Funds
To either achieve a lower risk by spreading the investments or to be able to afford an investment and share it among the parties involved, equity can also be acquired from a pool of funds generated by the contribution of several investors.
Equity funds invest in real estate, commodities, and equities. More common are also mixed forms such as investment funds, pension funds, etc., which distribute the money to many sources such as shares, but also bonds and other assets.
Exchange-Traded Funds are particularly simple. These can be purchased on the stock exchange through a broker and are made up of many different combinations of shares that replicate an index or are sorted by theme. Small-cap, large-cap, high dividend, etc. ETFs became very popular with retail investors. The reasons for this are, on the one hand, the possibility of placing orders with online brokers yourself and, on the other hand, the low-risk, steady profits over the last ten years.

Total net Assets of ETFs in the USA

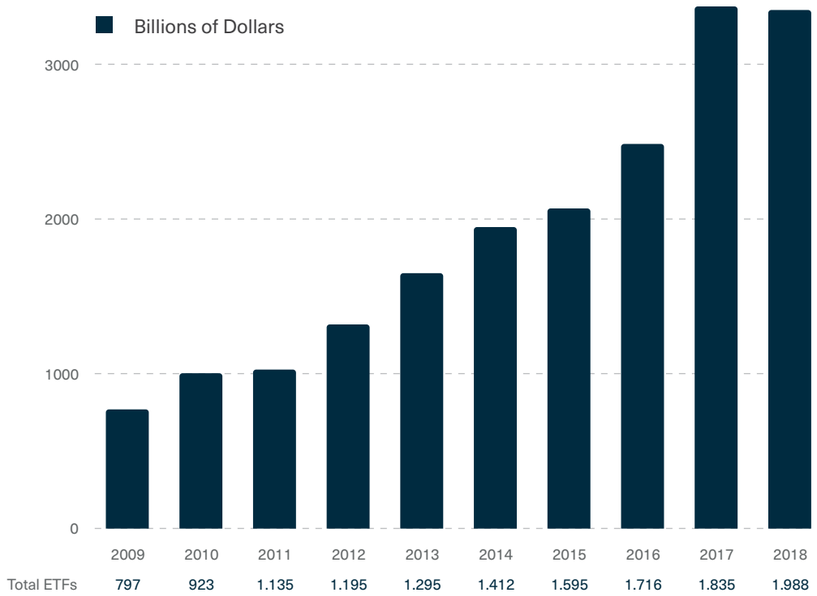

Fig. 07 Total net Assets of ETFs in the USA; Source: based on Investment Company Institute 2019: 83

Debt

Debt investment is the process of lending out one's money to a company, person, institution, or government and expecting the full payback over time plus interest. Compared to equity investments it is less risky but also earns considerably less return. Especially if the rate of inflation is high, the real returns can be marginal. That's why sometimes, for example, government bonds, are referred to as parking the cash (Spencer 2013).

Two common and major categories of debt instruments are in use today: Bonds and loans.

Bonds
Bonds are issued by companies and the government. The two most common types are therefore corporate bonds and government bonds (treasury bonds). Although bonds give the investor a loan position like any other loan agreement, bonds can also be resold, thus changing their value relative to their face value (Parker 2017). Corporate bonds are traded through brokers, but not as publicly as stocks, so price comparison can be more difficult. Government bonds can usually be purchased from the relevant institution.

Loans
Other loans, such as bank deposits, certificates of deposit, loans to small businesses, and individuals, are contracts that have payments and interest rates fixed. Depending on the borrower's financial situation, this can be a safe form of investment or very risky, although interest rates would also be higher. For example, banks, as borrowers, are secured in most countries up to more than six figures.

Real Estate

In the sense of the definition of profit-seeking, buying a property to live in and not expecting a profit, seeking, and measuring it, is technically not an investment. However, there are also investments in real estate where there is no intention to use it personally. Real estate can include houses, offices, agricultural land, and commercial property (Mayekar 2019).

Features of Real Estate Investing
Immune to Inflation
Allows Use of Leverage
Value Enhancement
Needs Management
Profitable even during Recession
Low Liquitity
Tangible

Fig. 08 Features of Real Estate Investing; Source: based on Mayekar 2019

Investing in real estate has many advantages. Especially the stability of value and retaining some value on top of monthly rent earnings is attractive to many investors. For some, however, the high level of commitment required to periodically renovate, organize, and manage properties can be a hurdle. Also, real estate is often associated with an enormous commitment and no quick liquidation of the invested money.

On the other hand, there are investment funds for real estate, called Real Estate Investment Trusts. The organizations collect money from numerous investors and invest it in larger properties. Here they take care of facilitating the management of the properties and distribute dividends according to the performance of the property.

Sustainability in Stock Investing

Sustainable investing has been around for a long time, just as there are movements concerning sustainability and ecological living and doing business. In contrast to traditional investing, where the focus is exclusively on short-term profit maximization, sustainable investing is about taking other values into account, e.g. the decision for steady growth without harming nature and people, influencing companies to act more sustainable and using these values to identify promising and stable companies for the future (BlackRock Investment Institute 2019).

As the manifestation of sustainability looks different to every person, it is harder to choose the appropriate investment product and to connect financial with sustainable values. BlackRock as an institution defines Sustainable investing as follows: *"Combining traditional investing with sustainability-related insights in an effort to reduce risk and enhance long-term returns."* (BlackRock Investment Institute 2019: 4). But for individual investors an additional level, the orientation towards personal views on sustainability, must be defined.

Timeline of the Evolution of Sustainable Investing

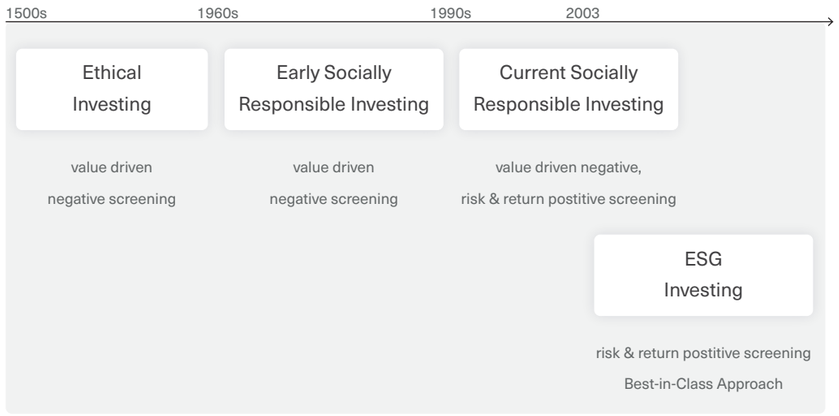

Fig. 09 Timeline of the Evolution of Sustainable Investing; Source: based on Fulton et al. 2012: 11

Sustainable investing originates from the negative screening of religious investors seeking to invest in harmony with their beliefs. Though the term Socially Responsible Investing manifested itself in the early 60s as the brad term for all ethical value-based investments even till today, it hasn't differed so much from previous practices. The change came in the late 1990s, when practices evolved to incorporate more ecologically sustainable and governmental perspectives on businesses and when positive screening was adopted to actively seek out high-performance value products.

From 2000 on, increased attention of investors towards the governmental factors led to the evolution of ESG (Environmental, Social, Governance) as a term and new practice. Historically, the SRI approaches seemed to underperform and the hopes were to mitigate that through the incorporation of more detailed and transparent information (Fulton et al. 2012).

Approaches

To invest sustainably, investors can choose between and mix 7 mainstream approaches on how to achieve sustainability. Some are fairly new and others have been around for a longer time, making them more widely used and holding far more assets.

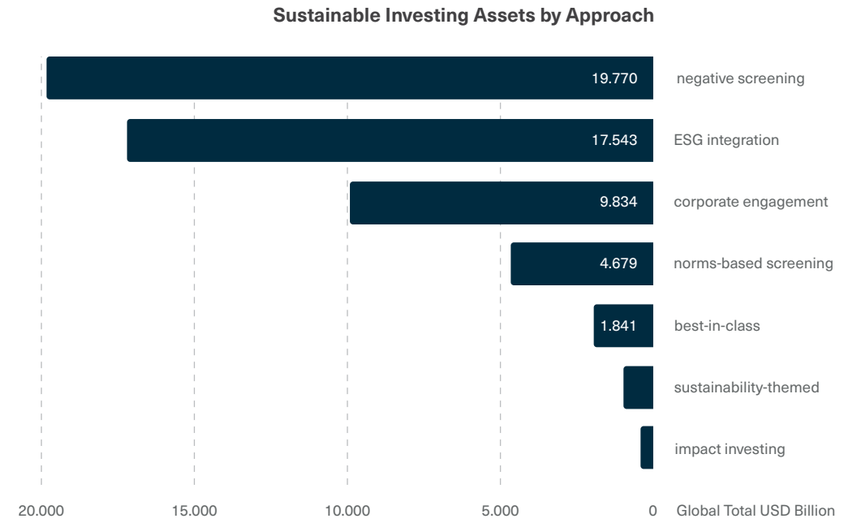

Fig. 10 Sustainable Investing Assets by Approach; Source: based on GSIA 2019: 10

The biggest within those approaches is negative or exclusionary screening, meaning through ethical and value decision criteria are defined which are undesirable and therefore act as exclusionary filters. Commonly used by asset managers, ETFs but also individual investors is the approach of excluding companies partaking in weapon production, tobacco, pornography, and animal testing.

Contrary, ESG integration is the act of incorporation of environmental, social, and governmental factors alongside conservative financial factors in decision making. For institutional investors, the potential effect of non-financial factors on the financials of a company is the most interesting.

Not only passive filtering of possible investments is viable, but also a common approach is being a shareholder of a company and engaging through the various ways within the company in the strategies and leadership decisions, also giving voice to matters on sustainability through other channels.

Another way is to identify important norms and laws which are relevant today or will be in the future. Through this norms-based screening approach, companies are selected which are not subject to penalties for disregarding local legislation or left behind or forgotten in a mainstream platform.

Best-in-class is an approach where only the best-performing companies on ESG factors within a confined universe, category, class, or industry are selected and chosen for investing.

Investing in companies their activities are directly linked to solving issues on ESG matters is regarded as Sustainability-themed investing. An example is investing in a renewable energy provider which actions directly affect and are seen to reduce the impact on the environment.

Impact investing is the approach where most change can be achieved. The intention is to create an impact on the local level or environment directly. Though this approach is not applicable to stock investing (Uzsoki 2020).

Indicators

When it does come to identifying specific criteria for ESG integration the number of possible choices is almost overwhelming. Within the three categories, a multitude of criteria and their detailed specification is possible, for example, emission can be divided into different gases and compounds like CO2, Methane, CO, etc.

"Investors need to assign ESG priorities, based on what will have the most material impact over the long term." (LGT Capital Partners 2019: 10)

or on what is most important to them personally. Most investors already have values that roughly reflect the criteria mentioned by companies in their reporting.
A quick overview of which criteria are the most important to investors was done by LGT Capital Partners, surveying 207 investors form 27 different countries.

Most Important Environmental Indicators

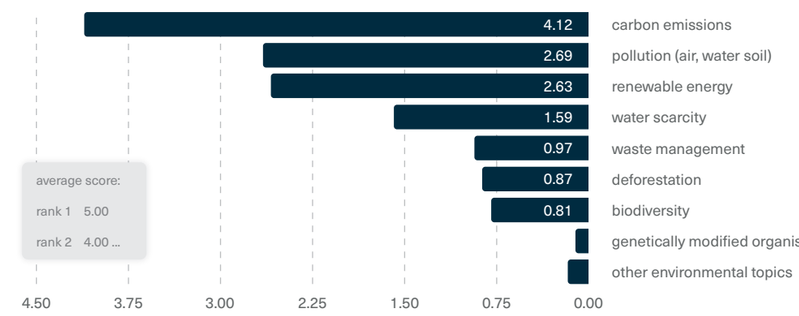

Fig. 11 Most Important Environmental Topics; Source: based on LGT Capital Partners 2019: 10

Most Important Social Indicators

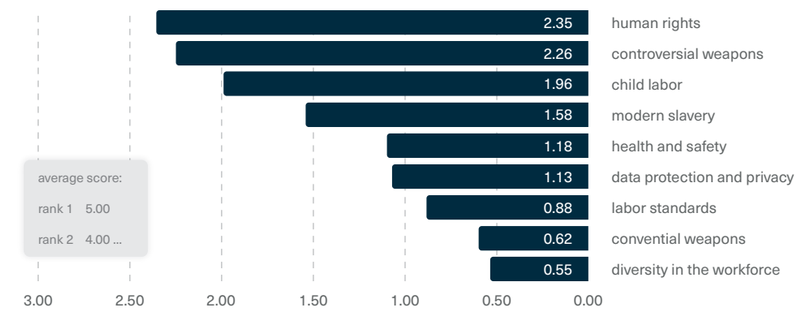

Fig. 12 Most Important Social Topics; Source: based on LGT Capital Partners 2019: 11

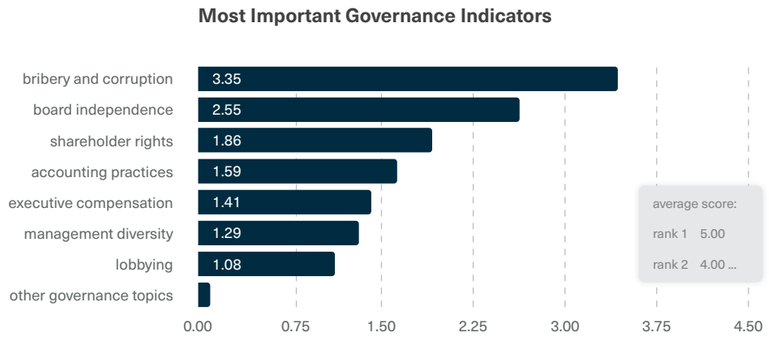

Fig. 13 Most Important Governance Topics; Source: based on LGT Capital Partners 2019: 12

Widely used and recognized are the UN Sustainable Development Goals with the 2030 Agenda for Sustainable Development adopted by all members of the United Nations. These 17 goals aiming for an environmentally friendly, social, just, equal, but still prosperous world are important to companies as well as individuals within and outside of the investment context.

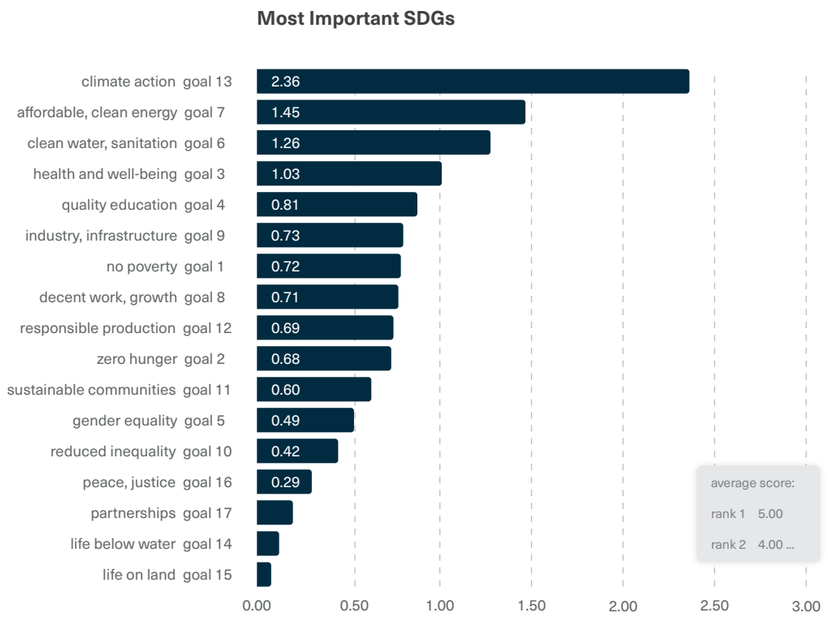

Fig. 14 Most Important SDGs; Source: based on LGT Capital Partners 2019: 23

Fig. 15 17 Sustainable Development Goals; Source: based on United Nations 2020

Reporting

Law

Listed companies have been required for decades to report their financial data to make it publicly available to investors for their decision-making. Since insider trading, i.e. the buying and selling of shares based on non-public information, is illegal in most countries, the only source of information for investors is company reporting, their website, news, and analysts' assessments. This means that most of the information on which investors can base their decisions depend on company reporting.

As climate change and social injustice have become more relevant public and political issues, there has been a corresponding increase in pressure to act more sustainable and corporate social responsibility (CSR) regulations have become more widely enforced. In addition to financial information, investors are increasingly incorporating environmental, social, and governmental factors into their decisions. As a result of this development, certain standards for corporate reporting need to be supplemented to ensure a comprehensive and complete comparison for decision-making purposes. However, there are problems with some companies that are unwilling to disclose this type of information due to an unsustainable business model or negative impact.

One of the most advanced and widely observed regulations is "Directive 2014/95/EU", also known as the Non-Financial Reporting Directive (NFRD). It is "necessary to establish a certain minimum legal requirement concerning the scope of information that should be made available to the public and to public authorities by companies throughout the Union. Companies subject to this Directive should provide a fair and comprehensive overview of their policies, results and risks". (EU Parliament/EU Council 2014).

Listed companies, banks, and insurance agencies with more than 500 employees are obliged to comply with the Directive. In the EU, there are about 6000. Issues to be addressed and reported on are

- Environmental protection
- Social responsibility and treatment of workers
- Respect for human rights
- Anti-corruption and bribery
- Diversity in company boards (in terms of age, gender, education and professional background)

The precise manner in which this information is reported is still not specified and it is up to the company to decide under which guideline the reports are to be prepared (European Commission n.d.).

Process

Reporting on financial and non-financial information is a complex process and requires internal decision-making, strategic planning, resource allocation, and possibly the creation of monitoring systems and new information and communication channels. Therefore, companies have to invest a lot of time and resources in the process of preparing a (sustainability) report. According to a study by the European Commission in 2013, the cost of producing a sustainability report ranges from €91,000 to €331,000, with smaller companies generally being closer to the lower amount mentioned. (European Commission 2013). Generally, the process for corporate reporting looks like the following: (Guthrie et al. 2013: 18)

- Defining requirements set by law and other stakeholders like NGO's and Investors, as well as engaging with them to extrapolate their demands.
- Defining and reflecting on strategies for sustainable acting through the company and including them in the overall Strategy
- Gathering of data and deciding on the boundaries of this process
- Deciding on the approach and guideline on how to report and which exact content is included
- Setting up and maintaining communication channels to and from Stakeholders

Guidelines

Many different guidelines have been developed on how companies can disclose their financial and non-financial information, including complementary tools and databases.

For the European area, the European Commission has published guidelines based on the proposal of the Technical Expert Group on Sustainable Finance (TEG) in 2019 (European Commission 2019).

These guidelines sought to integrate the work of the Task Force on Climate Change Related Financial Disclosures (TCFD) while being closely guided to provide the most suitable illustration of the Non-Financial Reporting Directive.

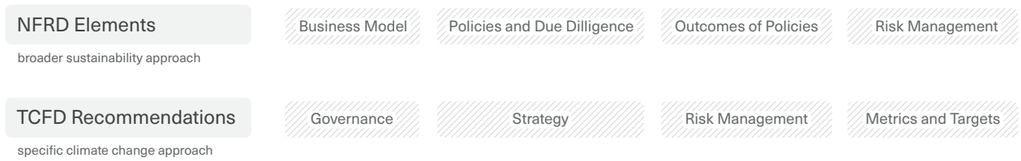

Fig. 16 Timeline of the Evolution of Sustainable Investing; Source: based on Fulton et al. 2012: 11

These guidelines may be the official guidelines, but there is no obligation to follow them. According to the study by Kirchhoff and BDO, the DAX 30 companies prefer the Global Reporting Initiative (GRI) approach (see Fig. 17).

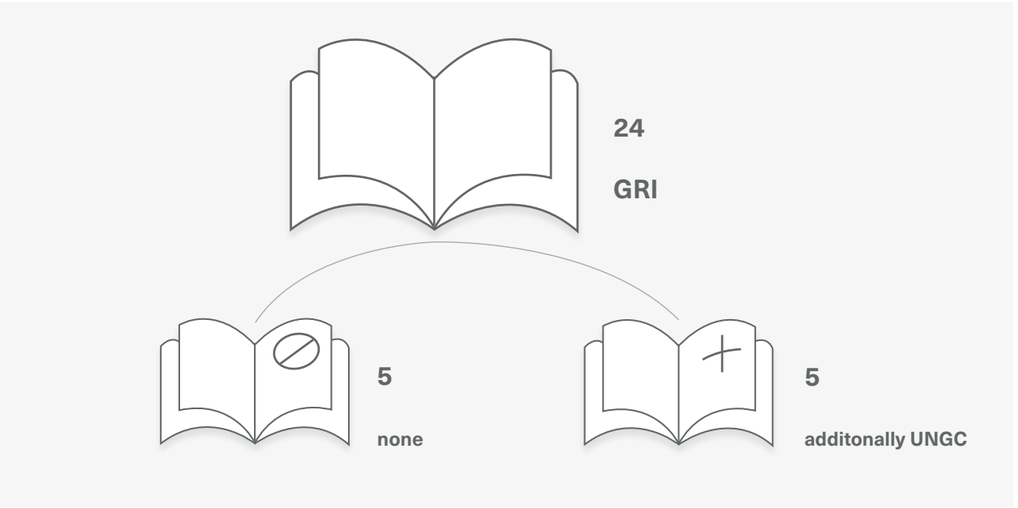

Fig. 17 Use of Frameworks; Source: based on Kirchhoff/BDO 2019: 5

In addition to the GRI guidelines, some companies also use the principles of the UN Global Compact together with the goals of sustainable development. This preference is probably due to the detailed classification of the guidelines in the GRI framework, which comprises more than 550 pages. This ensures that the unit responsible for preparing the reports has an organized plan and structure.

Continuous improvement, taking into account the experience of users and cooperation with other institutions already mentioned, such as the UNGC or the CDP, has made the GRI the leading provider of sustainability reporting guidelines since its foundation in 1997 (Guthrie et al. 2013: 21).

The requirements of the GRI are grouped into 4 categories: Universal standards, economic standards, environmental standards, and social standards. In order to comply with the GRI standards and to assert that the report has been prepared following the standards, a company must report on all or most of the universal requirements, as well as on the topics from the other three categories if the key issues that the company has identified in advance are not covered by the standards (Global Reporting Initiative 2020).

GRI STANDARDS UNIVERSAL

GRI 102: General Disclosures

1. **Organizational profile**
   - Disclosure 102-1 Name of the organization
   - Disclosure 102-2 Activities, brands, products, and services
   - Disclosure 102-3 Location of headquarters
   - Disclosure 102-4 Location of operations
   - Disclosure 102-5 Ownership and legal form
   - Disclosure 102-6 Markets served
   - Disclosure 102-7 Scale of the organization
   - Disclosure 102-8 Information on employees and other workers
   - Disclosure 102-9 Supply chain
   - Disclosure 102-10 Significant changes to the organization and its supply chain
   - Disclosure 102-11 Precautionary Principle or approach
   - Disclosure 102-12 External initiatives
   - Disclosure 102-13 Membership of associations
2. **Strategy**
   - Disclosure 102-14 Statement from senior decision-maker
   - Disclosure 102-15 Key impacts, risks, and opportunities
3. **Ethics and integrity**
   - Disclosure 102-16 Values, principles, standards, and norms of behavior
   - Disclosure 102-17 Mechanisms for advice and concerns about ethics
4. **Governance**
   - Disclosure 102-18 Governance structure
   - Disclosure 102-19 Delegating authority
   - Disclosure 102-20 Executive-level responsibility for economic, environmental, and social topics
   - Disclosure 102-21 Consulting stakeholders on economic, environmental, and social topics
   - Disclosure 102-22 Composition of the highest governance body and its committees
   - Disclosure 102-23 Chair of the highest governance body
   - Disclosure 102-24 Nominating and selecting the highest governance body
   - Disclosure 102-25 Conflicts of interest
   - Disclosure 102-26 Role of highest governance body in setting purpose, values, and strategy
   - Disclosure 102-27 Collective knowledge of highest governance body
   - Disclosure 102-28 Evaluating the highest governance body's performance
   - Disclosure 102-29 Identifying and managing economic, environmental, and social impacts
   - Disclosure 102-30 Effectiveness of risk management processes
   - Disclosure 102-31 Review of economic, environmental, and social topics
   - Disclosure 102-32 Highest governance body's role in sustainability reporting

GRI STANDARDS ECONOMIC

GRI 201: Economic Performance

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 201-1 Direct economic value generated and distributed
   - Disclosure 201-2 Financial implications and other risks and opportunities due to climate change
   - Disclosure 201-3 Defined benefit plan obligations and other retirement plans
   - Disclosure 201-4 Financial assistance received from government

GRI 202: Market Presence

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 202-1 Ratios of standard entry level wage by gender compared to local minimum wage
   - Disclosure 202-2 Proportion of senior management hired from the local community

GRI 203: Indirect Economic Impacts

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 203-1 Infrastructure investments and services supported
   - Disclosure 203-2 Significant indirect economic impacts

GRI 204: Procurement Practices

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 204-1 Proportion of spending on local suppliers

GRI 205: Anti-corruption

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 205-1 Operations assessed for risks related to corruption
   - Disclosure 205-2 Communication and training about anti-corruption policies and procedures
   - Disclosure 205-3 Confirmed incidents of corruption and actions taken

GRI 206: Anti-competitive Behavior

GRI STANDARDS ENVIRONMENTAL

GRI 301: Materials

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 301-1 Materials used by weight or volume
   - Disclosure 301-2 Recycled input materials used
   - Disclosure 301-3 Reclaimed products and their packaging materials

GRI 302: Energy

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 302-1 Energy consumption within the organization
   - Disclosure 302-2 Energy consumption outside of the organization
   - Disclosure 302-3 Energy intensity
   - Disclosure 302-4 Reduction of energy consumption
   - Disclosure 302-5 Reductions in energy requirements of products and services

GRI 303: Water and Effluents

1. **Management approach disclosures**
   - Disclosure 303-1 Interactions with water as a shared resource
   - Disclosure 303-2 Management of water discharge-related impacts
2. **Topic-specific disclosures**
   - Disclosure 303-3 Water withdrawal
   - Disclosure 303-4 Water discharge
   - Disclosure 303-5 Water consumption

GRI 304: Biodiversity

1. **Management approach disclosures**
2. **Topic-specific disclosures**
   - Disclosure 304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
   - Disclosure 304-2 Significant impacts of activities, products, and services on biodiversity
   - Disclosure 304-3 Habitats protected or restored
   - Disclosure 304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations

GRI STAN

GRI 401:

1. **Manage**
2. **Topic-sp**
   - Disclosur
   - Disclosur
   - Disclosur

GRI 402:

1. **Manage**
2. **Topic-sp**
   - Disclosur

GRI 403:

Scope of 'w

1. **Manage**
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GRI 404:

Fig. 18 Overview GRI Standards; Source: based on Global Reporting Initiative 2020

Human Rights

Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
Principle 2: make sure that they are not complicit in human rights abuses.

Labor

Principle 3: Businesses should uphold the freedom of association and the recognition of the right to bargaining;
Principle 4: the elimination of all forms of forced and compulsory labor;
Principle 5: the effective abolition of child labor; and
Principle 6: the elimination of discrimination in respect of employment and occupation.

Environment

Principle 7: Businesses should support a precautionary approach to environmental challenges;
Principle 8: undertake initiatives to promote greater environmental responsibility; and
Principle 9: encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption

Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

Fig. 19 UNGC Principles; Source: based on United Nations Global Compact 2020

Reasons
There is a multitude of possible reasons for a company to prepare a sustainability report and publicly disclose this information.

"Companies produce sustainability reports in response to the increasing demand for them to manage a wider range of resources [...], in the interests of the efficiency of the company and also in response to compliance requirements." (Guthrie et al. 2013: 11)

The reporting on sustainability concerns the external as well as the internal stakeholders of a company. As far as external parties are concerned, governmental laws and requirements must be met and it is recommended that the demands of stakeholders and shareholders are also met to maintain and build a solid relationship. However, this is not the only reason for disclosure. Internal effects may also occur, such as increased awareness of risks and opportunities related to environmental or legislative sustainability factors (Guthrie et al. 2013: 12).

Reasons for Implementing Reporting Recommendations

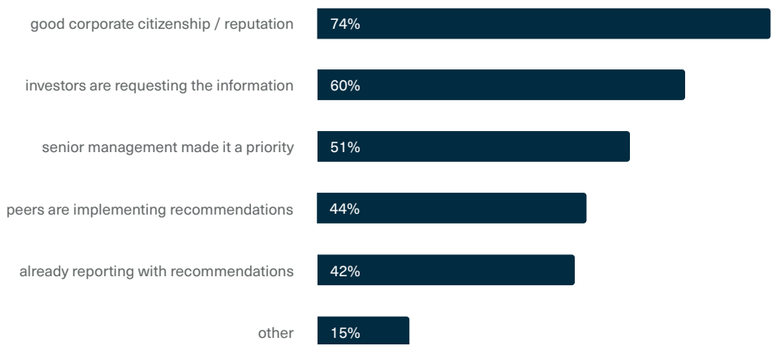


Fig. 20 Reasons for Implementing TCFD Recommendations; Source: based on TCFD 2019: 54

The TCFD published the responses of 1,126 large companies from 142 countries on the reasons why they decided to disclose non-financial data. These reasons, if only external, show that it is not solely legislation that encourages companies to report. Most of them see one or more benefits in this, which makes a further increase in the disclosure of sustainable information and standardization likely.

Current state of Reportings
All in all, non-financial reporting is at a good level, as the study by Braam and Peters, which was researched in the GRI database, shows. Already 67% of the sample size reported on sustainability information of their company, half of them assured their report by a third party. Looking at the Dax 30 companies, all companies have reports available and all but one of them are certified by a third party.

Reporting Characteristcs across 2009 - 2014

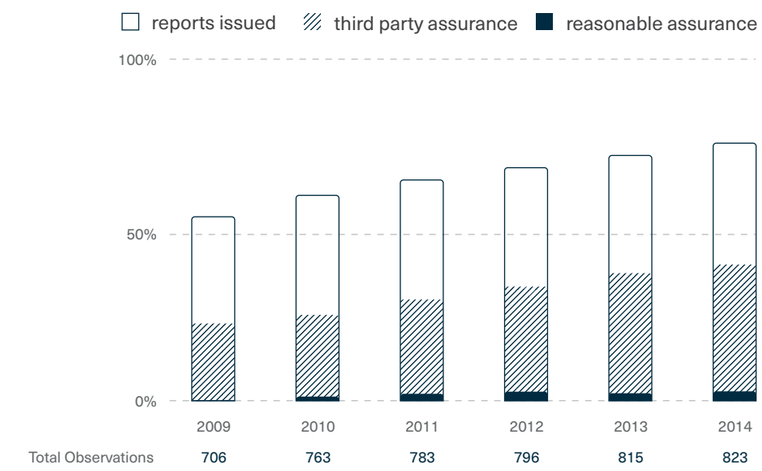


Fig. 21 Reporting Characteristics across 2009-2014; Source: based on Braam/Peeters 2017: 171

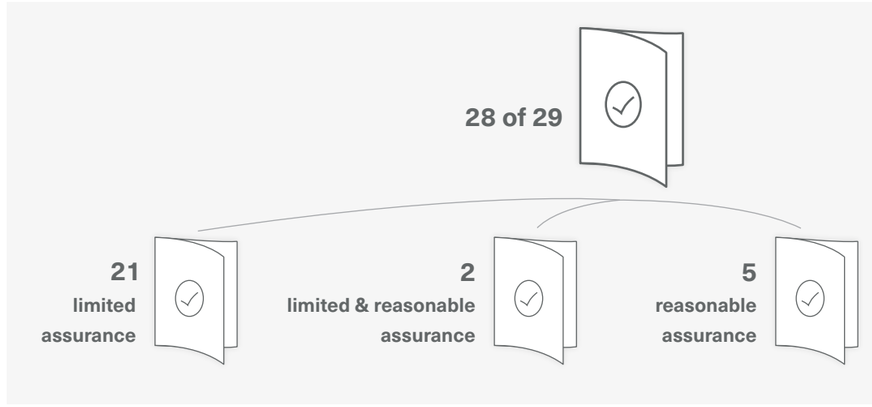


Fig. 22 Amount of external Assurance; Source: based on Kirchhoff/BDO 2019: 9

However, there are still problems with the disclosure of information by smaller companies. Compared to large companies, smaller companies disclose significantly less. The reasons for this may be a lack of knowledge of the benefits, lack of public interest or pressure, as well as lack of legislation in the specific area or insufficient internal resources.

Disclosure by Company Size 2018

<$4B Annual Revenue	$4-10B Annual Revenue	>$10B Annual Revenue	
19%	30%	38%	Governance
21%	35%	45%	Strategy
14%	27%	35%	Risk Management
23%	44%	56%	Metrics and Targets

Fig. 23 Disclosure by Company Size 2018; Source: based on TCFD 2019: 9

Quantitative and Qualitative Goals in Reportings of DAX 30 Companies

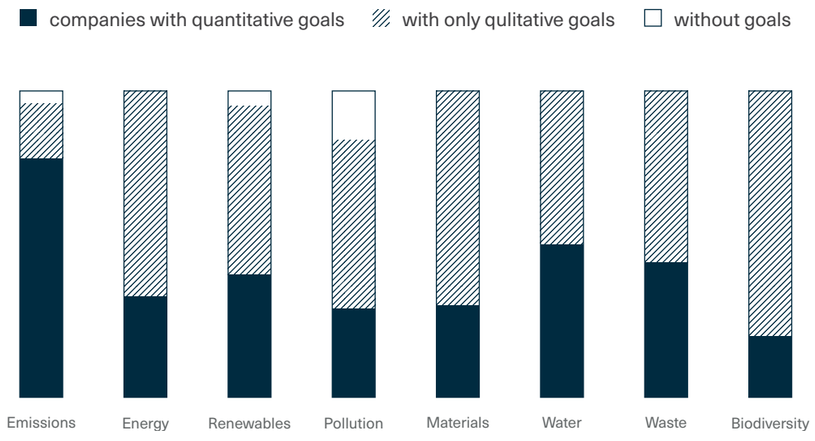


Fig. 24 Quantitative and Qualitative Goals in Reportings; Source: based on Kirchhoff/BDO 2019: 11

Companies are legally obliged to disclose information in the EU, but due to the lax implementation of the law, not all reports are satisfactory. For example, from a pool of 50 listed European companies for the financial year 2018:

"Only 3 in 10 companies fully disclose the environmental and climate-related aspects of their business model" (Climate Disclosure Standards Board 2020: 2)
and
"Less than 1 in 3 companies reported metrics directly linking environmental and financial activities and performance." (Climate Disclosure Standards Board 2020: 2)

Data
Accessing raw data as a private person proves to be extremely difficult to impossible. Although the companies' reports are public and the GRI, for example, has a huge database of almost 15,000 organizations and their accompanying reports, there is no public, free raw database for private individuals.

ESG data is available to investors who are willing to pay for access to a database. These most likely consist of manually collected data from reports or come from direct communication with companies. CDP and Refinitiv are providers of ESG data, but charge a fee for their services. For example, CDP's data service for an education account is approximately $5000 per year. This is affordable for an institutional investor, but not suitable for a retail investor.

Currently, public consideration is being given to setting up a public raw database for sustainable corporate data. More specifically, the 'Sustainable Finance Advisory Council of the Federal Government', an organization that advises the Federal Government on sustainable finance, has proposed such a database at European level:

"Development of a new and ideally at European level managed raw sustainability database. The aim of this database is the centralized collection of sustainability information published by companies in the course of their sustainability reporting obligations." (Sustainable Finance-Beirat der Bundesregierung 2020)

Impact

In addition to making a profit, sustainable investments aim to have a positive influence on the issue that was at the center of considerations when selecting or adapting an investment.

There are two main problems associated with this intention: firstly, whether and how investors can achieve a positive influence on companies through the act of investing and exercising their voting rights. Secondly, how influence and impact can be measured.

Influence

The actions of shareholders or groups of shareholders can take are limited and not often exercised. Still, they are a good tool to influence the companies and initiate change for the better as to be seen in the figure above.

Direct communication with the management can be an email to the corresponding office or the entity itself, expressing concerns, new ideas, and proposals for change. By using social media, it is also possible to make the press aware of or publicly address a concern as an individual and through this force a company to react to specific topics.

Forms of Shareholder Activism experienced by Companies

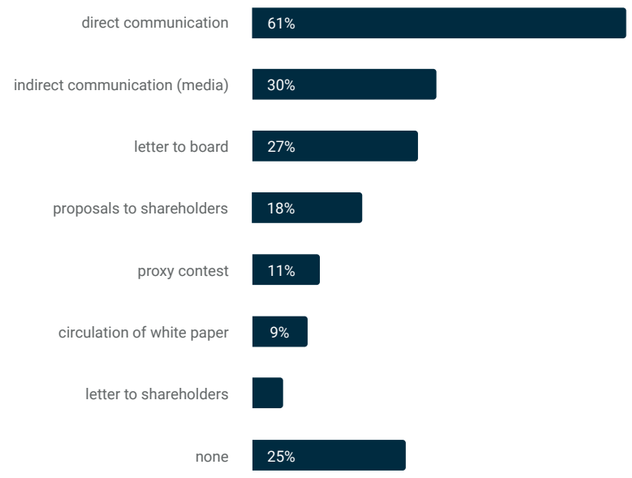


Fig. 25 Forms of Shareholder Activism; Source: based on Deloitte 2015: 22

As mentioned above, ordinary shareholders are generally entitled to vote. Since a candidate for a new position in a company needs a majority of votes to be able to take up the desired position, withholding votes is one way to prevent an unsuitable candidate from taking up an important position, or much more often, to urge the candidate from voluntarily withdrawing from the election due to public and internal pressure. (Cloyd 2015).

With a shareholder proposal that is sent to the mentioned institution within a company (most likely the investor relations department), a recommendation can be expressed on how the company can act in a more profitable, social, or environmentally friendly way. This proposal is then, if it complies with all the regulations, voted for in the next annual meeting (McGuire 2012). Though not every shareholder is entitled to submit a proposal, the common threshold is a minimum of 1% in shares held or 2000$. Additionally, legal fees for document filing and advice can be quite high, meaning this way of activism is not accessible to every investor.

Although hurdles can be big, change can be achieved through various channels. It is proving effective to use voting rights in votes directly for a change in management. As the Deloitte survey shows, a change in corporate strategy can also be achieved. However, it is unclear whether this survey covers the entire spectrum of companies. A change in social and environmental policies and measures is not yet foreseeable.

If Mary Ann Cloyd is correct in her statement: *"Shareholder activism remains intense, most notably for the largest companies"* (Broadridge 2014), ESG already has taken a serious position in recent years or definitely will in the future.

(Expected) Actions in Response to Shareholder Activism

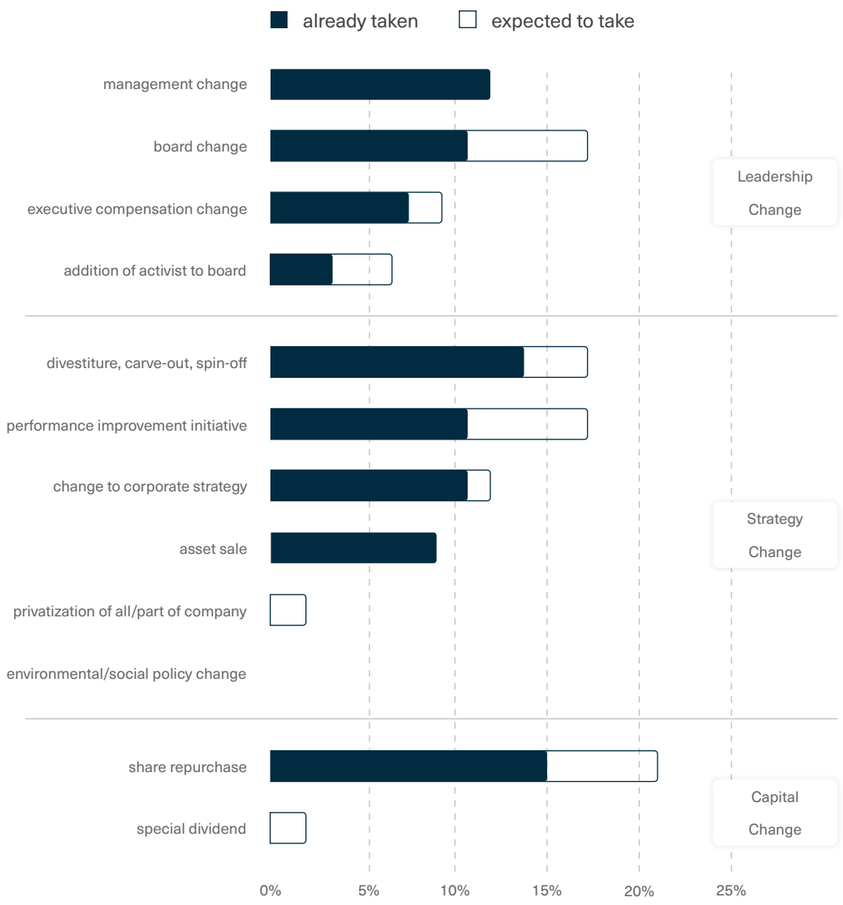


Fig. 26 Actions in Response to Shareholder Activism; Source: based on Deloitte 2015: 23

Effect

The act of investing and divesting itself has limited effects on the stock prices and therefore on companies. Generally, the opinion about impact might be like the following of divestment campaigners:

"When many investors decide it's time to sell at the same time, that company's stock comes under pressure. Over time, a low stock price can make it harder for a company to get loans, finance its sales, or expand the business. And if the pressure is high enough, an entire industry—even a national government—can decide it's time to change how they do business." (MacAskill 2015)

The same applies if many investors decide to buy at the same time. Even though this may be true in theory, and can be observed in popular stocks that rise well above their intrinsic value due to excellent press and rich prospects, there are economic reasons for this. Even today this is still a greater motivation than all the non-financial aspects combined.

Due to the smaller potential group, investments in and divestments of companies for these non-financial reasons have a more limited impact. A large number of neutral investors who are prepared to adjust their holdings according to the supply and demand for "sinful shares" or, in particular, green shares for their personal economic advantage, quickly balance the share price and therefore do not impose any financial hardship on the company (Ansar et al. 2013).
In the report by the Smith School of Enterprise and the Environment at the University of Oxford, experts found that divestment campaigns rather have an indirect than direct impact. Stigmatization, public announcement of divesting, and raising public awareness can have a considerable impact on stock prices and changes in market norms and legislative. More directly targeted to investors:

„Those that commit to divestment should engage with the media. Divestment, our research shows, creates far more indirect impact by raising public awareness, stigmatising target companies and influencing government officials." (Ansar et al. 2013: 72)

This also applies to the debate in the media about positive criteria for investments in companies that reflect more stable share prices.

Stock Investment Strategies

The development of strategies helps investors in the selection and implementation of investments. This includes, for example, the definition of rules and objectives according to which actions are carried out.

Investing can, therefore, be a very active process in which strategies play a major role. Alternatively, a passive method, also known as indexation, can be used. While active investors crave the opportunity to achieve higher returns than the average market, to get involved in the companies themselves and to learn, passive investors are satisfied with the average market return, want to avoid excessive risk and generally believe that it is neither worth the effort nor the money to beat the market and select specific shares (Retail Investor 2020).

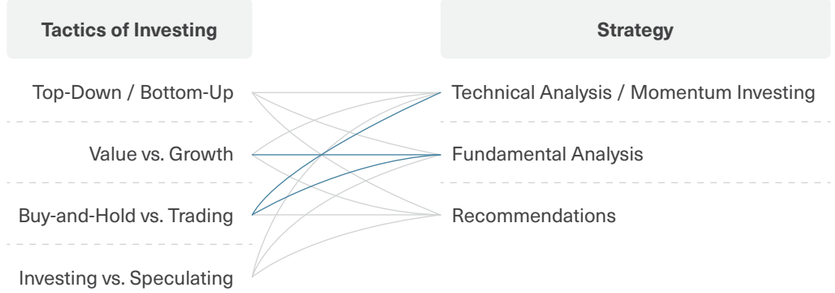


Fig. 27 Strategies in Investing; Source: own diagram

Tactics
Tactics are generally less common investment practices that can be applied to any of the following investment strategies. Finding the right stocks in the enormous pile can be difficult, so in order to pre-filter the tactic of top-down and bottom-up has been established.

The top-down approach lets the investor filter macroeconomic factors first: Usually, this approach is based on a location, sector, or industry preference. Companies are then evaluated within the framework of the restricted selection.
Opposed to this, the bottom-up approach usually doesn't exclude sector nor locations as it's based on the belief that good stocks can be found anywhere. Thus, intuitively chosen stocks are selected for further evaluation.

Another thing that has to be differentiated is the investing period. This means whether an investment is more longterm (buy and hold investment) or whether it is of short term nature (trading). External circumstances may influence the available period and adopted strategies. The pursuit of a strategy also influences the time an investment is kept in one's portfolio.

Another important variable in the stock market is timing. The tactic of the dollar cost average, which is more often used in long-term investment strategies, i.e. when a regular amount is invested over a longer period of time, claims to reduce the actual costs on average. Ultimately, highs and lows guarantee a neutral price, and the chance of hitting the wrong time is lower compared to the timing of the market (Taylor 2020).

Passive Investing (Indexing)

Although this strategy is referred to as passive investing, it is still based on intensive considerations and decisions regarding the selection of a specific region and the composition of the fund.

An index can consist of different measures:
The closest to the economy is to proportion companies according to their market capitalization. This leads to more large-cap and established companies and ultimately to more stability, but also to less growth. For example, one of the best-known index funds, the S&P 500, is weighted by market capitalization.
To distribute the number of shares in the entire fund according to their price is also quite common so that a company with more expensive shares is represented to a larger percentage. The Dow Jones Industrial Average (DJIA) is an example of this.
One trend these days is thematic funds, which try to integrate active elements into passive investing and give investors the opportunity to speculate on future trends, for example, or to limit their selection to a specific sector.

Though indexing is a great tool for investors to invest safely and without much work, it also carries many problems. According to an article in the Bloomberg Businessweek, around 22% of the typical index fond company is represented in the portfolios of the 'big three': BlackRock, Vanguard, and State Street (McLaughlin / Massa 2020). The high amount of ownership means that a lot of the shareholder power is concentrated at one point and not acted out in votings. Furthermore, the power of divesting isn't given if a company has an increasing negative environmental impact or uncovered social injustices.

Technical Analysis

Technical analysts are convinced that the market value of a share already represents and includes all relevant information and thus reflects the correct valuation of the company. In this sense, there is no need for detailed specific research, which is part of fundamental analysis.
Decision relevant information may, for example, be the historic stock price, volatility, or long/short ratios. Especially for day traders, the shape of a chart can lead to conclusions about the short term future.

Momentum Investing
Momentum investors are both traders and investment beginners. Without much knowledge of technical analysis or fundamental analysis, beginners often buy stocks out of momentum. They believe that a rising stock will continue to rise and sell quickly when it goes through a downturn because they believe it may be permanent. In this category, short selling and tactics such as the use of leverage play a role, i.e. essentially short-term borrowing of money to increase profits or avoid large losses.

Fundamental Analysis

Fundamental analysis can take various forms: valuation of a company based on financial ratios, company structure, behavior, brand, etc. The basis is usually the financial figures. These factors can be divided into three evaluations: absolute evaluation, heuristic evaluation, relative evaluation.
Absolute valuation tries to find the specific numeric value of what a stock's actual worth, independent from the market value. Often, this approach requires enormous effort and knowledge from experts. That's why it isn't really useful for individual investors.
Heuristic valuations integrate emotional factors and acknowledge that individuals cannot or don't want to valuate a company in detail. The willingness to survive enormous downturns may not be there, so the tactic is to assess a subjective value, taking into account the market and the company, which leads to a purchase decision. If the company does not meet the specified requirements, the investment is often terminated regardless of market-related events.
Relative evaluation cuts out subjectivity by using a superficial financial evaluation like key figures to test and determine a value. It takes the approach of identifying undervalued companies and examining the usefulness of staying in the market.

10-Year total Return Difference: Value vs. Growth

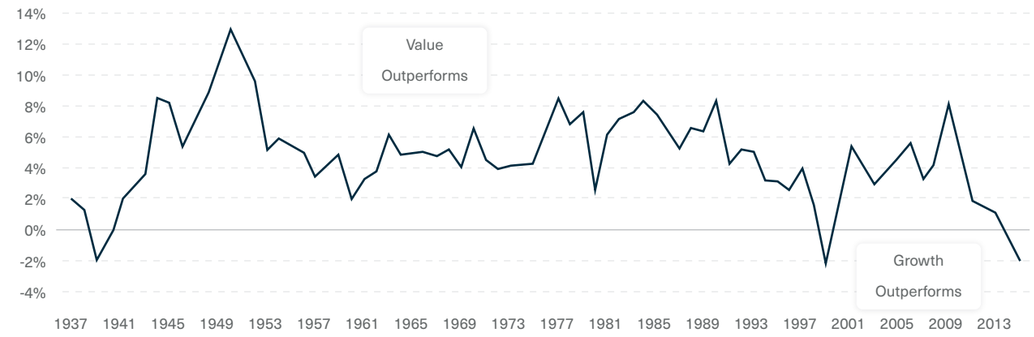


Fig. 28 10-Year total Return Difference Value vs. Growth; Source: based on Dodge & Cox 2016: 1

Value Investing
Value investors can be compared to bargain shoppers. They try to buy undervalued stocks to keep for the longterm. The core idea is that the market price isn't reflecting the true value of a company due to fluctuations caused by irrationalities which result from unmet financial expectations.
To successfully thrive as a value investor, the assessment of the intrinsic value and the conclusions of the fundamental analysis have to be correct. Additionally, the will to hold a share for a longer period, and faith in the product needs to be given.
Value investments are therefore basically about investing in an underlying value that is identified and confirmed by in-depth research and is not based on uptrends, feelings, or other influences. Or like Jonas Zweig said it in Benjamin Graham's book "The Intelligent Investor":

"A stock is not just a ticker symbol or an electronic blip; it is an ownership interest in an actual business, with an underlying value that does not depend on its share price." (Graham/Zweig 2006: xiii)***.***

The foundation of this investment strategy was laid by Benjamin Graham and David Ott with their book "Security Analysis", in which they propose to analyze a company and to decide on the purchase of shares rationally. They positioned themselves against buying and trading based on rumors and insider information.

Later, Warren Buffet, who studied with Benjamin Graham at Columbia University, became the current champion of this style.

Growth Investing

Rather than looking at the value of a stock, growth investors focus on the potential future earnings and increase of value. Still, it isn't comparable to speculation. The financial stability of a company and its projected growth potential can be marked on figures and decisions base on estimates.

Trends are a relevant topic and probably the most common reason for growth. To give you an example: Growth investors could elaborate on whether artificial intelligence is the next great thing and, based on such an assumption, select the most promising company in this industry with the hope of great growth.

Taking higher risks and focusing on smaller companies, which often lack dividend payments, does not make growth investment for everyone.

Growth investing can work, has worked, and will work in the future for special occasions and with correct predictions. According to research from Merrill (Merrill 2019), upturns in the market and low interests favor a growth approach, whereas during recession growth stocks and funds are the most likely to decrease in value.

Recommendations

Following the recommendations of others and basing your own investment decisions on them seems to be one of the most intuitive and simple strategies. This is especially true for inexperienced investors. In every other area of life, the opinion of those around us, especially the ones we trust, plays an important role in decision-making, for example when we go shopping with a friend to get their opinion on outfits.

The decisive factor is whether the person making a recommendation is pursuing the same goal and on what information he or she bases his or her recommendation. The most common, though not the only, goal of investments is of course to achieve high returns. For this reason, most of the recommendations made by investment gurus are for this purpose. CXO Advisory Group conducted a study ranging from 1998 to 2012 in which they measure the returns and impact of around 7000 forecasts from 68 public experts in relation to the returns of the S&P 500 (CXO Advisory 2012).

Although recommendations usually do not contain specific mention of an individual share, comments such as these are used to measure future earnings:

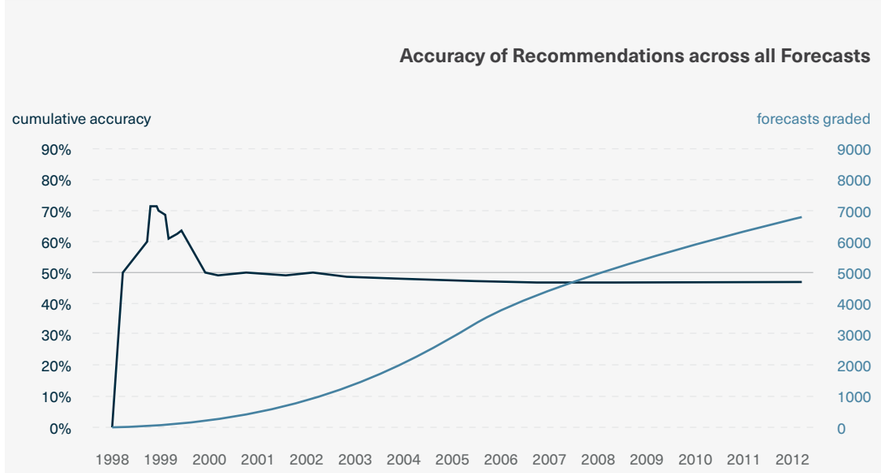


Fig. 29 Accuracy of Recommendations across all Forecasts; Source: based on CXO Advisory 2012

"Amazon, eBay, USA Interactive, and Yahoo — have broken out. [...] Perhaps [...] it's still not too late to get in." (Cramer 2002)

As the results of the study show, following the recommendations of investment gurus is on average worth about as much as a 50:50 decision. Although more returns can be achieved with an expert with an accuracy of up to 68%, you can never be sure that an expert's predictions will be so successful in the future.

Private Investors

Early on, we recognized the potential and the need for solutions for private investors. One of the reasons for this was that investing is fraught with negative feelings such as fear, especially for investment beginners. For them, the stock market cannot be fully grasped, seems unapproachable and the fear of misinvestment or the knowledge barrier, as shown in a study of ally with more than 2000 prospective investors,, is great (Ally Financial Inc. 2018). At the same time, however, this group of investors urgently needs some form of money growth to maintain their standard of living and protect themselves from crises. Through more effective communication, new technologies, and the incorporation of new trends and regulations, a major change can be made possible for this group and the positive effects that their investments could have on the system and the environment.

Summary

Why is investing useful?
There are several reasons why investing and asset accumulation are relevant to individuals. Two of these reasons include maintaining a certain standard of living in the future and pension uncertainty. Due to low-interest rates, it also does not make sense anymore to save unused money.

Why are sustainable investments so relevant?
For some time now, a positive development in interest and attention to sustainability issues has been evident. Millennials and subsequent generations in particular often have higher standards of social justice and environmental protection.
In the near future, these millennials will inherit total assets of 30 trillion dollars. Much of this will flow into investments. The trend towards sustainable and value-based investments will continue to grow in the future.

What does an investment process look like?
We have divided the investment process into 3 steps: Personal, Information, and Act. The first step and the basic requirement for investors is to have clarity about their own finances. From here, information is collected, a category and product is chosen in which to invest in the Act part. After the investment follows the optional steps monitoring, exit, and reward.

What are the general problems and hurdles for individual investors at the beginning?
Money is a very emotional topic. For example, there is a great fear of losses, wrong decisions, and misinterpretations of information. In addition, there is also a status quo bias and procrastination, because the actual necessity does not seem to be sufficiently great to get into action.

To be a successful investor, however, it is important to develop a growth mindset. This describes a way of thinking in which failure is an opportunity to learn. Because regardless of the investment product, with the exception of cash deposits, there will be failures, the need to learn from them, to accept challenges, to learn from more experienced investors, etc. And all this must be overcome and managed in order to achieve sustainable profits.

What types of investments exist and do they have specific problems?
For the description of an investor 4 attributes can be used. These are available money, age, risk tolerance, and the preferred investment period.

Additionally, categorizations can be made, such as Behavioral Alpha. In this case, preferences for the level of activity/passivity and risk tolerance are examined. On this basis, the investor can then be placed in one of four type categories: Preserver, Follower, Independent, and Accumulator.

Depending on the category, type-specific problems can arise in 2 directions: In addition to fears, uncertainties, and inhibition thresholds, which can lead to (1) emotional distortions, (2) cognitive biases can also arise. These are misinterpretations and misperceptions in human thinking. Preservers, for example, tend to suffer from loss aversion bias, while accumulators may be increasingly under the influence of the illusion of control bias.

Why are decisions not really rational?
A decision is defined as the cognitive process of choosing one option non-randomly among several alternatives at a given time and in a given context.

The desire for rationality and the reality of emotionality can lead to internal conflicts in decision-making processes, or influence the quality of the decision. A purely rational decision does not exist and does not have to exist, since the use of heuristics, for example, may lead to better results.

Among other things, there are 6 factors that can lead to non-rational decisions: Choice and information overload, unstable or undefined preferences, heuristic decision making, framing Effect and investment menu design, procrastination and inertia, overconfidence and loss aversion.

Reasons

Individuals do not actually need to make investments themselves, as there are advisors, insurance companies, and pension funds that do not need to be managed by the investor. One reason for our focus on individual investors rather than institutional or any other stakeholder is the uncertain future of pensions in Western countries. We believe that state pension funds may not be able to provide a stable retirement for most people due to the demographic aging in Western countries. For this reason, everyone must take appropriate measures to build up and save money for retirement. A study by Charles Schwab found that 900 out of 1000 people of all ages are largely dependent on themselves to raise the money for retirement. Also, a study from ally claims that *"Most Americans are counting on Social Security for retirement, but 3 in 5 believe that when people who are currently under 50 retire, Social Security will most likely not be available to those retirees."* (ally 2018)

Instance relying on most for Money needed in Retirement

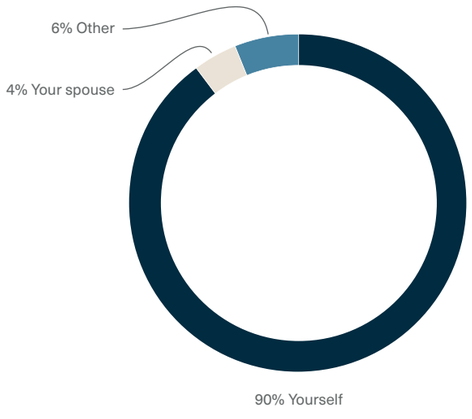


Fig. 30 Instance relying on most for Money needed in Retirement; Source: based on charles schwab 2014: 4

However, the future of retirement is not the only reason for the need for individuals to invest. The trend in recent years towards a 0% interest rate or even negative interest rates for cash savings means that many people feel pressured to invest excess money in order not to lose it to inflation.
A study by Black Rock shows the percentage of reasons why millennials in Hong Kong need to invest their money.

Financial Goals of Millennials in Hong Kong

52%	**47%**	**47%**	**42%**	**37%**	**35%**
make money to improve my quality of life	provide for my agign parents	purchase or renovate a home	take a nice vacation/holiday	ensure I can maintain my standard of living in retirement	accumulate enough money to retire early
35%	**34%**	**26%**	**24%**	**21%**	**21%**
all goals for children	purchase an investment property	prepare for retirement	purchase good insurance fpr myself or family	invest in a business	pay off my mortgage early

Fig. 31 Financial Goals of Millennials in Hong Kong; Source: based on BlackRock 2019: 15

Problems

Our initial research revealed that this group of stakeholders is generally confronted with many problems. Therefore, the group of individual investors is particularly rich in design possibilities and interesting for us.

One of the problems they face is that investment generally doesn't seem really attractive or feasible to them - this is especially true for women. With regards to the stock market opinions like this arise quite often:

"The general public see investing as confusing, elitist, male and risky, with stock markets being the ultimate casino. This perception is what we need to change in order to get more women and young girls interested in investing for themselves [...]" (MHP 2018: 9)***.***

We have observed and recognized this problem in groups, blogs, and podcasts for women dealing with investment issues. One of these platforms is [madamemoney-penny.de](http://madamemoneypenny.de/).
The survey by ally, to which we referred earlier, examined the biggest obstacles and hurdles for prospective investors. It found that one of the biggest fears is "making the wrong decision" and "trusting the wrong source". But also the lack of knowledge, and the question of where and how to start, was frequently mentioned.

Fears of Investors

Fig. 32 Fears of Investors; Source: based on Ally Financial Inc. 2018

Also millennial investors in Hong Kong mentioned barriers in investing as follows:

Barriers of Millennials in Hong Kong to Invest

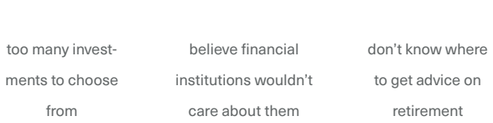


Fig. 33 Barriers of Millenials in Hong Kong to Invest; Source: based on BlackRock 2019: 14

Affection for sustainability

Generation Y is particularly interesting for the investment market because they are the group that will inherit a fortune of around 30 trillion dollars in the foreseeable future. A large part of the inherited money will be invested. (Seelan 2019). Additionally, Millennials make up a large demographic group of around 80 million in the U.S., taking over the baby boomers (Chiavarone 2019).

Moreover, millennials and future generations tend to have higher standards of social justice, environmental friendliness, and sustainability. These trends will continue to develop positively over time. In a study by Morgan Stanley, the interests of millennial individual investors were compared with those of other investors who do not belong to this group. It was found that interest in sustainable investments is highest among millennial investors and appears to be growing overall.

Development of Interest towards Sustainable Investing

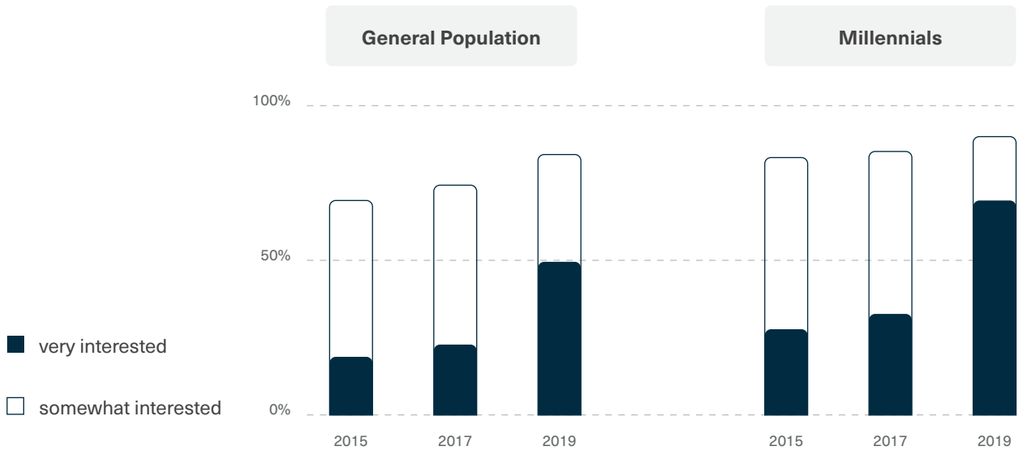


Fig. 34 Development of Interest towards Sustainable Investing; Source: based on Morgan Stanley 2019: 4

Conclusion Attributes of Individual Investors

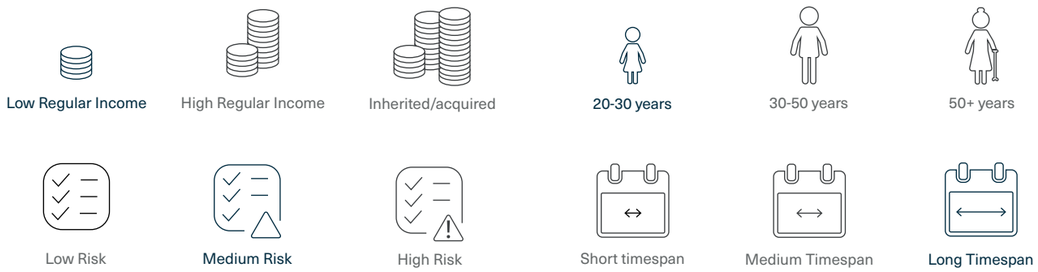


Fig. 35 Conclusion Attributes of Individual Investors; Source: own diagram

When it comes to the description of a private investor type, four main attributes are particularly interesting. These are available money, age, risk tolerance, and preferred investment period. Within our focus group, there can be any level and combination of these attributes. Later in this documentation, we will go into some specifics of the qualitative interviews, such as the tendency of the German investors surveyed to invest in very safe forms of investment.

Mindset

Basic Mindsets
According to the research of Ph.D. Carol Dweck, there are two basic mindsets in humans developed and adopted at an early age, the 'Fixed Mindset' and the 'Growth Mindset'. (Popova 2014) The terms "fixed" and "growth" here do not necessarily refer to financial matters, but should rather be understood in a general context. Both types of mindset can, however, to a certain extent be associated with corresponding investment products and strategies.

Fixed vs. Growth Mindset

Fig. 36 Fixed vs. Growth Mindset; Source: based on Holmes 2016

These ways of thinking show how people understand their personality and world. Someone with a rather fixed way of thinking carries the belief that character and qualities such as intelligence, creativity, and other special abilities are fixed. These people strive for success and tend to avoid failure in order to prove their intelligence and self-esteem. In contrast, people with a growth attitude seek challenges and perceive failure as an excellent opportunity to learn and develop. They do not see failure as a lack of intelligence. For them, it is a valuable life experience to engage in something and then ultimately succeed, which shapes their optimism for the next challenge.

To be a successful investor, it is necessary to change from a fixed to a growth mindset. Because regardless of the investment product, with the exception of cash deposits, there will be failures, the need to learn from them, to accept challenges, to learn from more experienced investors, etc. And all this must be overcome and managed in order to achieve sustainable profits.

"When you enter a mindset, you enter a new world. In one world — the world of fixed traits — success is about proving you're smart or talented. Validating yourself. In the other — the world of changing qualities — it's about stretching yourself to learn something new. Developing yourself." (Dweck 2017:12)

Investor Mindset
An investor mindset, as stated in several blogs and help guides for future individual investors (Brown 2019), focuses more on the relationship people have with money and making money.

We deal more emotionally with our money than we'd like to admit. The act of paying and spending money is associated with major feelings such as success, power, security, independence, and quality of life (Zukunftsinstitut GmbH 2017: 9). Basically, as investors, we give room to these feelings through our investment. Yet, it is oftentimes a goal to act more rational in decisions about investment.

As far as making money is concerned, one must be aware that it is compound interest and that wealth can be achieved and maintained by the money invested. If one gets it right, there is a point where one no longer needs to save and invest to sustain the desired lifestyle. This way of thinking creates a sense of power and freedom that motivates the investor to take control and responsibility for his or her financial situation and capital.

Mindset Development

Individual investors must develop a growth mindset. But this alone is not enough for success. The mindset needs to be constantly developed and improved, and new investment skills and knowledge must be acquired.

First, there must be a desire to invest and multiply money. Stories from successful Wall Street investors can inspire and help, but they can also be intimidating. The desire can also arise from a general knowledge of the opportunity.

Learning from your fellow human beings is one way to develop new skills and knowledge. It also reflects the human need for connection and dialogue.
Losses are to be expected and learned from, and it is crucial that one continues. Otherwise, the chance of getting your lost money back disappears.
Ultimately, perseverance and decisive action is the key to being a successful investor.

Through our research and interviews we have learned that the mindset development issue is not covered by the mainstream investor scene. Although various blogs talk about the mindset of investors, there seems to be no common understanding about it. Also the instructions on how to develop such a mindset are very vague and not personalized at all. However, this topic is not a priority for us when developing our system.

Investor Types

A lot of research has already been conducted for big investment providers, brokers, and banks to categorize investors and better tailor investment products to their personal needs. Regardless of whether these efforts yielded any results, it is essential to know how and what investors act and base their decisions on. Later, this analysis will help us to design a personalized solution.

Investing traits
When it comes to determining which investment category is best suited to an investor, it is necessary to know his or her investment characteristics. This can result in a rough classification and corresponding recommendation of suitable investment options. One way to do this is a process called Behavioral Alpha: (Pompain 2018 a)

By figuring out if he/she already actively invested money him/herself or never taken part in any act towards investing, the first step is to identify the investor's tendency to be rather active or passive.

The second step is the assessment of the risk tolerance of the investor. Through a set of questions, an accurate determination of how willing the investor is to sacrifice parts of his/her money in pursuit of profit. These questions can be quite specific as shown in the Investor Profile Questionnaire from Charles Schwab (Charles Schwab & Co., Inc 2018).
In the end, the results of steps one and two can be compared, combined, and allocated to either one of the four investor types: Preserver, Follower, Independent, and Accumulator.

Consider this scenario:
Imagine that in the past three months, the overall stock market lost 25% of its value. An individual stock investment you own also lost 25% of its value. What would you do?

Sell all of my shares	0
Sell some of my shares	2
Do nothing	5
Buy more shares	8

Fig. 37 Investor Profile Questionaire; Source: based on charles schwab 2018

Four behavioral investor types

According to a Study of the CFA Institute (Pompain 2018b), investors can be categorized into four different behavioral types: Preserver, Follower, Independent, and Accumulator.

The Preserver's
main goal is to preserve his or her wealth. The chance of profit is rejected for the more secure option and this type remains reserved when an investment opportunity arises. This type is very afraid of losing money, even if it is only temporary. That is why people of this type tend to watch the development of their products very closely. This behavior is guided more by emotions than by critical thinking. Usually, this type occurs more than average among older investors who have earned their wealth through work and may have experienced a crucial crisis.

The Follower's
main characteristic is passivity and lack of interest in investments. Decisions are often based on the ideas and recommendations of others. This type can also be susceptible to offers that are unsuitable. If investments prove successful for this type of investor, this can lead to overestimation and risky behavior. Some fear investment decisions in general and either postpone the whole issue, resulting in high cash balances or decide only on the basis of professional advice.

The Independent's
are characterized by the fact that they want to be proactive in investment activities and decisions, learn and participate in investments, speak the language of financial terms, and act logically. Through their own research, people of this type feel more comfortable taking risks and sticking to long-term investment plans - even if there are some downturns along the way. They do not feel comfortable if they are not sufficiently informed. Sometimes they confuse a promising insight with proper research, which can lead to the wrong track. As doers and thinkers, they can act decisively and usually achieve their goals.

The Accumulator's
main goal is to make as much profit as possible. Typically, these investors are also successful in other areas and generally feel confident. They will certainly devote themselves to thorough and detailed research on investment issues. This confidence leads to higher risk tolerance. The paths they choose are often adapted to the market situation in order to maximize profits and not miss great opportunities. Because they are independent and do not need help, they can get too carried away with trading while enjoying the thrill of successful "gambling".

Behavioral Biases

To get a further understanding of individual investors types and their behavior, it is interesting to look at the origins of problems investors face in the decision-making.

Problems oftentimes arise from the wrong perception of a given input. Deviating perception and judgment from the norm is what's called a behavioral bias (Haselton/Nettle/Andrews 2005). In finance, it's often distinguished between cognitive biases and emotional biases (Pompain 2016).
Cognitive biases describe errors in how people think, process information, and recall memories. When recognized, these biases can be easily mitigated by education and worked around.
Emotional biases describe misjudgments of situations resulting from feelings. Since feelings are not really controllable, these distortions are rather easily accepted.
Since money is often a quite emotional issue, the adaptation to the client's behavior or moderation also depends on the amount of money to be handled, as the diagram shows.

Actions towards Biases with Individuals of different Wealth

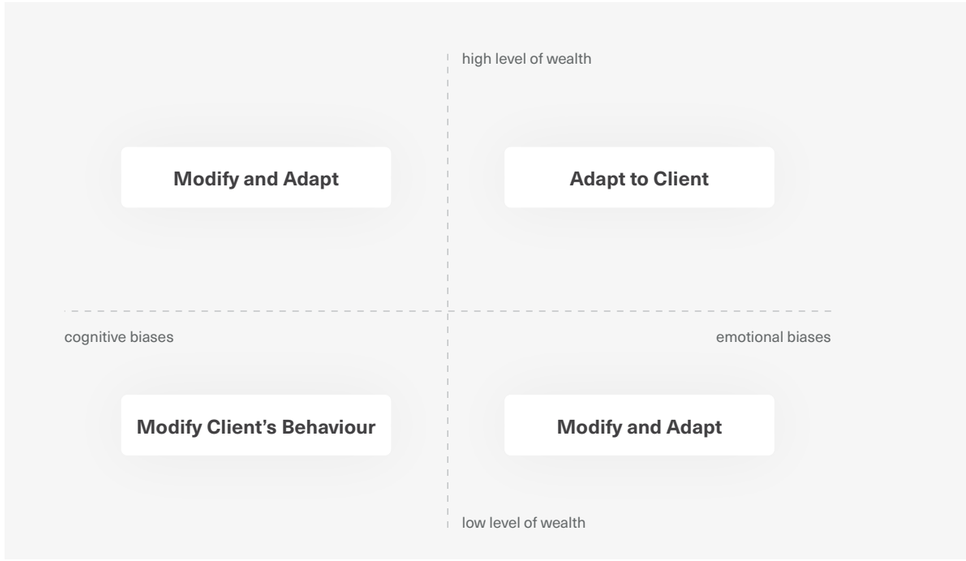


Fig. 38 Actions towards Biases with Individuals of different Wealth; Source: based on Pompain 2016: 4

The knowledge about what kind of biases occur more frequently in specific investor types makes it easier for the investor to find matching products and make better investment decisions. Also, it helps service providers to create products tailored to the needs, requirements, and limitations of their customers.

Biases and Risk Tolerance of the Investor Types

	Preserver	Follower	Independent	Accumulator
risk tolerance	Low	Medium	High	Very High
bias type	Primarily Emotional	Primarily Cognitive	Primarily Cognitive	Primarily Emotional
biases	Endowment	Regret	Conservatism	Overconfidence
	Loss Aversion	Hindsight	Availability	Self-Control
	Status Quo	Framing	Confirmation	Affinity
	Anchoring	Cognitive Dissonance	Representativeness	Illusion of Control
	Mental Accounting	Recency	Self-Attribution	Outcome

Fig. 39 Biases and Risk Tolerance of the Investor Types; Source: based on Pompain 2016: 8

Preservers
tend to feel losses more intensely than the pleasure of gains (Loss Aversion Bias). They feel safer keeping plans and sticking to the status quo (Status Quo Bias). Further, already made investments are seen as more valuable compared to possible ones, regardless of the actual value (Endowment Bias). Anchoring sometimes seems to be important for decisions, like a specific round number as a goal to sell the investment (Anchoring Bias). Capital is mentally categorized into different groups and treated differently according to the assigned purpose, as for example dividing money into safe and risky (Mental Accounting Bias).
Products and recommendations must be presented to the Preserver in a comprehensive way. The reasons for their concern and how these prejudices shape their perception must be explained. A safe space for communicating emotional issues can be a good way to build trust and encourage them to take action.

Followers
may tend to focus too much on recent events and draw false conclusions, such as the assumption that the stock market will continue to rise on the back of a vein of good years (recency bias). After something unforeseen happens, the predictability of the event may be overestimated (hindsight bias). The decisions of the followers vary, e.g. due to a positive or negative tone of a question on risk tolerance (framing bias). When confronted with a fact contrary to their opinion, some may ignore this fact and try to justify their own in order to alleviate the pain caused by the dissonance (Cognitive Dissonance Bias). Often followers believe that every decision they make will be wrong and shy away from decisive action for fear of regret (Regret Aversion Bias).
Products and advice should be presented in a clear and detailed manner with supporting facts. Since followers are not able to fully assess their risk tolerance and may not hesitate to choose the first choice that is good enough and recommended by someone, these shortcomings should be noted. This pedagogical way of communication and advice is necessary and creates trust and a connection.

Independents
tend to value original information more than new data and to maintain the same path based on the original data (conservatism bias). When predicting outcomes, independents tend to project one existing event onto the predicted outcome of another (representative bias). After having invested successfully, independents praise themselves and their abilities because they think they are the reason for it, and if the opposite happens, they blame external factors for the losses (self-attribution bias). When independents believe in something, they often tend to seek only information that is consistent with and supportive of their opinions and assertions, ignoring any contrary information that might actually help them (confirmation bias).
Products and advice should be presented in a way that takes into account the beliefs of the independent. Discussions and questioning of investment decisions, as well as education about fully researched information and reflection on past investments, can lead to a trusting and supportive relationship.

Accumulators
tend to overestimate themselves and may attach too much importance to an investment that corresponds to their values and beliefs but may not be the most profitable (affinity bias). They may focus too much on results and profit rather than on how those profits can be made through that investment. This could lead to misinterpretation of decisions (outcome bias). Sometimes accumulators are susceptible to the illusion of control, as they often have to make decisions to feel safe. In this way, they think they can have more influence on outcomes (Illusion of Control Bias).
Products and advice should recognize the aggressive nature and limit options or even take control. But still, there is a need for deep involvement, which must be allowed.

Decision Making Process

Generally, what is a decision?
The core objective of our work is to empower private investors to make informed investment decisions. To this end, it is important to understand which steps and factors have a significant effect on the decision-making process and how we can influence it. Depending on the project topic, our focus is on investment decision processes in economic and financial situations.

First of all, we look at the basic psychological processes involved in human decision making. In this context, a decision is defined as the cognitive process of choosing one option non-randomly among several alternatives at a given time and in a given context. In doing so, some desired consequences shall occur and others shall be avoided (Fischer /Funke 2016). Hence, the result of a decision is a non-random choice of an alternative followed by a related course of action or purposeful activity (Hansson 1994 : 6).

Alternatives are options that can be chosen. They can either be clearly defined and predetermined and thus form a closed set of alternatives or they can be open and unprescribed, i.e. decision-makers discover new alternatives during the process or they come up with them in another way (Hansson 1994: 23-24). The basket of alternatives can be deliberately narrowed down by the decision-maker.

The outcome of the decision process is invariably the selection of an alternative. However, the consequences of this choice or how satisfying it turns out to be is not within the control of the decision-maker. Factors that are beyond the power of the agent are called scenario or state of nature (Hansson 1994: 25).

If only one external influencing factor has to be considered, the decision is relatively easily made by the decision-maker. Here we speak of a decision under certain conditions (Hansson 1994: 25). In contrast to this, is a decision under not certain conditions, where the circumstances and the scenario are much more complex and obscure. Further classification can be made into three sub-categories: uncertainty, risk, ignorance (Hansson 1994: 26).
Thus, the success of a decision is dependent on both the choice of an alternative and the scenario. It is therefore not enough to only consider the option alone, it must rather be examined in context, if possible with its dependencies and probabilities (Hansson 1994: 29).

Risk and Uncertainty

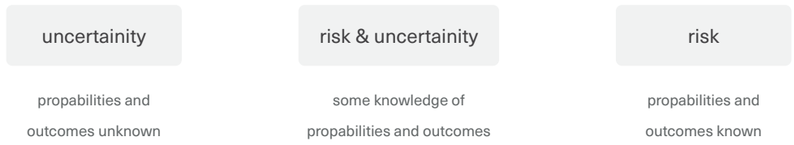


Fig. 40 Risk and Uncertainty; Source: own diagram

What is the process of a decision?
Starting from the assumption that there is sufficient time to make a decision, the process can be divided into different steps in a time sequence. There are many different models of rational decision-making processes, meaning processes where the best decision is to be made effectively and logically.

We studied and evaluated various decision-making models and set up our approach that meets our overall research and requirements. This could be a strictly rational process aimed at making the most logical and effective choice possible:

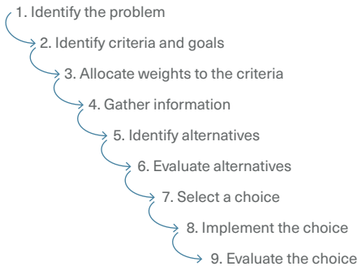


Fig. 41 Decision-Making Process; Source: own diagram

However, decisions do not always follow this very rational and structured pattern. It may happen that time or information is not sufficient. In this case, other processes and methods must be utilized.

Rationality in decision making
Decision processes have long been assumed to be based on rationality and people to act logically and analytically when confronted with decision making (Tapia/Yermo 2007: 4). For instance, according to the Accuracy-effort trade-off theory, it was assumed that more information and computation always resulted in better solutions (Gigerenzer/Brighton 2008: 110). Today, however, there are enough studies and

evidence to contradict this assumption. Particularly in the aforementioned non-safety conditions, when information and knowledge about consequences are lacking or the time frame is limited, investors may have difficulties to rationally choose a product that meets their criteria and financial goals (Tapia/Yermo 2007: 5). In everyday life and in complex situations, people rely on the tool of experience or heuristics, i.e. mental shortcuts.

Indeed, the use of heuristics can lead to better decisions. At a certain point, more information and time lead to less accurate, less suitable decisions than with the use of simple heuristics. This effect is also called less-is-more effects (Gigerenzer/Brighton 2008: 110-111).

In terms of the investment context, it can be categorized as a mix of risky and uncertain scenarios. In some cases, consequences can be expressed in probabilities, but the entire environment and the future cannot or only with difficulty be predicted. Hence, both rational and intuitive process models and methods are used when investing. In the mixed non-security process, statistical and heuristic methods are required (Gigerenzer 2008: 03).

Behavioral Finance

Developed from the realization that decisions are not always rational, that cognitive distortions and mental short cuts play an important role, the research field of Behavioral Finance has evolved. It investigates the human non-rational processes in decision-making. Our interest is in whether and what peculiarities and idiosyncrasies occur in the investment selection process.

Even in long-term investment goals such as retirement provision, decisions often do not proceed very rationally. A qualitative study from England shows that investment decisions for retirement are essentially driven by “confusion and apathy” (Harrison et al., 2006, as cited in Collard 2009: 9).

Now, what are the reasons behind investment decisions that fail to be rational? According to Tapia and Yermo, seven factors influence the choice of an unfit or non-optimal rational decision quite strongly:

- Choice and information overload
  Too many alternatives can overwhelm the decision-maker and paralyze his actions. If fewer products or information are offered, it is easier for the investor to evaluate them and make a choice (Tapia/ Yermo 2007: 6). Collard shows that internationally, in countries with fewer investment opportunities for retirement provision, these are used more often. On the other hand, in nations with more alternatives, lower active investment activity and a tendency towards default options can be observed (Collard 2009: ii). Qualitative research in the UK indicates that 3-5 investment alternatives are traded as a good basis for private investors to make decisions (Collard 2009: iii).

- Unstable or undefined preferences
  When investing, it is important to be clear about your own goals, preferences, and requirements. This is the basis for strategically building up a portfolio or making a targeted and fruitful investment. However, investors are often not aware of their own requirements and tend to leave them undefined (Tapia/Yermo 2007: 6). In an experiment by Benartzi and Thaler, it was found that own portfolio constructions were on average rated significantly less attractive than professionally composed pension portfolios.

- Heuristic decision-making
  As mentioned above, an investment decision is marked by complexity and the indescribability of its development. This makes the rational selection of an alternative much more difficult (Tapia/Yermo 2007: 7). Particularly in the context of such non-security, heuristics is a frequently used tool that reduces the high complexity and enables fast, simplified decisions (Gigerenzer 2008: 03, Benartzi/Thaler 2007: 84). The risk researcher Gigerenzer suggests a mix of simple and robust heuristics and statistics as decision support tools in situations of mixed lack of certainty.

- Framing effect and Investment menu design
  The framing effect refers to a cognitive distortion in which the presentation of available information has a decisive influence on the assessment of a situation and the making of a decision (Mitchell /Utkus 2003:9).

  There are studies that show that the ordering and nature of the information and how it is displayed can cause decisions to change. An experiment by Benartzi and Thaler illustrates and confirms that the presentation and selection of information from long and short term directly influence the interpretation of options (Benartzi/Thaler 1998: 17). Furthermore, the Cambridge Institute for Sustainability Leadership has, for example, found that the addition of information on sustainability performance and impact has an effect on investment decisions (University of Cambridge Institute for Sustainability Leadership 2019).

- Procrastination and inertia
  People tend to procrastinate difficult and complex decisions or actions into the future (Tapia/Yermo 2007: 9). In addition, there is the human tendency to remain with the status quo and accept default options (Choi et al. 2001). The research of

Choi et. al. concludes that in the context of retirement provision investors often take the path of least resistance and may, therefore, behave sub-optimally. Once a portfolio is in place, it is more likely not to be adjusted (Mitchell /Utkus 2003:11). Procrastination and the status quo bias make evident that decisions are not necessarily rational and logical and that there is a "divergence between Desired and Actual Behavior" (Mitchell /Utkus 2003).

The mentioned research results correspond with our own findings from interviews conducted: We have noticed a tendency among prospective investors and amateur investors to postpone their investment. Often investors inform themselves for a long time, consider investing very seriously, but implement their strategy much later or not at all in the real world or act contrary to their own interests.

- Overconfidence
  Another human, cognitive bias is overestimation of self, i.e. *"the tendency for people to overestimate their knowledge, abilities and the precision of their information"* (Tapia/Yermo 2007). This distortion of one's own ability has a direct effect on decision making and can thus make a process more diffuse and difficult.

  One can observe this illusion and distortion in two ways. Both in terms of control and knowledge, people tend to value their abilities higher than they actually are (Tapia/Yermo 2007:9).

- Loss Aversion
  According to the Prospect Theory of Kahnemann and Tversky, people experience losses much more strongly and intensively than gains. This suggests that investors are less willing to take risks in winning situations than when there is something at stake in losing (Mitchell /Utkus 2003: 23).

Besides, it should not be forgotten that a person's experience has a strong influence on his or her assessment, decision-making, and action. Actively used life experience is a valuable element in making complex decisions (Fischer /Funke 2016: 228).

Therefore, if our work is aimed at enabling private investors to make more effective and better decisions in their long-term and sustainable investments, we must at a minimum consider these points.

Support - How can decisions be influenced by indirect suggestions, positive reinforcement and design?
Let us retain that an investment process can be characterized by great complexity. Particularly in the case of long-term investments with a specific goal, such as retirement provision, decisions have to be made and acted upon several times. Due to the unpredictability of the consequences and lack of knowledge, investors find it difficult to make a decision. They need support in choosing alternatives that are in their own best long-term interest (Benartzi/Thaler 2007: 102, Mitchell /Utkus 2003: 35, Tapia/Yermo 2007: 25).

Design has the ability to empower individuals to make better investment decisions. To some extent, external factors can be influenced and thus the decision can be steered in one direction. There are already some efforts to make decision-making processes easier and more effective. Presentation and limitation of alternatives as well as sensitive default options and automatic risk management can help investors (Benartzi/Thaler 2007: 102).

Fig. 42 Decision-Making Process; Source: own diagram

Investment Journey

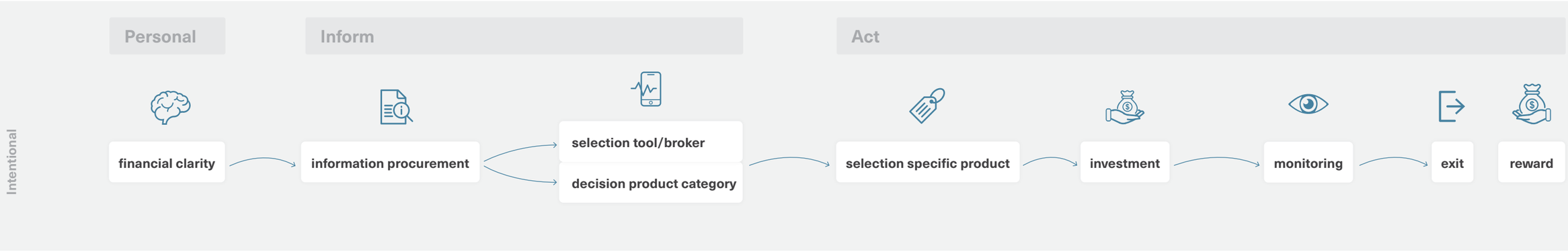


Fig. 43 Investment Journey; Source: own diagram

This User Journey summarizes the steps an investor goes through when investing. There are more hurdles on the way for beginners and potential investors than for experienced ones, as they have to start by obtaining financial clarity. The most relevant part of the Journey for more experienced investors is the “Act” part.

The process is structured into “Personal“, “Inform” and “Act”. Sub-processes of decision making are assigned to these. In addition, a division into conscious and unconscious processes has been incorporated into the diagram.

The first step and basic requirement for investors is to have clarity about their finances. It is common practice to first repay all debts, if necessary, and only then to decide how much can be spent on an investment product and how much of the monthly or yearly earnings are being invested.

Since money is a delicate matter, investments should be carefully considered. This is why research plays such an essential role. By gathering information, it usually becomes clear whether an advisory service is better suited to one’s own needs or whether there is the motivation to find the right product independently. In the section on private investors, we focus more on the different needs and requirements, such as risk tolerance or time horizon.

In our work, we focus on equities. It can be very difficult for investors to find a suitable product from the enormous pool. However, if a choice is made that makes you feel good and a confident conclusion is drawn as a result of the decision-making process, the act of investing is no longer a problem.

Difficult decisions can arise both in times of recession and in times of prosperity on the way to owning a stake in investments. Just like the selection of stock, the decision on when to sell shares can be a highly emotional and cognitive process.

After a successful exit from the investment, reward or loss can be the result. The whole process then starts again, either at the very beginning or in the “Inform”/”Act” part.

Intentional

unintentional

Personal

financial clarity

"Well, saving money doesn't really make sense. Especially with money you don't really need." - Private Investor

"I get money in my account every month that I don't need to live on. [...] That's why I like to save it up to fulfill a big wish, or just to prevent crises."
– Private Investor

Inform

information procurement

"For the basics, I watched some videos of a finance guy.I read some of Mrs Moneypenny's stuff." – Private Investor

"30h research phase on general. I really want to understand it."
- Private Investor

selection tool/broker

decision product category

There are different types of investors. There are investor types who want to know exactly (...) there is my money inside, and there are investors who are also satisfied with more anonymous forms. - Expert

"If you plan it right for the next 10-20 years [...] then you have to choose where you want to invest. Because switching brokers in between [is expensive]"
"In the beginning you think very carefully which broker you go to, and I didn't feel like it yet, because that's the non-exciting part of the whole thing."
– Private Investor

clarity of values

"It should be relatively safe. I'm not the risk-taking type, but it's supposed to pay off. Otherwise, this is just too futile." – Private investor

Act

selection specific product

"If you or I go to Daimler, [...] they won't give us the data." – Private Investor

"It is incredibly difficult for investors to understand by now what is really sustainable and what has only a green coating." – Expert

"Unfortunately, you can't contemplate such a huge, complex topic on one number, say here you have a dark green fund and the other one is light green. Especially since stocks in a fund change." – Expert

investment

"One thing I found quite exciting was, that I started buying individual shares. Only as a kind of real game. I found it exciting [...], therefore also with small amounts."
– Private Investor

"[...] and try to find some independent opinions and also look at the shares that are in it. Then try to rely on my intuition. Whether I think it fits or not."
– Private Investor

monitoring

"I have since discovered for myself that this dividend is pretty cool. [...] I am receiving this distribution [...] as a gift, after all. In the meantime, I use it to buy food. I didn't have to work for the food, it's a gift.
– Private Investor

exit

"I think about impact over time. I mean returns sustain a portfolio. You do want high return pieces in your portfolio and you need to make sure, while you're targeting that, that you're having impact."
– Private Investor

reward

Fig. 44 Investment Journey; Source: own diagram

Empathy

Empathy is about recognizing your conceptual framework, putting it aside and opening up to the views, problems and motivations of others. It is not about feeling the same as the other person, but about listening and accepting.

Empathy plays a key role in design. Because only if you break away from your views and assumptions and focus on the person you are dealing with can you design solutions that add value.

On the following pages we will discuss interviews with various stakeholders. A major focus of this section is the information we were able to gather from individual investors. We also describe a self-experiment that we conducted intending to develop a better understanding of the situation of prospective investors.

Summary

What problems do rating agencies face?
Basically, the evaluation of a sustainable investment involves taking into account economic, ecological and social KPIs. These indicators show whether an activity fulfills its purpose and to what extent it achieves specified goals. 3 fundamental elements of a rating can be identified: Scope, Weighting and Measurement. Discrepancies in ESG rating are mainly caused by (1) different definitions and (2) disagreements about underlying data.

What difficulties do banks have?
Banks have the main problem of identifying and communicating sustainable offers. The implementation of and compliance with a clear definition of impact investing by all stakeholders is necessary.

What findings could be gathered from user interviews?
While professional impact investors attach particular importance to impact, leisure investors are more flexible here. The process of involving stakeholders is also different to impact investors who invest significantly higher amounts.

Important to all investors with more experience is that they want to fully comprehend the business and the structure of the business or the details of the product they invest in. Value-based decisions are coming to the fore because there is already enough knowledge and self-confidence. They usually have a specific, validated approach that they feel comfortable with and according to which they make decisions.

Inexperienced investors, however, have particular difficulties with the early stages of the investment process. Financial clarity, setting up a strategy, and so on are corresponding tasks. For them, a secure return is usually priority 1, they find it harder to identify sustainable products and are often guided by their intuition.

How has the self-experiment brought us closer to the users?

The Self-experiment has enabled us to experience the problems of investors ourselves and has thus led to a deeper understanding of the field of design.

Our experiences and journeys have been very different internally. But we also observed some similarities among ourselves and with the users. We found problems especially in the areas of financial clarity, commitment, and the selection of suitable products.

Interviews

Interviews are particularly suitable for clarifying questions and obtaining specific information on needs, problems, and motivations. Conclusions and insights can then be drawn from these, which help to better understand the scope of the project and to get a sense of where the work can go.

We have both conducted expert interviews with several stakeholders to ask specific questions, as well as some interviews with investors of different backgrounds and experiences.

Impact Investors

The general phenomenon of non-uniform, differing definitions in the field of investment is also evident for impact investing. Basically, it is about investing for the sake of impact. In addition to return and risk, an understanding of the impact of the investment is added to the basis for decision-making (Bundesinitiative Impact Investing n. d.). We spoke to two impact investors who live this investment approach and also pursue and fulfill non-financial goals in investments.

"If you are serious about impact you need to use any tool available. Having a business background I believe in the power of markets and there's not enough philanthropy to solve the worlds problems. [...] To me, the biggest opportunity in the world right now are investors taking peoples assets. [...] Rather than compartmentalizing and saying money is over here and my investments are over there but i do a lot of work in the community and for the environment, it does seem more like a way you do want to live your life." parts of impact investor 2's definition

But return isn't unnecessary and remains the main reason to invest. *"I think about impact over time. Returns sustain a portfolio. You do want high return pieces in your portfolio and you need to make sure, while you're targeting that, that you're having impact."* continued impact investor 2.

As both investors are usually investing single-digit million into startups or projects, their investment process differs completely from the individual investors' one. At Impact Investing there are pitches, presentations, various people, and networks involved, all of which are directed at checking whether there is potential in an investment and an appropriate mindset on the part of those involved. *"I must trust in the commitment of the entrepreneurs. That they can actually do this."* concluded impact investor 1. Qualitative and valuable information, for him, is more helpful than a large amount of unnecessary information. As all projects and investments may differ widely, impact investors spent a lot of time investigating each opportunity individually and discuss these with their teams or trusted network. *"I realized, that you can do a lot of it solo, but I am a social beast, so it was important for me to join groups. Not only for learning, but also to have the network I could share the journey with."* added impact investor 2.

"I took some opportunities like a philanthropy workshop, where you think about your own theory of change; what you care about, and how you can make your impact." commented impact investor 2 on his journey of becoming an impact investor. *"Impact investing is a method."* summarized impact investor 1. This underlying own method on how to define and refine personal values and goals basically consists of three main steps that lead to personally matching investments.

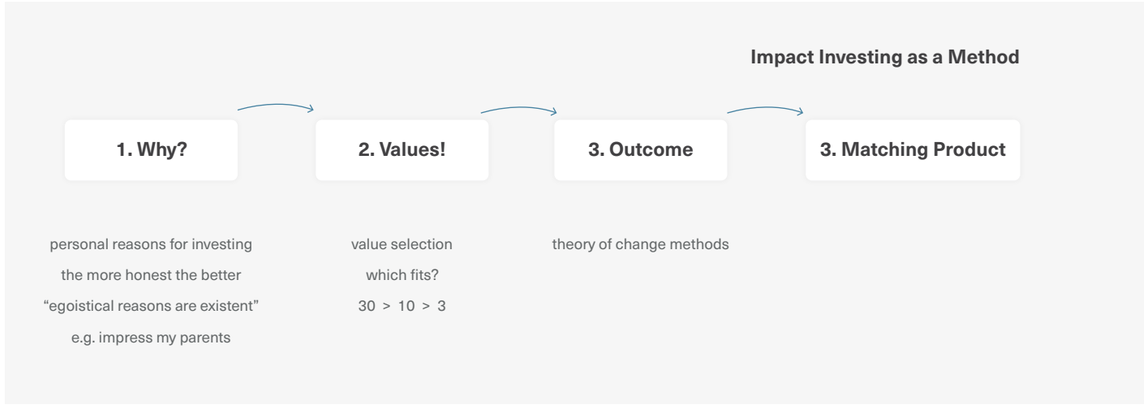


Fig. 45 Impact Investing as a Method; Source: own diagram

Experienced Individual Investors

Investors not relating their investments to measurable impact, but thoughtfully investing their personal assets in the stock market constitute this group. Through our initial interviews, we had the chance to get an insight into the experiences of 3 investors who have been investing over several years.

Their handling of monetary matters is mature and well reflected, recognizing that "Saving money doesn't really make sense. Especially not with money that you don't need directly." like Experienced Investor 3 mentioned. Generally, this group only invests money that they have in surplus so the emotional attachment is less. Experience Investor 1 put it this way: "You should split the money you invest to different

categories and risks. Only money you can spare you invest in shares, because they have a higher risk but offer more interest. Then it is less important if there is a decline in the share value - because you do not necessarily need the money."
All investors make their own decisions for every investment product for different reasons. Two investors grew increasingly suspicious over the unbiased objectivity of their bank advisors. "If you talked to someone in the bank, they were trying to sell you their products [...]. How is he supposed to go about it super objectively [...]?" was Experienced Investor 3's experience, and also Experienced Investor 4 relates to this: "At the beginning, I trusted my bank advisor completely! [...] Then I noticed: with every offer I pay fees. These were never clear to me." Experienced Investor 1 mentioned that the information gathering process and the independent decision builds a feeling of security: "I think you have to spend more and more time with the respective topic, then you have a certain security."
What unites them all is the strategy of their investment efforts. Buying stocks with the aim of holding them for a long period of time, combined with a firm belief in the company and its ability to prosper in the future, builds the basis of their investment strategy. In the words of Experienced Investor 3: "The idea is buy-and-hold, so you buy it and just hold it for a long time. Actually, there's no point in looking at [the current stock price continuously]." And all while recognizing that frequent trading may be unfit for them because "back and forth empties your pockets" as Experienced Investor 4 mentioned.

On the issue sustainability, these investors have different opinions and values, Experienced Investor 1 has an explicit concept in his mind: "Sustainability is not only about the environment, but about all sorts of aspects such as working conditions, which is the case in supply chains up to raw material suppliers." while Experienced Investor 4 sees sustainability "More like how to help other people with."

Important to all Investors is that they fully comprehend the business and the structure of the business or the details of the product the invest in. The information procurement process describes Experienced Investor 1 as follows: "You have to inform yourself. Read financial reports of the companies, how old they are, a bit of history. Where does the company come from? How did it develop? Who works there? How are investors involved?, [...]". Even "You have to come up with a little bit of a strategy and then follow it through and that's the most promising thing." is an advice form Experienced Investor 3. For experience Investor 4 its crucial to "[...] ask yourself every day anew: would I buy this stock today as the company stands?".

Consistent is also the importance to fully comprehend and believe in the company. Experienced Investor 4 has "[...] still four individual shares. Because of my affinity for the IT industry, I own these companies." To believe in a company's potential crucial to Experienced Investor 1: "I think you invest if you believe in something. To believe, the offering firm does not have to provide marketing slides, but their strategy, real figures, real projects and goods I'm just convinced of the investments that are now going towards sustainability."

Inexperienced Individual Investors

Who does not know the barriers within the beginning? In many areas of life, the start is hurdles. Also in investing, aspiring investors are confronted with such obstacles.

We have talked to 3 (prospective) investors who are still in the early stages of their investment journey (see Fig Journey).

Our interviewees in this group have already gained initial financial clarity, acquired basic investment knowledge, and have made initial thoughts on strategies for their personal investment goals. Some of them have already completed their first small purchases, but these were more spontaneous or short-term in nature. These investments were more of a trial and error. However, all 3 interview partners are interested in long-term investments and plan to realize them in the future.

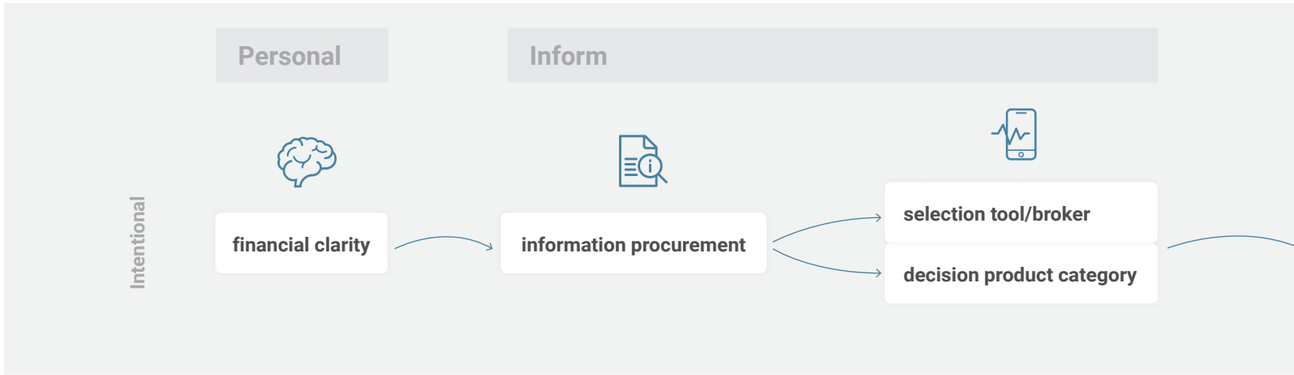


Fig. 46 Investment Journey Abstract; Source: own diagram

In discussions with inexperienced investors, we have been able to develop a better understanding of their situation and problems. We have subsequently clustered the findings from the interviews.

Secure return of investment is first priority
All three of our interview partners have a very strong need for secure investments and returns. Moreover, they are all aware of this greatest need. For example, interviewee 1 states quite clearly that “security is a major factor” in the decision for or against an investment. The other two prospective investors also describe their risk aversion. For interviewee 2, the need for security is deliberately given greater weight than the desire for sustainability. This investor needs to lay a foundation stone in the investment that they know “nothing can happen“ to. So although a product contains companies that do not correspond to the investor’s understanding of sustainability, they may want to invest in it. “I’m selfish,” says Investor 2, and Investor 3 also says something similar: “You have a certain willingness to take risks and at the same time an intention to make a profit. For me, it should be relatively safe. I’m not the kind of person who likes to take risks, but of course, it should also yield a return. Otherwise, it’s too stupid for me“.

Long investment periods and the buy and hold strategy is particularly interesting for the 3 risk-averse interviewees. Investor 1 explains the reasons for this investment strategy in our interview, as follows: “Index funds and ETFs are the core of the buy and hold strategy, which I have defined as my way to go after studying literature. Because I’m not the type of person who wants to follow the news, read the cheats, etc. For me, it would be especially interesting to take the growth from the market with me.” Investor 3 also expresses clear rejection and uncertainty regarding short-term and therefore risky investment strategies when they say there are things they would never touch: “Shorts and longs, and even more complicated stuff - I would not do that. Anything peculiar designed for speculators.“

We conclude from this that the greatest need of our interview partners is to get a secure return on investment and that these financial values are at the top of the priorities. Generally, they prefer long-term investment periods, as these are less risky. Although our interview partners are all personally interested in sustainability, they would always opt for a secure ROI.

Sustainability is difficult to identify in investments
Although financial values are a particular focus of the three interlocutors, they also raise some non-financial requirements. For Investor 1, sustainability is basically something that “everyone should care about these days”. In the case of investments, they say, sustainability is a “side effect that one would like to include”. In a similar vein, Investor 2 states that “as long as the risk-return balance is fulfilled, the investment should be as sustainable as possible”.

To this end, it is important to them that certain industries and companies are excluded. Based on negative criteria, “malicious” products should be sorted out in the best case. However, the reason why this filtering is not always applied is again the security factor. “I don’t believe that if you only buy sustainable products, diversification is possible”, doubts Investor 2 and admits: “It’s just a question of where I set the bar and where I turn a blind eye again”.

Furthermore, the recognition of sustainability in investment products is problematic. Investor 3 is particularly skeptical about sustainability metrics. “I don’t think it’s methodologically sound, honestly,” they say, “and I don’t think you can just break all that down to a number.” Especially the comparability between products and their non-financial performance is not sufficiently given for our interview partners. Investor 2 is confused as to why the sustainability ratings are so divergent: “Especially when funds are supposed to represent something very similar and one is declared sustainable and the other is not, you have to ask yourself first what the difference is”. For better comparability, Investor 3 can imagine a qualitative rating. Because it is more helpful for them to take a close look at the companies and to research what makes them what they are.

On the whole, our interview partners would also like to see a better overview and depth of detail about the sustainable offers. From Investor 2 comes the desire for a clearly structured website of all sustainable product providers, with detailed information that “may not fit on a factsheet”.

In the end, intuition decides
Concerning the information gathering process, we have found that all our interview partners invest a lot of time. Investor 2 attaches great importance to extensive research: “Of course I would look at the share price and see how it develops. I would also look outside of what is available, at the industry itself, and try to find some independent opinions and look at the shares that are in it”. Part of the reason for this is probably the lack of experience and the great need for security. This feeling is created, inter alia, when one’s actions or the arguments of the source seem logical. “I always have the feeling that the whole financial and economic sphere is just a lot of logic. And if it seems logical to you, it can’t be all that wrong,” continues Investor 2.

However, prospective investors also realize that the information available is often incomplete. Investor 3 addresses the problem and says “The factual situation is imperfect and if it were to be complete, one would still have to decide what is most important. Weighing information against each other in the decision for or against a product is a very subjective matter” and “actually intuition”. This is also confirmed by interview partner 2, who says: “I try to rely on my intuition. Whether I think it fits or not“.

So, although great importance is attached to rational decisions, the influence of non-rational factors on decisions cannot be denied. Emotions and unfounded preferences are ultimately part of investment decisions.

Procrastination over long periods of time
In the end, it was also interesting for us to find out why our interview partners have not yet gathered any serious experience with investments.

“A key point is that I’m a little lazy. […] that I don’t want to deal with contracts“, Investor 1 admits. For this investor, choosing the right broker is very important. “In the first place, you think carefully about which broker you go to,” they explain, “and I didn’t feel like doing that yet, because that’s the unexciting part of the whole thing.“

Interview partner 2 had not had the topic of investing on their radar for a long time: „It was not a real priority until recently, so it went under“. In addition, the focus has long been on the acquisition of fundamental investment knowledge. The time for concrete action had not yet come: “until recently, I didn’t focus on specific indices, but rather on the general concept. I wanted to take the time to understand it“.

Investor 3 was able to gain some experience with a few purchases a few years ago, but then dissolved the portfolio and has not made any further investments since. As the reason for the inactivity, the interviewee 3 recalls: “It was 1000 euros, my savings at the time. To be honest, at some point I needed the money and therefore I didn’t [invest] it anymore“.

Overall, it can be concluded that a lack of urgency, low priority and general insecurity in particular lead to procrastination over a longer period of time.

Rating Creators

As a private investor it is quite difficult or even impossible to obtain data directly from companies. In addition, it is very time-consuming to undertake the filtering process, i.e. the procurement of transparency and sustainability assessment, oneself. So in the 1980s, ESG Ratings came up to support investors in the evaluation of non-financial characteristics and performances. As the trend of sustainable investment grows, *“more and more investors rely on ESG ratings to obtain a third-party assessment of corporations’ ESG performance”* (Berg et al. 2020).

Experts in various rating agencies, research centers and organizations strive to provide a meaningful and truthful picture of the sustainability of an investment. However, this endeavor is made more difficult by the lack of regulation and its diverse and ever-evolving character. Basically, the evaluation of a sustainable investment involves taking into account economic, ecological and social KPIs. These indicators show whether an activity fulfills its purpose and to what extent it achieves specified goals. However, at this point in time a large discrepancy can be observed between the ESG approaches of different rating agencies. Scope, weighting and measurement sometimes differ widely, resulting in strong differences in the assessment of companies and their performance (Berg et al. 2020). So it may be that although data is available, it is processed and weighted quite differently depending on the definition and methodology adopted.

In their paper *Aggregate Confusion: The Divergence of ESG Ratings* , Berg and his colleagues examine the reasons driving the divergence of sustainability ratings. They identified 3 fundamental elements ratings consist of:

“(1) a scope, which denotes all the attributes that together constitute the overall concept of ESG performance; (2) indicators that yield numerical measures of the attributes; and (3) an aggregation rule that combines the indicators into a single rating” (Berg et al. 2020)***.***

On this basis, they come to the conclusion that discrepancies in ESG rating are caused by (1) different definitions and (2) disagreements about underlying data.

While a diversity of definitions and opinions on scope and weights may even be favorable considering the individual and heterogeneous preferences of investors, Berg and his colleagues state, divergences in measurement and underlying data are more troublesome as *“ESG ratings should ultimately be based on objective observations that can be ascertained”* (Berg et al. 2020). Only if more uniform and accessible metrics are available, the divergence in ESG ratings will reduce. Another point concerning the differences is that measurements partly are influenced by the rater

effect meaning a *"bias, where performance in one category influences perceived performance in other categories"* (Berg et al. 2020). Categories could, therefore, be reduced to a smaller set, the paper argues, since their far-reaching assessment is superfluous in a statistical sense.

Another point Berg and his colleagues make is that companies are often free to decide which information is shared. However, the different valuation approaches make it harder for companies to decide on measures for improvement that are positively reflected in all ESG valuations and are generally acknowledged.

Our interviews with rating agencies, NGOs, and research centers revealed the great complexity of sustainability measurement and fit the picture that Berg and his colleagues paint in their work. In the following, we will go into the interviews in more detail.

FNG Seal

- Service:
  A seal that distinguishes sustainable endeavors in a four gradations rating: Basic, Medium, High, Very High

- Approach:
  There must be a minimum standard, which is examined with the help of exclusions, transparency work, and sustainability coverage. In a phased model, further achievements in the areas of credibility, product standards, and impact are then considered and evaluated. The stars are distributed according to the performance within these elements. Maximum is a star rating of 3, for a high degree of quality in all mentioned elements.

- Challenge:
  "Hundreds of analysts, in various sustainability agencies, who weight and evaluate data according to the set of criteria and come to sometimes quite different results. […] Data will be much more available in 3-5 years, they will also be more solid, but whether one can then use them meaningfully in terms of materiality, that it is empirically also meaningful for a financial decision, […] that will still take time."

Some organizations and labels like the FNG seal use a filtering process in which transparency issues and negative criteria are mandatory, while positive criteria is considered voluntary. According to the management of the FNG seal, this process is based on the experience that many people know what they do not want before they know what they want. Its aim is to select a basket of individually suitable options. Although informed investors do not necessarily need a label or seal, the management says, the less informed appreciate it as a quality feature and feel-good factor. Labeling has a psychological effect on people and is associated with value and certain security.
In our interview, the management emphasized that at present, an overall assessment of sustainability is not possible, but rather a "Herculean task". In the conversation, our interviewee made it clear that they offer orientation in the sense of saying that in a company "many efforts are being made to achieve sustainability". They're not trying to say a title itself is sustainable.

Small Rating Agency - anonimized

- Service:
  Integration of ESG factors while controlling greenwashing with a multi-source, AI-powered scoring system and data feeds

- Approach:
  The approach is based on a variety of information combined from web monitoring and artificial intelligence together with human analysis. Publicly reported data is compared with media sources about reputation. The goal is to track inconsistencies and monitor developments. Companies are therefore assessed on a score from 0-100.

- Challenge:
  "Asset managers will be like political parties, […] they will defend certain opinions and their clients will follow them."

The interview with one of the brains behind a smaller rating agency confirmed that ESG ratings face certain challenges. Among the issues raised were the lack of consensus, data gaps, and the difficulty of rating smaller companies.

The latter is due to smaller amounts of data that can be evaluated. Our interviewee made it clear that "there is a bias in favor of the large companies, […] once because the large companies have more resources to produce reports, respond to questionnaires, second the largest companies are the object of more attention, monitoring, and are more likely to be stimulated to act".

Data gaps arise when companies do not act and communicate transparently. In most cases, according to our expert, companies want to keep their data confidential and internal. Here, our expert sees the need for more pressure from politics, society, and other interest groups on companies to communicate transparently.

In case of uncertainty or lack of information, their approach is to set the value at an average, according to its own methodology a value of 50/100. However, our interviewee does not see these data gaps and the divergence of the ratings exclusively in a negative light, because they “reflect the diversity that we have inside the society”.

Frankfurt-Hohenheim Guide

- Service:
  A guide that rating agencies and investors can use as a basis for the criteria of ethical-ecological investments

- Approach:
  For the structure of the guideline, a value tree analysis is used, which is arranged in 3 structuring main branches or dimensions: cultural compatibility, social compatibility, and nature compatibility. In the following levels, the areas of action within a dimension and further assessment parameters are dealt with. Hence, along the path an investor can orientate him- or herself from dimension to area of action and finally along with relevant parameters.

- Challenge:
  “For the actual operational business, [the guide] is too complex, too difficult, too inconvenient, too theoretical. […] It was clear to us that a reduction in complexity was necessary. Otherwise, investors will also be overwhelmed.”

Ultimately, investors bring with them a very individual set of attitudes and requirements, so the weighting of criteria and the decision for a product must in the end lie with them.

In particular, the interviewee emphasized the role of politicians and banks who can promote sustainable offers and shall communicate them more clearly on a larger scale. Our interview partner explained to us that sustainable investment should not be a “niche market for the rich” or an “add-on”, but should be part of the mainstream.

Therefore, the interviewee calls for a complex division of labor between stakeholders: “The consultants must try to get as deep a look as possible into the respective companies. […] Part of the division of labor is that there are consulting people who sit in the banks and various rating agencies. They have to actually evaluate the offers and say: I think this is a very legitimate thing, I see this as problematic and so on. So that you can really get into a high-quality consultation and really give the person options”..

NKI

- Service:
  Consulting and training services for institutional investors, companies, banks and investment advisors as well as research and publications

- Challenge:
  “There is a lot of market potential in this area for private investors, which is currently only being exploited to a very small extent. This may be because when it comes down to it, people do not choose sustainable products. Maybe it’s because of external influences or because the product offerings are not yet on the market or are not communicated.”

The fact that a fund does not always have to consider all three dimensions is something we have also learned from the Sustainable Institute for Investments. In a special monitoring service, the NKI offers a screening of certain areas and sectors in order to present investors with arguments for or against exclusions and inclusions. What is particularly important in screening, says our interviewee, is that the sources are independent and that attention is paid to the development of the information: “You always have to screen all things in order to keep everything up-to-date. Today a product is green, but tomorrow it won’t be.” The business model behind the data and who pays for the evaluation should also be considered.

In talks with the NKI, we were also able to find out that there are hopes for standardization in the near future. The EU action plan, which wants to define which investments are green or not green, was specifically mentioned. “This is a very complex task,” admitted our discussion partner.

CRIC

- Service:
  CRIC focuses on raising awareness, engaging in dialogue with business and scientific research

- Challenge:
  “The more differentiated the information situation, the more difficult it is to use it.”

CRIC is an association of ethical and sustainable investments. The special thing about their approach towards sustainability is that it includes a transformative force. When we spoke in our interview about the impact of sustainable investments in the secondary market, the expert stressed that it is a philosophical question: “What can we as individuals achieve? […] We alone as individuals do not make that much

difference. But in the masses we may do. There are various levers and you can certainly make a small contribution by investing indirectly in shares.

This expert also believes that there is a lack of standardization and regulation to promote sustainable investment and make it mainstream. However, she also sees a great challenge in standardization, since information can then be lost.

With regard to the publication of data by companies, she was critical: “The sustainable topics that have an impact on the company’s business model are the ones most addressed in the reports”. She sees greenwashing as a challenge for authentic ratings.

In summary, all rating agencies and organizations we talked to mentioned challenges around regulation, data, and reporting difficulties.
The market potential of sustainable investments in the capital market has not yet been exhausted, as there is a lack of transparent and competent information on the one hand, but also a lack of regulation and standards.

Nevertheless, many experts believe that a certain degree of divergence is desirable and can better reflect different opinions of investors and society.

Data delivery by companies, data gaps, and greenwashing are among some of the biggest challenges in ESG ratings.
As Berg and his colleagues also state in their paper, we found out that there are problems due to different definitions and weightings on the one hand, but also due to the underlying data, which is not yet communicated in a standardized way and is not assessed in this way.

Bank

With the growing interest in sustainability and green investments, banks and financial advisors increasingly want to respond to the inquiry with their own products and information expertise. Green or ethical banks that want to go a different way and fully address sustainability issues are receiving more and more attention.

We have interviewed an expert from a German sustainability bank about topics such as the development and challenges of green investment and sustainability measurement.

The expert we spoke to confirmed that a lot is happening in the market right now: “The market is growing rapidly. At the beginning of 2015, this was not yet [...] but in the meantime, it has really arrived in the financial mainstream.” But this development is also accompanied by some difficulties. The interviewee sees greenwashing as one of the major risks. Investors would find it difficult to distinguish sustainable products from the green coating, he argued.

The approach of the sustainability bank distances itself from classic ESG ratings and is skeptical about their meaningfulness and comprehensibility. The mapping of sustainability performance into a single figure is inadequate and not very informative, according to their understanding: “An ESG score of 7.3., I couldn’t tell you what that means without further information. [...] One cannot expect the private investor to understand this. I don’t know how, and I’ve been dealing with this sort of thing for 6 years”.

Instead, the bank, explains the interlocutor, relies on taking single judgments with a multi-stage decision-making process and discussions in an investment committee of experts. Thus an evaluation from diverse perspectives is to be ensured. While “ESG criteria create an illusory reality of sustainability that does not really exist”, the advantage of our qualitative approach is that (1) “individual decisions are more comprehensible to private investors than complex ESG ratings” and (2) “individual decisions are more true-to-reality than many ESG scorings”, the expert says. In concrete terms, for example, attention is paid to climate strategies and how they are implemented, whether they are realistic, and what development the company can point to. Performance is then evaluated by a variety of experts who can assess the situation.

The interviewee sees another difficulty of ESG ratings in the divergence of data to assess large and small companies. The expert notes that “large, multi-national corporations, in particular, perform better because they have better reporting. Small companies don’t have the capacity and so, ESG research providers focus primarily on large companies”.

In general, data availability is a major challenge, “because there are no standards for which indicators are collected. […] Everybody interprets it differently and that’s the problem.” The interviewee, therefore, calls for “greater uniformity [of data] in order to have a better overview [of sustainable investments]”. The implementation of and compliance with a clear definition of impact investing by all stakeholders is, according to the contact, necessary for private investors to find the right product. The raw database that politicians are currently working on and discussing is in principle a good idea, but does not solve the problem of the various interpretations: “In principle, a raw database would make things easier, but the task of an asset manager would still be to put this data into context”.

At the Good Money Barcamp in Stuttgart, we participated in a workshop of one sustainability bank, which presented its evaluation process in a quite practical way. Several examples of anonymous companies were presented with their qualities, i.e. positive and negative characteristics. The participants were then asked to evaluate the companies and decide whether or not they would be considered sustainable investments. We were able to make some interesting observations in this workshop.

For example, we found out that the presentation and framing of information, activities and efforts of a company influences and guides the judgment of the participants. For this reason, it is absolutely essential that the presentation is as neutral as possible. It was also noticeable that there were changes in the ethical/sustainable assessment when information on return, risk, and sustainability was mapped and viewed together and simultaneously.

Also, it makes a difference to investors whether they want to invest in only one company or in several: In the case of a single company, the expectations of sustainability performance tend to be very high, while in the case of several companies, the portfolio composition factor is taken into account to a greater extent

Another thing we observed at first hand is how different the assessments can be depending on individual attitudes and understanding of sustainability. A lot of work that investors, therefore, have to do is to become aware of their own attitudes and then translate these into judgments of individual products based on personal weightings and values.

Solution Owner

In our examination of existing university work and projects, we came across the communication design project Financial Forrest. With one of the team members, we had a detailed interview about the process, challenges, and approach of the work.

According to the interviewee, Financial Forrest is designed to “provide access to finance for people who have not had such access before: especially young people and students. Who A. do not have much money and B. are not really interested in investing their money.” The question at the heart of the work is how young people can be encouraged to acquire financial knowledge and invest their money from early on.

The team’s approach was to incorporate playful elements and make financial knowledge tangible. For this purpose, the metaphor of a forest is used for a portfolio, e.g. a stock is a tree. This explanatory model helps the user group “to convey a good basic understanding that is missing in a lot of people”.

During the research, the team realized that the community factor must also be taken into account. Many people have the need to exchange their experiences. “To avoid the feeling that this is a solo effort and I have to see for myself how I invest my money”, says our interview partner, “we have integrated support via the app, the content and the community”.

It has also proved necessary and useful to specialize in a particular investment product. After having developed an overview of all products, the team decided to map and focus on ETFs in their prototype for the start.

A special feature of the project is certainly the effortless integration of investing in everyday life. By means of a rounding principle, small change from purchases and everyday payment transactions is to flow into investments. Our interlocutor explains that “via minimum amounts, you can see how things can develop when you save money.”

We were able to draw helpful tips for our own process from the conversation and got a first impression of how such a complex topic can and must be approached.

Empathy Map

Think

"You have to inform yourself. Read financial reports, how old they are, how they've developed and a little history."

"As long as my risk-return requirements are met, I would like to make it as sustainable as possible."

"Where does the company come from? How has it developed?, Who works there? How are investors involved? [...] so that you can see with certainty that the company is successfully developing its product or service."

"How do i want to live my life? And do i want my actions throughout my life aligned with my values?"

Hear/See

"If I don't know what the info is for, better make it three instead of 30."

"Mentors are great stuff, me and my friend we mentor eachother, help us in defining goals and talking about investments."

"It would be nice if the [sustainable product suppliers] could get together and design a clear website. That there is more attention and that they show what makes them so sustainable. Something that might not fit on an Infosheet."

"And where, in principle, you only get what the company gives you. That's not really transparent."

Feel

"I'm a little skeptical about metrics. I don't think it's methodologically sound, to be honest. [...] Well, it's a complicated subject in any case, and I would like to take a close look at it in detail. I don't think you can just break it down to a number like that."

"I do not want to support companies that are extremely harmful to the environment."

"You should never buy stock based on a feeling."

"Safety is a big factor."

Do

"30h research phase on general. Ultimately I want to understand."

"[I] just looked at so many websites and blogs on Google and saw what they had in common. As I said, now I'm reading this book as a more serious source. Although you can't really say that books are more reputable anymore."

"Rather than compartmentalizing and saying money is over here and my investments are over here but i do a lot of work in the community and for the environment it does seem more like a way you do want to live your life."

Gain

Lack of qualitative comparability and ratings with absolute numbers are a problem

Locating products that match the value set

Inadequate traceability of sources

Tedious information procurement process

Investors are dependent on the provision of transparent and credible information, companies have the delivery responsibility

Pain

Distinct set of values

Deeper, inner drive and mindful lifestyle

Curios and Interest in deep examination

Zest of action, actions of conviction

Reflective

Long-term oriented, rather rational way of thinking

Fig. 47 Empathy Map; Source: own diagram

Self Experiment

Develop empathy for the situation of the investors
Putting aside one's own conceptual framework and actually listening to the other person is probably the best way to build empathy and understanding. However, in addition to interviews and conversations, it can also be helpful to put yourself in the position of the users and to make your own experiences. This is why we have decided to embark on a self-experiment and buy some shares ourselves. For authentic experiences, we have used real money.

Planning and conduction of the Self Experiment

- Goal
  The main goal of this experiment was to build empathy and understanding of investment decisions by stepping into the users' shoes. The hypothesis behind our experiment was, that we are going to encounter a lot of stress, insecurity, and worries. This should be investigated and authentic experiences should be gathered in order to gain a real and intimate insight into our design context.

- Time
  We have not defined a time frame for this experiment. The experiment is open-ended and should ideally be the starting point of our own investment journey.

- Limitations
  For the start, we considered a range of 50 to 100 Euros reasonable. There were no further limitations on how or what should be invested in. Each of us was free to follow their individual preferences and requirements.

- Previous experiences and knowledge
  None of us had any previous experience with this topic, so we all had to go through the entire process from financial clarity and information gathering to the evaluation of our activities.

- Documentation
  Each one of us has recorded their experiences using audio recordings and notes.

Insights and patterns
While two of us quickly realized that they were finding it quite difficult to actually act and were more affected by fears and uncertainties, one person dared to invest in multiple products: a single share, 2 funds, and a cryptocurrency. In the following, we describe the most important findings, paying special attention to parallels and patterns that occurred in more than one journey.

Obstacles and challenges

- The biggest challenge for one person was to achieve financial clarity.
- Another person struggled with long-term commitment and lack of motivation the most.
- Finding matching products presented the biggest challenge for the third, investing person.
- Other challenges mentioned were procrastination, lack of long-term plans, and stability of lifestyle, small financial means, lack of experience, high time expenditure, as well as the need for security, control, and liquidity.

Patterns

- Touchpoints
  Google, [Finanzen.net](http://finanzen.net/), Youtube, podcasts, investment apps, advertising, book "The intelligent investor" by Benjamin Graham

- Broker
  For brokers, we all considered banks where a bank account was already held and which offer custody services.

- Investment product
  All of us were strongly focused on indirect investment options like shares, funds, or ETFs as they're quite accessible and popular among new investors.

- Emotions
  Great insecurity! Each of us struggled with fears and worries in some way. It's been a quite emotional journey for all of us.

Other interesting findings

- It is noticeable in the wording that money or investments are associated with pain. One of us said in their recording that, because it doesn't hurt that the money is on the account, there is no investment. Another one said that an investment of 50 Euro does not hurt and therefore can be invested.
- Obviously, there is a threshold, from when an investment carries too high a risk. The fear of losing large amounts of money strongly determines investment behavior.
- In addition, the status quo bias can be strongly seen in 2 people who do not see any urgent action and therefore do not make their investments. Each of us experienced procrastination, although in different manifestations.
- A detailed breakdown of costs is very important for the purchase and can decide whether to buy or not. Especially for small investment amounts one does not

want to pay relatively high fees.

- Although we all strive for sustainability in different aspects of our personal lives, we have not actively and primarily looked at corporate sustainability strategies and reports. The industry, usual graph, and performance over long periods of time were usually the focus of a product's research.
- Morningstar Rating is trusted, even if one does not know exactly what it means. It serves as an indicator of external opinion and evaluation.
- The person from our team who invested did not really feel comfortable with their first investment. It felt weird that the money wasn't in the account. Therefore the development was often followed and controlled. In the next exploration, a fund then convinced them through positive development, social commitment, and a good reputation. Basic trust was there and it was bought. In other words, trust plays a considerable role.
- There is a great deal of trust in experts and investment influencers because a new investor struggles with knowledge gaps and uncertainties when investing. The professional reliability of experts is not only assessed in terms of content, but also by many other factors such as sympathy/dislike or how much the person fits into the idea of a financial expert.
- Not all funds present the same information. Completeness is not always given, especially when it comes to sustainability. Hence, the comparability of alternatives is difficult.
- Panic, as a strong feeling, can dissolve investment strategies and inhibitions and lead to irrational actions. The panic in the Corona crisis has infected 2 people in our team. The person from our team, who has already invested, considered whether to sell the previously bought fund, because it had fallen sharply. Another one, who previously had a great inhibition to do anything, was convinced by conspiracy theories to invest about 100 Euro in an Asian gold mine. However, this purchase did not come through in the end - luckily! Overhasty action is not good and it is always advisable to calm down before buying or selling.
- The one of us who invested in multiple products always followed their personal interests and fields of fascination. Especially the idea of cryptocurrencies has always fascinated them. Even though cryptocurrencies are not ecologically sustainable, this person wanted to try them as a gimmick. Thus, sometimes investments should be fun and have a playful, betting character.

Analysis

Findings and conclusions result from all previously collected information from research and interviews. All information is carefully considered, prioritized, and processed for this purpose. In the following, we will explain the process regarding our Opportunity Area, the solution requirements, and our clear design focus.

In a market analysis we have been able to identify a gap: At present, there are no providers who offer individual investors both support services and a high level of information. We look at the individual service providers, analyze and evaluate their features.

In addition, this section includes the description of a persona, which brings together and combines all the essential needs and behaviors from the initial research phases. The abstract investor thus becomes a more tangible person.

Summary

What is the current situation regarding investment apps and are there any market gaps?
In our market analysis, we examined investment apps in terms of their support service and the amount of information offered. It was noticeable that all but one of the existing solutions offered either a lot of support but little information or vice versa. Here we see a gap in the market and untapped potential.

What services are individual investors interested in?
In a Discovery Sprint, we developed 4 concepts based on our assumptions and the information from research and interviews.

The testing revealed that the questioned individual investors are particularly interested in a value-based product search. In terms of information gathering, the respondents wanted more qualitative information about the companies and a better overview.

Who belongs to our user group and how can this group be described?
We name our user group, the quality and value-based investors. Regardless of their experience, our user group places high demands on investment products and takes sufficient time to inform themselves about the companies behind and their sustainability performance. Actions of conviction distinguish this group. Investment actions are the extension of their mindful, sustainability-interested, and slow life attitudes and are marked by a clear set of values.

Which solution requirements result from the analysis?
From all the information we have collected, we have worked out the requirements and principles for our solution. In these, we formulate how we intend to design the solution and which elements are indispensable.

The requirements we have found are the following: Autonomy, diversity of personal requirements, time for what is important, positive experiences, quality over quantity, credibility and trustworthiness, the right amount of complexity and flexibility.

What added value do we want to offer this user group with our solution?
We would like to position ourselves in the market niche and offer the individual investors a lot of information and support. We orientate ourselves on the validated service concepts around the value-based search for information and details about companies. We would like to rethink the product detail page in particular and focus on qualitative information.

“Our investment service helps individual, quality-oriented investors who want to invest longterm in stocks that match their personal requirements by reducing their effort researching credible, relevant information and enabling solid decision-making processes through the integration of and focus on transparent, qualitative information unlike providing solely general, technical data.

Market Analysis

Investment apps can be categorized in many different ways: by the services they offer, by pricing models, and so on. Our own categorization takes into account, as shown in Figure 48, (1) the level of support, and (2) the amount of information provided by the solution. However, the amount does not necessarily correlate with the complexity of the information.

Most providers can be located in the field left-bottom or the field right-top. Here a strong contrast becomes apparent. In the upper right-hand field, service providers are positioned which offer a lot of information and no or hardly any support services. These services are aimed at experts and are rather not useful for occasional investors or laymen. In contrast, the bottom left field contains solutions in which Robo consultants, taking on the task of investing for the customer, are located. This approach has often been designed with user-centric measures and seems to work well for the specific customer group.

Solutions that provide little information and almost no support seem to be aimed at more intuitive investors or require the customer to do research on the companies via alternative platforms. Examples of such solutions are ‘M1 Finance’ and ‘Trade Republic’.We find this rather confusing. Especially in the case of sustainability issues, we see a need for sufficient and extensive information provision. Nevertheless, the existing solutions may have functions that are worth exploring more deeply.

As we see with expert tools, it can be good and necessary to have all or much information. However, this can also make clients feel overwhelmed - even those who are well informed in the investment spectrum. Goodments tries to close this gap. Goodments is an application-oriented towards sustainability and values, which is unique in its category. The direction they are taking is quite promising, as both a lot of information and more support is offered. However, there is still much room for improvement in providing information, but at the same time being supportive and reducing complexity.

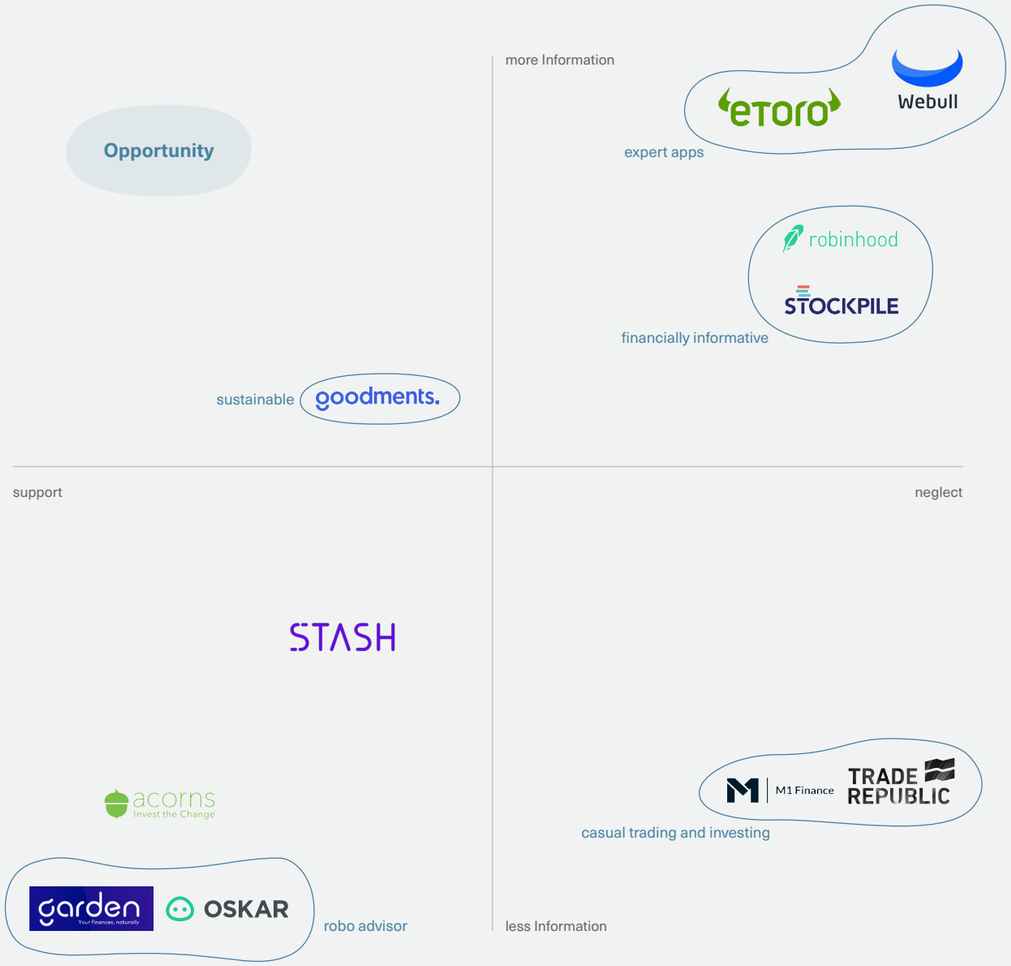


Fig. 48 Market Analysis; Source: own diagram

Webull

Fig. 49 Detail Screen Webull; Source: own diagram

Products: Single Stocks, ETFs

Webull is an app for experts, mostly traders. The application is generally quite complex, delivers, and displays an enormous amount of data. The terms for ratios, for example, are written in abbreviated form, which presupposes a certain level of knowledge and fluency in financial and investment terms of the users.
A key feature of this service is the focus on data on market value and current changes in ownership and price of the stock. Many different charts can be displayed for a stock. It is questionable which diagrams are actually relevant and must or should be accessible on a mobile device.

The comparison mode of two or more shares is worth mentioning. Unfortunately, only a comparison of the graphs and the market value over time can be compared. There is no possibility to compare underlying financial data or news. Although it is possible to compare certain financial figures with other companies, there are only predefined groups and values for comparison. For the example of Apple, this group is called “Smartphones and Handheld Devices” and consists of 8 companies. This is certainly not the entire industry and may not include customer preferences.

Robinhood

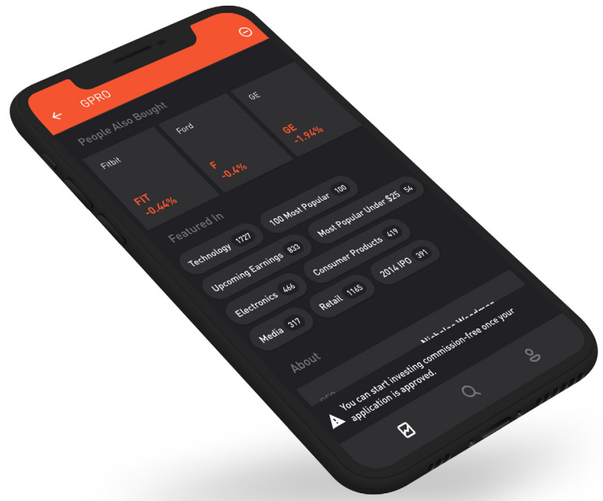


Fig. 50 Detail Screen Robinhood; Source: own diagram

Products: Single Stocks

The application Robinhood is more focused on experienced investors. The solution stands out through its very clear layout and information presentation. The restraint in the use of color and density of information makes it appear minimalist. This prevents users from being overwhelmed while still allowing more detailed information about the companies to be retained. As with many other investment apps, the focus of the detail page is on the graph showing the market value over time. Thus, this application is aimed more at technically oriented, momentum, and intuitive investors.

Browsing shares is not a focus of this solution and is only possible with restrictions. The app is set up under the premise that the user knows the fundamentals of the company and knows in which share to invest. Therefore the “About” section is placed at the very bottom. The search function can be used to enter shares or rough categories but requires an idea of what to look for.

With regard to the target group, this service works very well because it is clear and functional, does not cause any additional confusion and makes the purchase of stock very easy.

M1 Finance

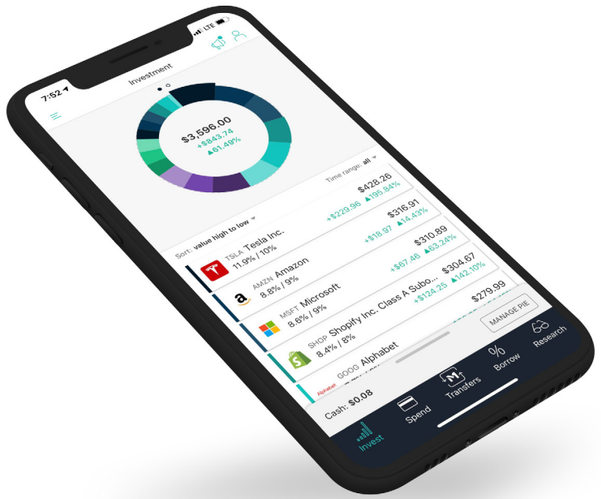


Fig. 51 Portfolio M1 Finance; Source: own diagram

Products: Single Stocks, ETFs, Thematical Funds

The most prominent feature of the M1 Finance investment application is the creation of a separate investment portfolio with target percentages of stocks, i.e. the fragmentation of larger, more expensive stocks and the simultaneous distribution of investments across all stocks in the portfolio.
In addition to shares, funds, and so-called “expert pies” are also offered. The latter are their own funds that focus, for example, on responsible investing or the succession of large hedge funds. This offer is also attractive for investment beginners.
With the intention of first building up a portfolio and only later balancing it, the focus is not so much on the performance of individual stocks, trading them, or finding the perfect time to invest, but rather on continuous investment and long-term holding of these assets.

The interface and navigation of this app are more difficult and not as intuitive as some of its competitors. The information about a company is very sparse and in our opinion not sufficient to make an informed investment decision. Apart from news, share price history, and a written profile of the company, only three real facts are given on which a decision can be based.

Oskar

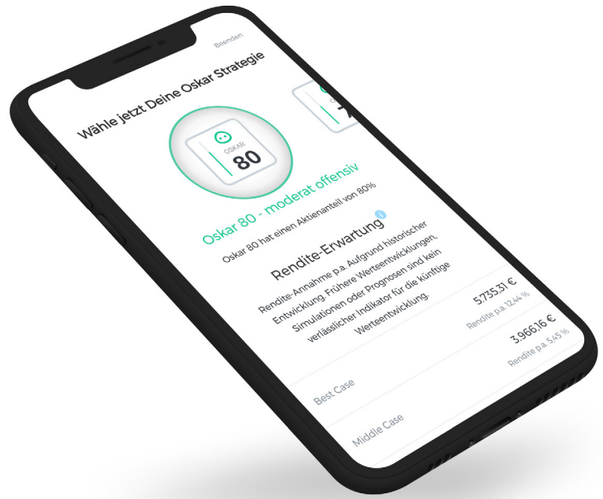


Fig. 52 Savingsplan Setup Oskar; Source: own diagram

Products: Portfolios out of Bonds and Stocks

Oskar is an automated ETF savings plan with a robo-advisor developed for investment beginners. After the set-up phase, almost no effort is required from the user.

A dialog-oriented onboarding process guides the customer step by step through an evaluation part, in which the savings volume and monthly savings rate are queried, as well as the definition of various investment goals, e.g. wealth preservation, or desired increase in wealth. Further questions evaluate risk tolerance. In the end, the client is presented with a savings plan and projected profits based on three scenarios.

This service is well suited for beginners and helps them to easily set up a savings plan without much knowledge about investments and with a minimum of time.

Stash

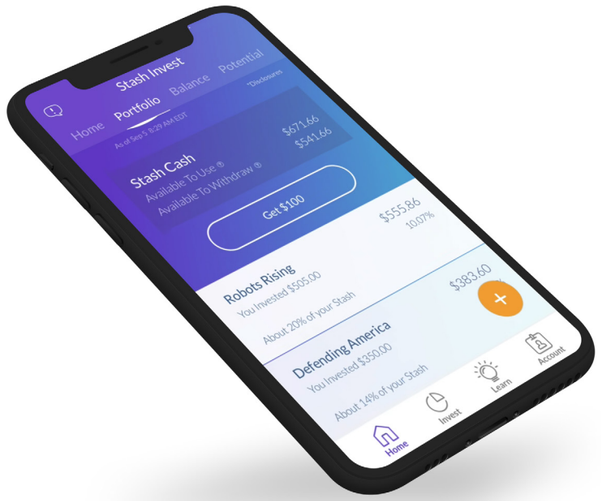


Fig. 53 Portfolio Stash; Source: own diagram

Products: Thematic Funds, ETFs

Stash is an investment service that focuses heavily on the experience of casual investors. Thematic funds such as “Roll with Buffet” or “Defending America” offer an overview of the top investments, a brief risk assessment, a description, and an indication of how much of the fund is held by other investors. This seems to work well when it comes to convincing the client.

Even though Stash comparatively offers more information than e.g. robo-advisors, it is still insufficient for more demanding investors. The app does not offer factsheets known from traditional ETFs to review positions and compare them to a benchmark.

Goodments

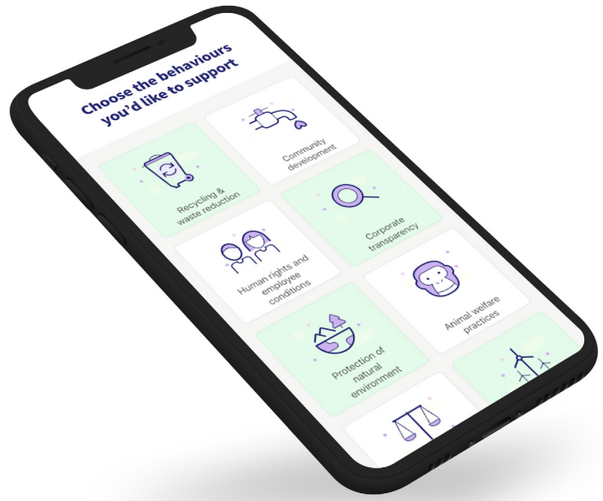


Fig. 54 Profile Setup Goodments; Source: own diagram

Products: Single Stocks, ETFs, Thematic Funds

Goodments pursues, in our opinion, the most interesting approach. This is due to the way a user can select predefined values and criteria in a profile to get matching stocks displayed.

In general, the focus of this service is more on the qualitative values of a company. These are reflected in a “Goodness Score”. The placement of the overview of the details of a stock is on the first page while returns over time, financial data, and key figures are, in contrast to competitors in the industry, only found on the second page. Unfortunately, values such as the “Goodness Score” or financial data are not backed up by sources, nor is it stated how up-to-date the information is. The same lack of transparency also applies to matches, where a percentage is shown with the degree of match, but not on which information this calculation is based.

Generally, the intention behind the concept is promising, but the design and user flow need to be thoroughly rethought.

Discovery Sprint

Our desktop research and interviews with (prospective) investors and experts in finance, sustainability, and ethics have provided us with a wealth of insights. Among other things, we were able to uncover a variety of problems that (prospective) investors are confronted with during their entire investment journey.

By constantly considering the importance, feasibility, and innovation potential, we have evaluated these problems and the associated opportunity areas. Finally, dot voting resulted in 15 areas that were particularly interesting for our project to follow up. These 15 areas were in turn clustered in order to get an even better overview. Especially 2 problem areas were identified for the further course and focus of our work.

“Friend and advisor”
The problems of the first direction increasingly describe problems of (prospective) investors to make rational and optimally suitable decisions. Here, questions about psychological influences and emotions as well as support from service providers and the community are particularly interesting. Essentially, this direction is characterized by the underlying assumption that (prospective) investors need help in making decisions. One of the opportunity areas might be, for example, support in defining their own set of criteria, another might be the development of community support.

“Information and data”
The focus of the second space is more on the selection and presentation of information that (prospective) investors need as a basis for their decisions. Here, the key core of our assumption is that (prospective) investors primarily need a better basis for decision-making in terms of information selection and presentation. One of the possible approaches in this direction is to simplify the immense complexity of the data to a level that enables and informs rather than overburdens and paralyzes them. Another task in this direction is the measurement and presentation of sustainability performance.

The analysis and identification of these two problem clusters was an important and further-reaching step in so far as we have become clearer in which directions our project may develop. With the intention of designing a solution that is in the interest of the (prospective) investors and actually generates added value, we, therefore, took a very close look at which core lies behind the directions. In this respect, the main assumptions behind the two directions differ to the extent that the focus and the main needs of the (prospective) investors slightly differ.

Since we found that our previous research results were not sufficient to select one of the directions, we decided to do a Discovery Sprint.
Sprints are an excellent way to validate assumptions, ideas, and concepts quickly and efficiently. The structure of a sprint always depends on the goal of the team. The Discovery Sprint offers the opportunity to intensively explore key issues and to gain a better understanding of tangible, real, and important needs.

In our case, the goal of the week was to validate the fundamental assumptions, as well as to find out through testing in which direction we should concentrate our creative energy and work in order to generate genuine added value for the (prospective) investors.

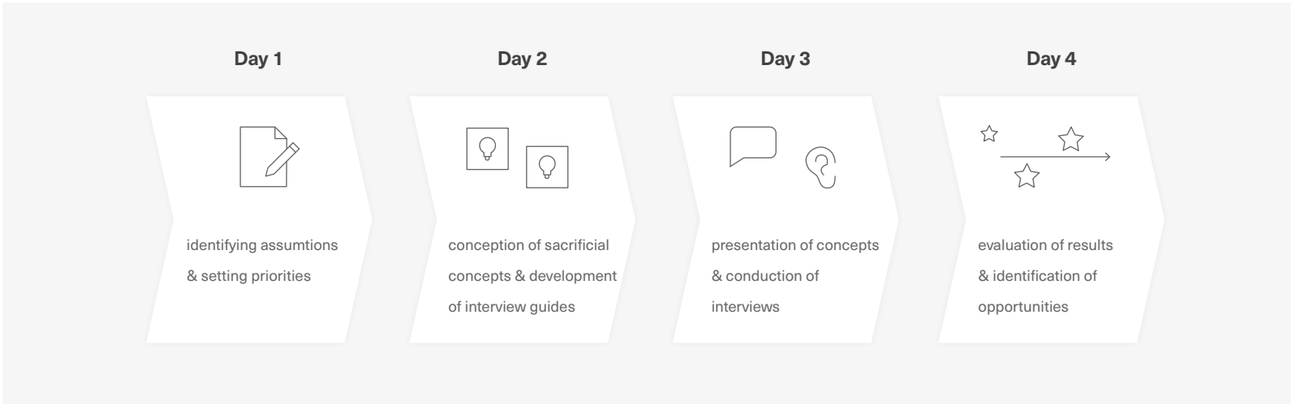


Fig. 55 Discovery Sprint Process; Source: own diagram

In the following, we go into the process in more detail, explain our approach, choice of methods, and finally describe the result of the process.

Problems

The initial challenge we faced was to prioritize our research results in a reasonable way and to select the best possible, directional selection of problems for the further course of the project. For this reason, we made a list of all the problems and insights from the research and added problem-specific possibilities and ideas. These have helped us to assess how feasible and promising a potential topic could be.

However, since the number of problems and insights was confusingly large at that time, we had to limit them to the most important ones. We made an initial pre-selection by considering factors such as innovation potential, feasibility, and perceived importance. Each team member had 5 dots to narrow down the basket of problems.

As a result, a selected pool of 13 problems was created, which were rated as particularly interesting. Within this pool, we then examined whether there might be patterns and groups. Indeed, we were able to identify 2 different problem spaces, which differ in their emphasis on the problem areas.

The first problem space we were able to identify is based mainly on our research on suboptimal decision-making processes in investments, cognitive biases, emotions, and the inability of many amateur investors to implement their portfolios according to their requirements.

Friend and Advisor

- The majority of investors do not know enough about the issues. For example, the flow of money in targeted sustainable investments in the secondary market is often not understood and thus creates a false sense of direct influence.
- Decision-making and evaluation processes are not purely rational, but in part very intuitive
- Direct recommendations are not really possible, so how can we help with decisions?
- Under sometimes uncertain conditions (lack of knowledge, time, experience) it is difficult to combine logic, rationality, and values to a goal-oriented decision that is in one's own interest and effective in the long run.
- Individual investors are very uncertain and therefore postpone the start of investing
- The concept of sustainability is fluid, i.e. situation- and person-dependent (values, features that are included)
- A uniform generalizing rating is not always useful, aka 1 - 100, A - F)
- Managing multiple brokers or investment tools can be stressful and undesirable

A common feature of all our previously collected Opportunity Areas on these problems was that they were a decision-making aid for (prospective) investors. Thus, in our analysis, we finally found that this problem area fundamentally merges into our assumption that (prospective) investors want active support in the decision-making process and need it for better investment decisions. Hence, we have named the first problem space “Friend and Advisor”.

Information and Data

- Sustainability assessment varies widely due to the lack of consensus on approach and methodology
- The majority of investors do not know enough. For example, the flow of money in targeted sustainable investments in the secondary market is often not understood and thus creates a false sense of direct influence.
- Which data is relevant for decision-making (regarding sustainability)? Do ratings help to determine which data is visible, for which type or knowledge
- Investors find it difficult to effectively diversify their portfolio
- Which data is relevant for decision-making with regard to sustainability? There is no answer
- Comparability is not necessarily quantitative but may be very qualitative

The second problem space contains more problems from research on data-specific problems, challenges in sustainability assessments, the lack of clarity and validity of decision-relevant information. Consequently, this room is more about the decision-making basis than the assistance in making decisions. The focus of the previously identified opportunities for improvement is on the redesign of information selection and the reduction of the complexity of data visualization. The key assumption is that (prospective) investors need a better base for better decisions. We have called this space “information and data”.

1. The main assumption is that (prospective) investors want and need support in their financial decision-making process in order to be able to make better decisions for themselves

2. The key assumption is that (prospective) investors want and need individually tailored information selection and presentation in order to make better decisions for themselves.

Fig. 56 Key Assumptions for the Discovery Sprint; Source: own diagram

Both directions have their justifications for existence. However, they differ in their approach to how better investment decisions can be made. Since we could not make any definitive statements about which direction is preferred by (prospective) investors and which need is more pressing, we decided that a Discovery Sprint was the way to find out.

Given that the first problem area was in our eyes much more critical, in the sense of being more uncertain, we decided to focus on validating assumptions of this area in the sprint.

Assumptions

Once it was clear to us that the key assumption of the problem space “friend and advisor” was particularly critical and could not be completely validated by our previous research, further accompanying assumptions had to be defined. First, we collected all these related assumptions in a brainstorming session. This led to a whole range of different assumptions regarding community aspects and the consideration of psychological distortions and emotions.

All assumptions were considered individually, discussed, and positioned on an Assumption Prioritization Canvas. The aim was to find out which of these assumptions were particularly critical and therefore needed to be tested in appropriate concepts. For the assessment process, we used a matrix that takes into account both the degree of criticality and the perceived value. Assumptions that could rather be clarified in the next research loop were identified and recorded as such.

We realized that many of our assumptions about the problem space were of critical and high perceived value. Hence we tried to cluster the critical assumptions again. The result was the classification of the assumptions into four comprehensive groups from which concepts were to be developed.

Since the time frame of a sprint is very limited and tight, we had to make another selection of directions from these groups, which urgently need to be tested. Considering the perceived value and the critical level, the most important assumptions were thus worked out in a second filtering process. In the end, four assumptions crystallized that suited the scope of the sprinter and were of crucial relevance. We aimed to incorporate these into concepts with a rather high degree of abstraction in order to pick up user reactions in testing and to have a basis for the interviews.

Altogether this step of formulating assumptions and evaluating was very valuable for our process, as we became clearer about our own prejudices and thoughts. After all, a solution that is valuable for users can only be designed if it is based on actual needs and preferences.

Fig. 57 Assumptions for the Sprint; Source: own diagram

Concepts

We developed several ideas on the first three assumptions and internally agreed on one concept for each assumption to be tested with users. Our selection was based on the clarity of idea and innovation potential. We have left out the fourth assumption, that a single result should be presented because it does not include the decision-making process and the selection of alternatives.

Concepts out of the Assumptions
Our approach was to work with Sacrificial Concepts. For this, we first sketched our ideas on paper and later transferred them into presentation slides to keep them accessible and simple.

Since Sacrificial Concepts should provide enough room for interpretation by the testers, actual information was only used when necessary to understand the general idea or a feature. All other text fields were only indicated by gray boxes.

Individual notification and emotion check
This concept deals with category 2 assumptions, i.e. the consideration of emotions in the decision-making process.

In our imagined scenario, the user receives a personalized notification on the phone that refers to news about a company. This company may or may not already be in the portfolio. If the user wants to see more, the detail page of the company appears. At the top of the interface, the notification appears again, for example, that the share price has recently fallen and it is a good chance to add the company to the portfolio. Further down is the content. It would be possible to add non-traditional content from stock investment platforms, perhaps news or user-generated content, either by anyone or curated.

Crucial to this concept, however, is that when the user clicks on „buy“ or „sell“, i.e. each action, a popup appears asking whether the user is aware of his or her action, emotion, and motivation. This should enable a reflection of the user‘s own behavior, whether the chosen action really makes sense.

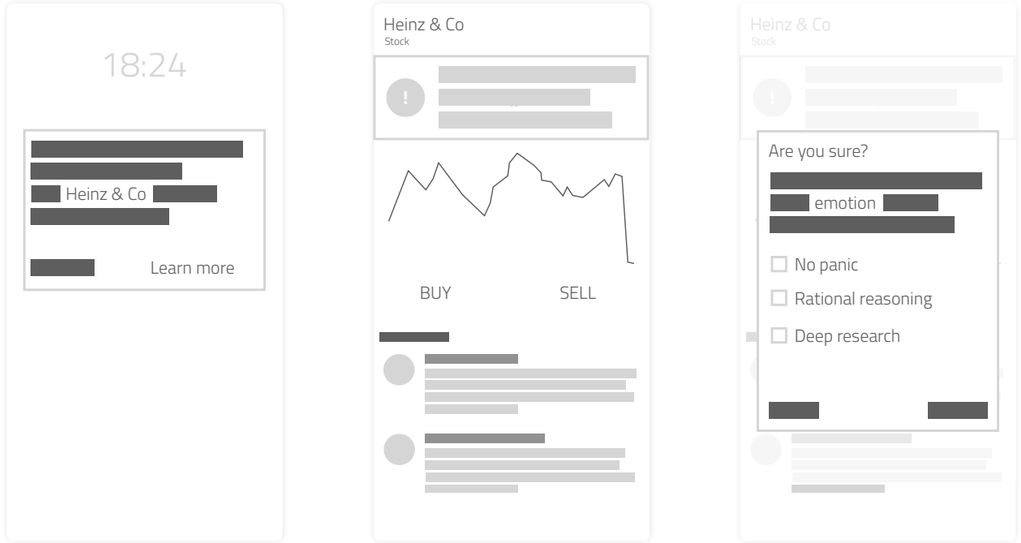


Fig. 58 Individual notification and emotion check; Source: own diagram

Product detail page with cumulated information
This is the most complex concept we have developed. It shows the detail page of a company. Basically, the interface can be divided into 3 parts: on the left side there is more standard information, in the middle there is news and opinion and on the right side there is community.

The area on the left side shows standard data of stock investment platforms, i.e. the stock price, its development over time, and other standard information. This section also displays a star rating. This is not uncommon and is usually the Morningstar rating. Rather unusually, however, we have added another star rating of a community to our concept on the right side of the interface. This was placed by us in order to find out in testing how the two ratings are perceived and judged in their supporting value and credibility. Basically, we wanted to find out what should be considered in ratings and what is considered especially important to users.

Fig. 59 Product detail page with cumulated information; Source: own diagram

Another feature that is part of the concept is the addition of news, opinions, reports. We have indicated these in the middle of the interface as tags. We wanted to find out if the integration of such information is helpful and desirable for users and how important sources, credibility, or other factors are.
On the right side of the interface are the features around the community. For example, the previously mentioned community rating appears here, as well as the possibility to get in contact with the community. How exactly this community looks like and who is part of it was deliberately left open. With specific questions, the testing should find out how this aspect is received in general and assumptions of category 3 should be verified.

Mentorship program

The concept of mentorship is based on the assumptions of category 1 and aims to find out if very individual support and recommendations are valuable for our testers. In our scenario, investors can post requests for such a mentor, and the mentor can then contact them. Depending on the investor's needs and objectives, the structure of the portfolio, for example, may then be discussed.

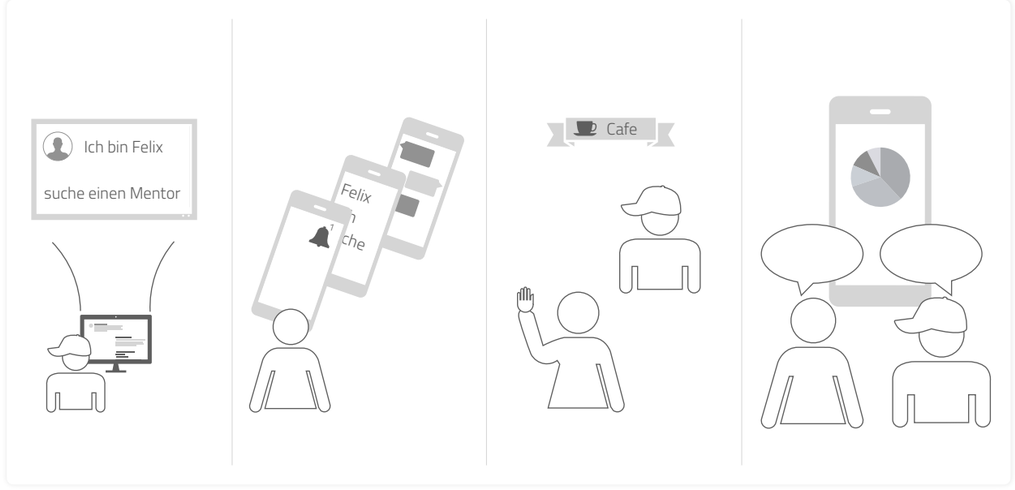


Fig. 60 Mentorship program; Source: own diagram

Defining personal values resulting in a product list

In order to find personally suitable products, it is essential for investors to be clear about their values and goals. The assumptions behind this concept are particularly related to category 1, where it is a matter of defining personal values that determine the product results. For this purpose, the user is guided through a step-by-step selection process and asked about his attitude, morals and general requirements.

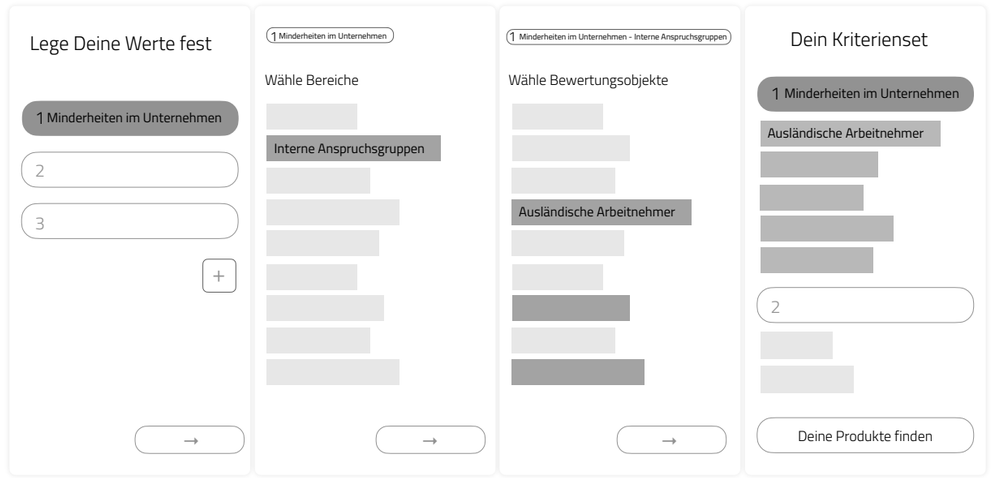


Fig. 61 Defining personal values resulting in a product list; Source: own diagram

Testing

To gather feedback on our concepts and check our critical assumptions, we conducted a test with two leisure investors and three prospective investors of different backgrounds, gender, knowledge, and experience.

The Sacrificial Concepts served as a basis for discussion. The testers were asked to express their thoughts on them loud and unfiltered. We presented the concepts to them step by step and delved deeper and deeper into the topics during the testing process. In this way, we were able to gather a great amount of information about expectations, needs, and suggestions for improvement.

Insights

Although the testers brought different knowledge and experience, we got quite consistent feedback. In general, we found that a combination of several features of different concepts is desired.

General insights

To make it easier to validate our main assumptions, we created a checklist of smaller assumptions related to features, which served as an interview guide. This allowed us to determine exactly whether the general idea is valid or maybe only some aspects of the concept are accepted.

Concerning the questioning of emotions, it was found that our testers believe that they are already aware of emotions in transactions and can control them sufficiently. “You should never buy a stock based on emotions,” said one of the experienced investors. This shows that emotions are an important aspect of decision-making. It was clearly undesirable to check the emotional situation and be asked about mood with every decision.

The implementation of news and other decision-relevant information about a product was consistently considered helpful and useful. However, the exact look of a detail page, how its components are generated and filled with data differed slightly between testers.

“Mentors are a great thing. Great stuff,” said one of the leisure investors. This quote sums up the opinion of most testers, although it turned out that mentors are not interesting as an independent service to use or pay for. The decisive added value lies mainly in the personal relationship with mentors, which is perceived as helpful and attractive in terms of trust.

The selection and definition of personal values that influence the product results is relevant for the testers. They all essentially want to find products that match their values and requirements. Most testers told us that they already know most of their values and could communicate them.

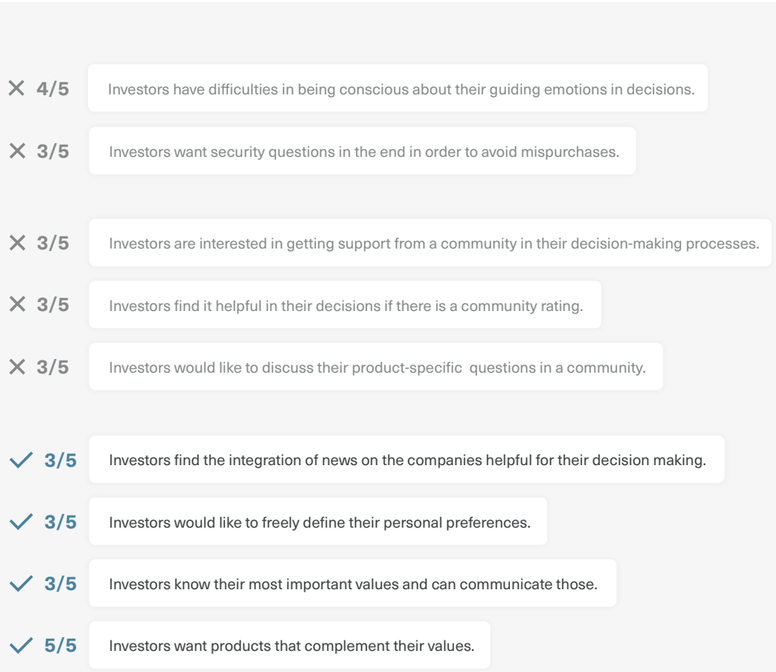


Fig. 62 Highlights of Assumption Results; Source: own diagram

Individual notification and emotion check

- “It would be exciting if the notification showed me that there is a share that is currently very cheap,” said one of the inexperienced, prospective investors. Here, this tester confirmed that this kind of notification could be interesting - provided the product in question is fundamentally interesting for the user. The identification of interesting suggestions could be caused by personal value agreement. The tester can imagine receiving notifications when the price of a product that matches the value settings falls, or when there is interesting news.
- Guidance was also generally assessed positively as long as it was in line with the personal goal or use case.
- In addition, context-related messages or warnings could be included on the product detail page, thus providing an additional layer of relevant, up-to-date information. “The exclamation mark could be a warning or perhaps a message,” said one of the leisure investors. But it could also be a notification of high turnover or falling stocks recently, as well as a quick update of information on the page.
- Whether the user already has a product in his or her portfolio or not should influence the interaction possibilities. The sell button, for example, should only be visible if this product is already owned.
- The expert or community opinion and the news section were often interpreted differently in the tests. Different testers had different opinions in this respect.
- Regarding purchase decisions, our testers told us that they were mostly confident and no additional validation was required. “If I have already decided, I am already sure at that step, I do not need any additional validation”, said one of the testers. However, checking whether the user’s knowledge and experience match the complexity of the product was accepted in principle. “Banks check how well you know the product. They have to warn you if the product does not match the level of experience,” said one of the more experienced testers. If the system learned to improve proposed products based on the feedback, it could be a useful additional feature.
- “Such a query of emotions would be useful to me the first five times, and not after that.” said an experienced investor. After some time, it may not be necessary anymore. The tester also mentioned that such a query “would be useful if, for example, the clickable options would change their positions each time and force you to read them”. We have heard similar statements several times. If the screen or pop-up window looked like a standard business terms window, people wouldn’t read it properly or think about it. But if it were designed in a simple and playful way, it could work as a query of emotions.
- According to our testers, emotions are no problem for experienced investors. They say they know how to exclude emotions from the decision making process. “I don’t make decisions when I’m emotional,” said one of the investors.

Product detail page with cumulated information

As this concept was the broadest in the test, but also the most complex, it received the most general feedback. Nevertheless, this is very valuable and informative.
Our key insight for this concept was that our testers prefer to be empowered to make their own decision rather than give all control to robo-advisors. Transparency and traceability of data and information are key.

- All information about a product such as standard broker or bank information, (expert) opinions, news, ratings of reports on a single overview page was considered valuable.
- Tags combining important information from different sources could provide a quick overview of the company. They could also be the starting point for learning more and delving deeper into company-specific data to develop a better basis for decision-making.
- Development is a very important factor in obtaining information, as, for example, screening a company with regard to its goals and whether they are being met is interesting for investors. The stock value over time is usually the most striking information displayed as a graph on the detailed pages of banks or brokers.
- “The usefulness of the news depends on who wrote it,” says one prospective investor. Transparency and source criticism are extremely important in order to be able to trust the information and assess its credibility.
- Transparency is generally very important. Seeing the source of information is crucial to get an idea of how trustworthy it is. It must also be clear how businesses translate their goals into action. “I want to see if goals are only a marketing gag, or if the company is on the way to achieving them,” said one of the leisure investors.
- A rating of a product only makes sense if it is clearly evident where the data comes from and how it is calculated. Furthermore, the methodology must be verifiable, bomb-proof, and objective.
- Curated and verified reviews were preferred to open reviews written by anyone. Again, trustworthiness is of crucial importance. This credibility tends to be viewed with skepticism when everyone’s opinion is treated as an expert opinion. There could also be a ranking system at the community level.
- The company’s access to its profile can be useful as it can then better maintain and promote itself by providing up-to-date data and information. “The more transparent a company is, the more interesting it is,” says one of the experienced investors. This particular tester has a keen interest in investing in companies that do a convincing and intensive transparency job.
- Information related to the individual investor and his personal values is more valuable and should be presented more visibly than others, in general. For example, it is better to sort news or comments based on the level of helpfulness for the user rather than by status or time.

Mentorship program

- The testers made a clear statement about the relationship between mentor and investor: “There must be trust”. A virtual communication channel between the two parties was repeatedly requested for a regular exchange.
- Mentors were mainly considered helpful to help with decisions on strategy, goals, etc., but not for specific product questions. “They could deduct short-term goals from long-term goals,” said one of the testers.
- “Mentors are a great thing. Great stuff,” said one of the more experienced investors. But, according to him, the mentoring program must offer clear time frames and services.
- Sometimes mentorships grow out of acquaintances. A trustworthy person who knows you personally and can respond to you individually has been positively evaluated several times.
- How to measure the competence of mentors and their support for users was a topic that came up several times. If the evaluation is community-based, there must be some kind of review. If mentorship becomes part of our solution, we need to work out the differences between mentoring and counseling - especially in terms of objectivity.
- The framework and the legal situation for this type of service were mostly unclear. Especially in the context of money and finances, this aspect is of crucial importance.
- Trust is essential, and it is questionable, at least at the beginning, whether it can be established with mentors from the Internet community.

Defining personal values resulting in a products list

- “I found it extremely good, I would download it immediately,” said one of the prospective investors in general about the concept of the value-based product list. She clearly sees the added value and has the need to find suitable products that match her personal values. In principle, all the testers shared this need.
- The simple and uncomplicated definition of values in one step is sufficient for most of the people tested to find suitable products. However, the values must then be transferred to appropriate filters. Otherwise, this would not make sense to the participants. A very complex analysis of the values was strongly rejected.
- Most testers were quite confident that they knew their criteria and could define and communicate them independently. Nevertheless, intelligent suggestions such as automatic filling in or typical adding of values according to those already added were considered valuable: “I would feel better if there were some categories; suggestions to guide me. [...] I would like to know what else I could think about,” said one of the investors.

- Our testers interpreted the value input mostly as general requirements and not just as sustainability values. For example, geographical aspects were mentioned, but also personal financial requirements. For this reason, the wording around “values” needs to be rethought. It was generally appreciated to focus not only on generic financial filters.
- It must be possible to change the selection of values at a later stage, as they can be flexible. For example, it may be the case that the filtered results do not meet the investor’s expectations and the requirements would like to be updated.
- A playful interaction, maybe even gamification, could help to make this process easy and help to define the requirements and wishes.

Opportunity Area

Collected Results:
The question of competence and trust is crucial for community ratings and the exchange of opinions. A community of individual investors with approximately the same level of experience and knowledge is not useful for any of the participants and is therefore rejected as an idea by us.

Emotions should not be the focus of our solution, as investors in the testings feel that they are already sufficiently aware of them. Whether this is actually the case cannot be determined after the testing. Nevertheless, it was found how important it is for investors to make rational decisions. One of our tasks is therefore to take this desire for rationality into account in our solution.

We do not think that the potential of a mentoring service is really great, but we would like to integrate this added value of knowing and trusting into our solution.

Very important and a large creative playground with potential is the detail page of a product. This includes standard inventory data, financial data, news, reports, ratings, goals, objectives, strategies, and the company's products. A qualitative assessment, in which all interviewees were interested, should be easier to make.

Overall, transparency must be paramount, as it leads to trust, credibility, and also enables users to understand where the information collected comes from.
The comparison of product information with the investor's personal values, i.e. goals, beliefs, and other requirements, is a valuable tool for quickly finding a small selection of possible investment opportunities. However, the selection and definition process must be simple and enjoyable. Here too, we see opportunities for design.

Found opportunity area
After testing and verifying the assumptions, an interesting design opportunity arose for us. This consists of the transparent translation of the personal values of individual investors into search criteria and product variables. We also want to enable a qualitative evaluation of the companies. To this end, the detailed page in particular will be reconsidered and filled with new, transparent data. This qualitative information instead of quantitative information is the key to our further work.

Mindfulness, Slow, Sustainable

There is a strong connection between a person's lifestyle and finances. If a person considers significant changes in their finances, a change in lifestyle must probably follow it (Greenberg et al. 2012).

A financial goal, in fact, reflects a person's desires from life. Lifestyle and other influences certainly impact the setting of financial goals and their reevaluation (Greenberg et al. 2012). Hence, we believe a mindful and sustainable lifestyle strongly influences a person's financial desires and goals.

In this sense, we consider the conscious examination of products, companies, but also of one own's values and emotions to be essential for sustainable investing. For this reason, we have decided to look at the topic of mindfulness in more detail, with the intention of understanding which of its elements are exciting and relevant to our work.

In addition to the topic of mindfulness, we looked at the Slow Movement and the characteristics of sustainable lifestyles and identified differences and similarities between these 3 areas. Ultimately, the combination of that analysis and our findings from the interviews conducted in our research culminated in a clear and focused definition of the user group.

Mindfulness
Mindfulness is probably one of the greatest counter-trends to a frenetic world in which everything is constantly changing at an ever faster pace and in which the attention is always on progress, on the future. The flood of information that we humans are constantly confronted within our daily lives today presents difficulties: We find it harder to concentrate on one thing and we give in to the lure of distractions. Mindfulness exercises allow practitioners to be in the moment, to explore the open space of consciousness and to sharpen their attention. The practice helps to improve awareness and to respond skillfully and reflectively to stressful and emotional situations (Bishop et al. 2004).

Bishop and his colleagues propose a definition of mindfulness that contains two key elements: self-regulation of attention and the adoption of an open and curious acceptance of one's experiences. The self-regulation of attention allows practitioners to observe stimuli and sensations as they appear, thus allowing them to adopt a „beginner's mind" that's free from personal perceptive filters. The open orientation towards one's experiences is particularly marked by the practitioner's non-judgmental and accepting attitude towards all experiences arising in consciousness. Mindfulness is an active decision and process to accept and acknowledge the present moment and all its internal and external stimuli as they are, decentralized.

Those who practice mindfulness can experience positive effects such as more focused attention and increased serenity in all areas and situations of life (Bishop et al. 2004). Mindfulness is often decisive for leading a reflected and conscious lifestyle.

Mindful investment to us means a conscious examination of one's own intentions and actions. Clarity and reflection as well as focused attention and curious openness are essential.

Slow Movement

The idea of the Slow Movement originated in Italy in the 1980s as a counter-draft to fast food. The concept of Slow Food does not focus on the speed of preparation but the quality of the food. The regionalism of the products and the strengthening of the local community are also strongly present ideas in the content of the movement. The preparation of a slow coffee, for example, is fun, it is a cherished experience and is carried out with great joy and attentiveness. Care is taken to ensure that the beans are of good quality and that one knows where they come from.

The idea of Slow Food spread and expanded to many other areas. Today the Slow Movement can also be found, for example, in the context of media consumption (Slow Media, Slow Reading, Slow Journalism, etc.) or travel.

Regardless of the field, all movements have in common that they rethink the use of time and do not equate faster with better. Pleasure, appreciation, and quality are of the utmost priority in slowing down. Transparency also plays a decisive role, because the connections to the products and the environment must be clear and strengthened (The Slow Movement: Making a Connection o. J.).

As Slow Money, we, therefore, understand investments in which the investor knows where he or she is investing. The investing person studies the background of a company, takes sufficient time for evaluation and action, and enjoys the process. Ready-to-use or non-transparent offers are of no interest to adherents of the Slow Money movement, they are interested in the quality of the companies matching their values.

Sustainability

Sustainability is characterized by its consideration of the consequences of actions viewed in relation to a longer period of time. The core idea of sustainability is that conditions should be exploited as sparingly as possible, so that the same or similar resources and basic living conditions are available in the future.
Often a sustainable lifestyle is defined with the consideration of ecological and social factors in consumer behavior. Such factors can then affect, for example, the choice of food, packaging and clothing. It can happen that a conflict arises between self-interest and holistic benefit. Then it must be weighed up which action should be taken.

In contrast to mindfulness and slow movement, measurability and objectivity play a strong role in sustainability.

In the introduction to our work, we already go into detail about our definition of sustainable investments. In short, these are investments which take into account personal, but also ecological, social and governance factors. Through sustainable investments, responsibility is taken, negative impact is avoided and positive impact is put in its place.

Conclusion

Although the three areas considered are partially different, some similarities can also be found.

Mindfulness as well as Slow Movement and Sustainability are attitudes to life and intervene in many of its areas. If an investor cultivates a mindful, sustainable or slow lifestyle, or a combination of all, it can be assumed that these patterns and values are also reflected in the investments. The approach to investment decisions and the requirements for a product can, therefore, be strongly linked to a deeper motivation and drive. In our solution, we have to consider and integrate this importance of key values and quality requirements.

Core Aspects of the Slow Movement and Mindfulness

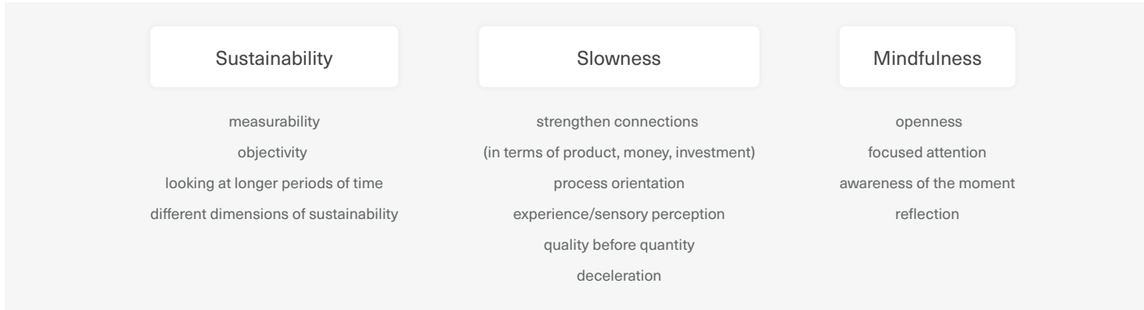


Fig. 63 Core Aspects of the Slow Movement and Mindfulness; Source: own diagram

User Group

Our exploration of mindfulness, slow movement, and sustainable lifestyles has had a guiding influence on our future work.

The findings of our interviews have merged quite naturally with the results of the exploration. In sum, we have gained a clear picture of a user group that values qualitative information and sustainable decisions that are in harmony with personal values.

Regardless of their experience, our user group places high demands on investment products and takes sufficient time to inform themselves about the companies behind and their sustainability performance. It is important to this group that the information they include in their investment decisions is meaningful, transparent, and well-founded. They act in their personal fields of interest or passion and are familiar with the products and markets in which they invest. Actions of conviction distinguish this group. Investment actions are the extension of their mindful, sustainability-interested, and slow life attitudes and are marked by a clear set of values.

Persona

A persona should help to present a simplified and tangible image of this user group, which can be communicated to the outside world in an easy and understandable way.

- Characteristics
  Our persona is characterized by a distinctive value system that focuses on sustainability and responsibility. The persona cultivates a mindful lifestyle and deals deeply with his/her wishes, values, and decisions. He/she has a holistic and long-term way of thinking.
  Our persona is clear and aware of her financial possibilities. He/she already has acquired a basic understanding of investments and financial markets and has an ETF savings plan and some stocks.

- Tasks and Goals
  The persona feels an urge for action. When he/she does something, then properly and consistently. He or she is an active and interested person and has many hobbies like reading and hiking. The persona is well informed about what is happening in the world. Where he/she can, sustainable alternatives are chosen. A life goal of this persona is to live a life as happy and as authentic as possible.

- Motivation
  The purchasing decisions of this persona are guided by the desire for quality, sustainability, and transparency. For example, the persona always looks at the back of the packaging and checks the origin of the product and the ingredients. This persona does not need mass and short-term purchases and tries to make his/her purchase decisions as long-term, personally, and ecologically sustainable as possible. The persona talks to a friend about wishes, goals, and sustainable lifestyle. The two mentor each other and encourage the other to think about objectives and values and to put them into action. So far, he/she has had very labor-intensive experience with investments. He/she is skeptical about which investment products are sustainable and which do not fit the requirements. Unfortunately, it is not easy for him/her to recognize this and he/she has to read and analyze reports every time until the needed information is found.

- Requirements and Needs
  The persona is someone who wants to feel comfortable and secure with own decisions. To do this, he/she needs facts and information on which decisions can be based. The persona has a good balance between intuition and reason and knows when to use what. He/she reads newspapers online and watches the news every day. Naturally, the persona expects a return from an investment product, but also wants to achieve non-financial values. It is important for him/her to establish a connection to the company and believe in its potential. Great importance is atteched to sustainability efforts and especially to CO2 reduction.

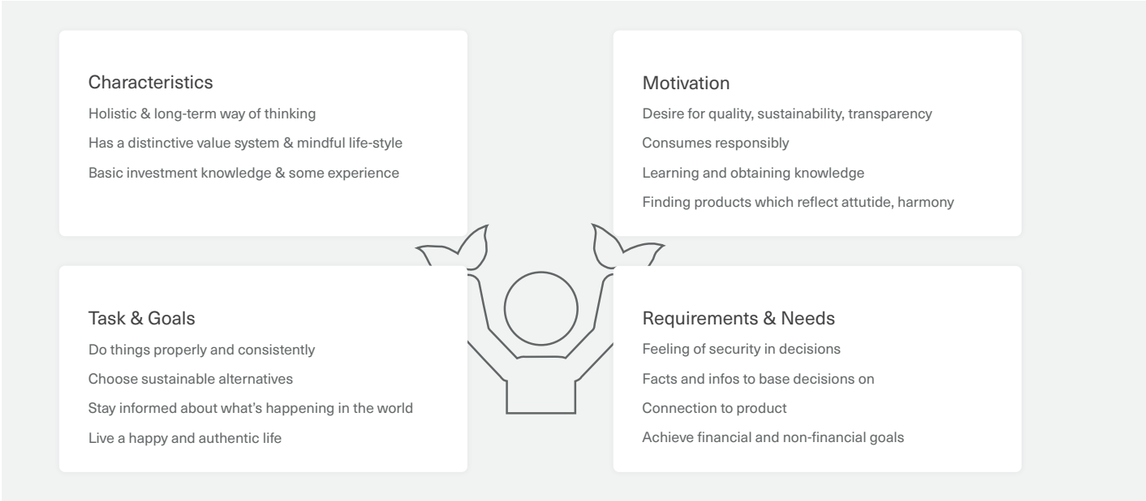


Fig. 64 Persona; Source: own diagram

Corporate Identity

Brand Identity
Brand identity plays a major role when it comes to being recognized and embraced by user groups. Although we do not want to build a brand in a traditional sense, approaches from this field can help us to make better, justified, and more consistent design decisions.

In order to make our concept and the identity of our solution more tangible and compact, we, therefore, decided to reflect it in a Brand Identity Prism. In this step, we defined not only the physical attributes of our solution but also the relationship that should be established and maintained with the users, as well as the core values of our service.

The prism addresses 6 elements of a brand identity: physique, personality, culture, self-image, reflection, and relationship. It applies a structure that distinguishes between internal and external, as well as the sender and receiver. The internal and sender elements refer to the provider, while the external and receiving elements refer to the user group.

Personality, Culture, and Self-image make up the internal elements. Here, the focus is increasingly on the attitude of the provider, its values, and the translation of these into visual language.
Physique, Reflection, and Relationship create a connection to the user group as external points. In terms of content, it is about the user's self-image, how this is reflected in the brand and what relationship is to be established through the services offered.

Our defined attributes are based on the results of research, interviews, and analysis. These revealed, for example, that trust, transparency, quality, and objectivity are decisive in determining whether a service is accepted by users. We have incorporated these characteristics into Brand Values, among others.

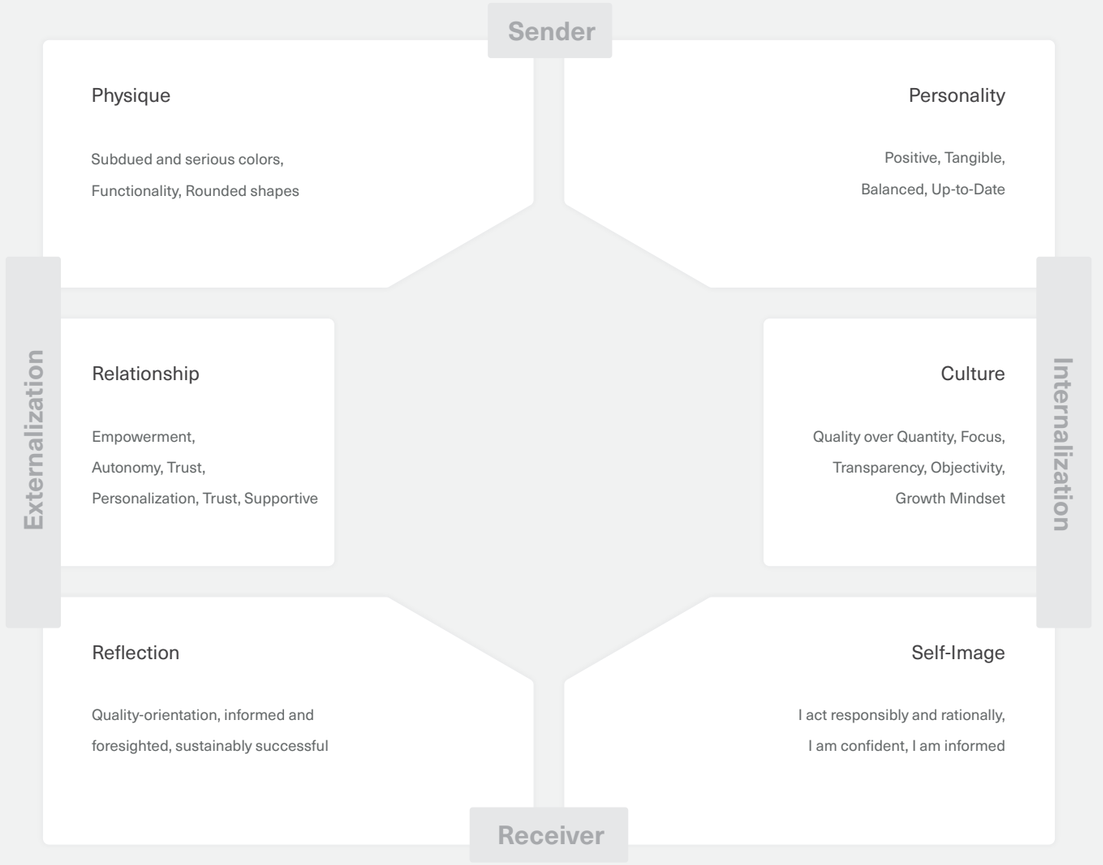


Fig. 65 Brand Identity; Source: own diagram

Solution Requirements

Once we had defined our user group and an exemplary persona, we analyzed and documented the corresponding requirements for the system. Besides basic requirements, we identified specific points relevant to the information design.

Overall system design principles

- Guided by autonomy
  Our system shall empower investors to make their own informed and deliberate investment decisions. Hence, our system shall provide a feeling of control. It shall facilitate the process of information procurement and decision-making but not take over the control or point the 'right' way. Our system shall actively engage the end-user, to build autonomous decisions.

- Guided by diversity of personal requirements
  Our system shall respect the diversity of personal criteria and requirements. It shall enable the integration of every individual and manifold intentions and criteria by which products can be found, evaluated, and compared.

- Guided by time, for what is important
  Our system shall be simple and must not demand additional time expenditure from the end-user. It shall reduce tedious, unnecessarily time-consuming work processes and free up time for information processes that really matter to investors and help them make better decisions.

- Guided by positive experiences
  Our system shall provide positive experiences for investors. It shall be fun and enjoyable to use. Therefore, our system shall adopt more playful and interactive elements.

Information Design principles

- Guided by quality over quantity
  Our system shall provide qualitative and sound information. Our solution rejects the concept of 'the more the better'. Therefore, all information not telling and distracting shall be removed. The information provided shall always help the investor to make a better decision.

- Guided by credibility and trustworthiness
  Our system shall evoke trust and credibility in investors. By naming and verifying the sources, the information shall always be traceable. All processes of our system shall be communicated transparently and with clear wording.

- Guided by the right amount of complexity
  Our system shall reduce complexity where it is unnecessary or not helpful. The system shall take into account different levels of knowledge and experience and provide according options. The visualizations of information shall be understandable, graspable, and adapted.

- Guided by flexibility
  Our system shall be capable of respecting the dynamic nature of information. It shall help investors understand the development of a product's performance. Also, it shall take into account that criteria and decision situations are dynamic and fluid, too. Therefore, our system shall allow investors to flexibly adapt their decision-making process to respective conditions.

POV, Value Proposition and HMW

A common vision is essential for working in a team. Only if everyone pulls together and works towards the same objective good, structured, goal-oriented cooperation is possible. For this reason, we have jointly developed a point of view based on the results of our analysis, which bundles our research and empathy and clearly describes the focused problem.

Point Of View

"Individual, quality-oriented investors need a way to find and assess investment products by their own requirements and holistic criteria sets in a simple and less troublesome way because now most information is limited to very technical, general data and makes a qualitative approach quite difficult."

For this reason, our fundamental value proposition focuses on simplifying access for our group of investors to meaningful and decision-relevant information, and on building a solid, holistic basis for decision-making.

Value Proposition

"Our investment service helps individual, quality-oriented investors who want to invest longterm in stocks that match their personal requirements by reducing their effort researching credible, relevant information and enabling solid decision-making processes through the integration of and focus on transparent, qualitative information unlike providing solely general, technical data."

Ideation

Prototypes allow ideas to become visualized, making them tangible and discussable. In the following, we present some of our ideas with corresponding prototypes and explain how embedded elements were evaluated. With the development of paper prototypes to mid-fidelity, the level of detail and concreteness increases. It was important for us to talk regularly with potential users, to get feedback, and to go into a kind of co-creation. This ensured that ideas actually carry the potential to become concepts.

We decided to choose the situation of exploration as the focus of our work. The issue here is that a single investor does not yet have a concrete company in mind in which to invest. With a value-based search and information gathering, the investor is enabled and supported to make a well-founded decision. In this section, we describe, among other things, the process of finding relevant features and the basic structure of our solution.

Use Cases

In order to better understand the identified opportunity area, we collected and analyzed contained use cases in the next step. These were based on the information we gained from the interviews and extensive general research.

The most important function and the biggest problem for qualitatively oriented individual investors is the search for suitable companies. Therefore Use Case 1 maps this use case. The goal of the users, in this case, is to explore investment opportunities that fit their own requirements, to compare the alternatives and to intensively examine individual alternatives in order to make an investment decision.

and a more complex set of criteria in our solution.

From this exploratory function, according to the findings of our research and the tests carried out previously, the user can tailor the criteria, create a catalog of filters and display corresponding information on products in an overview.

From the detail page of a company, it is possible to either buy shares directly or to add them to a watch list for further observation, see use case 3.

User Goal

Explore investment options according to own criteria, read details and information, compare different options and make a decision.

Task Flow

user views the explore tab

selects a predefined profile with criteria, values and goals

selects criteria, values and goals from categories and sets

enters criteria, values and goals directly in a search

checks and/or modifies the criteria

views result page

sorts results to choosing

views personalized detail page

acesses the source of information

buying or adding to watchlist

Wire Flow

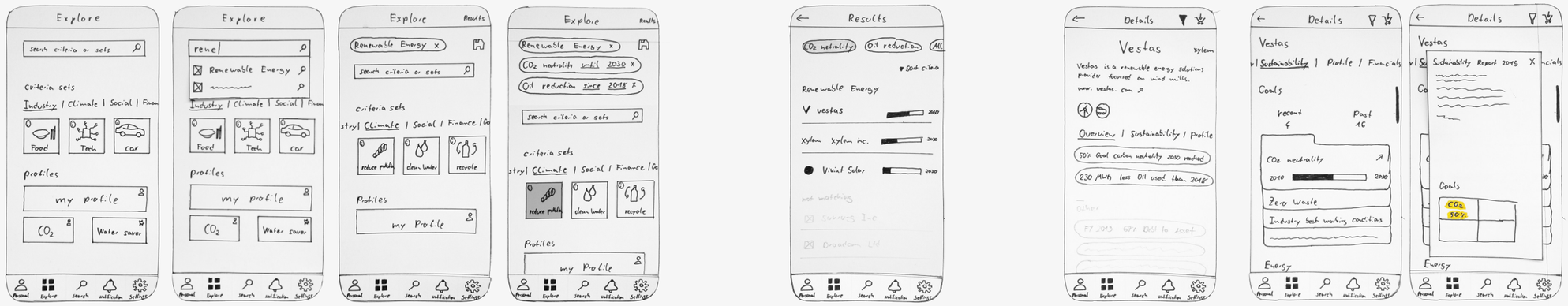


Fig. 66 Use Case 1; Source: own diagram

Two main functions are particularly important in this situation: Firstly, an exploration function should enable the user to enter criteria according to which the matching stocks can be filtered, compared, and ranked. The complexity of the input is completely in the hands of the user. It is possible to enter a few criteria such as region and industry, as known from other investment services. For those investors who wish to make a more complex entry, we also offer the function of creating their own rating

As explained in the chapter “Investment Strategies”, the comparison and selection of investment products follow the “bottom-up” or “top-down” approach. The exploration mechanism of use case 1 addresses the top-down strategy and gives the user the possibility to first filter by factors, then compare and choose between a narrowed selection. On the other hand, searching and adding a product directly to a watch list via the search bar is more suited to investors with a bottom-up strategy.

Use Case 2 describes the situation when an investor wants to get an overview of the current investments and monitor them to adjust them if necessary. Since our solution does not only focus on quantitative economic data, initially decisive criteria for the investment are presented in an updated form. Thus, not only is it shown how the share price of a company has developed over the period in which the user has become a shareholder, but also how the defined criteria have developed about topics such as the environment, social affairs, and governance.

User Goal

Monitor the current investments, economically as well as qualitatively/values, and adjust ownership.

Task Flow

user views the watch tab → navigates to the portfolio subsection → selects a current investment from the overview → monitors on how the values changed from the time invested → makes adjustments communicating the reasons

Wire Flow

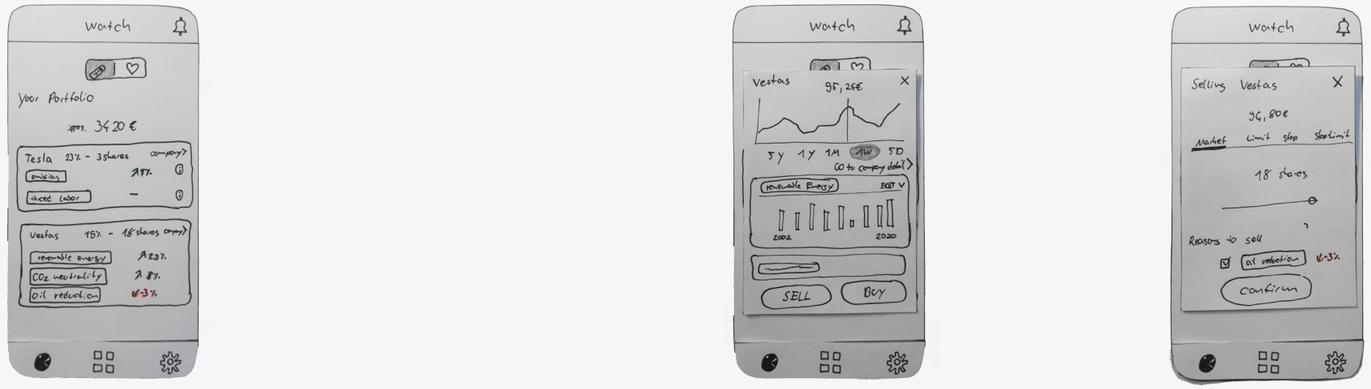


Fig. 67 Use Case 2; Source: own diagram

In Use Case 3, investors can access a watch list of companies added in Use Case 1. The companies can be monitored and their performance in the defined criteria can be compared with each other. The functionality and visual appearance are similar to the result screen of the exploration function.

User Goal

Adding a company to the watchlist and choosing criteria for notification and investment reminder. Comparing companies with eachother.

Task Flow

User adds a company to the watchlist → navigates to the favorites/watchlist tab → filters favorites list → chooses company to add to watchlist → selects the list → navigates to list → chooses the criteria to compare → compares companies

Wire Flow

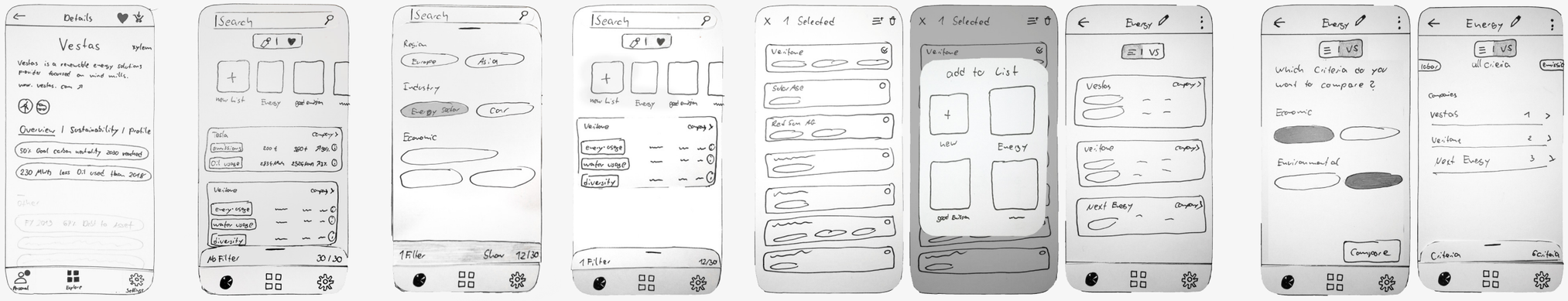


Fig. 68 Use Case 3; Source: own diagram

Early Stage

As the next step in our process, we developed initial ideas for a solution by taking the user group, their specific requirements and the consolidating Value Proposition into account.

It quickly became clear to us that our solution would have to be a digital service, or more specifically an app. A web application seemed to be an option as well but was dropped due to competitive reasons and the general market movement towards apps.

We collected our ideas wildly and without judgment for one use case: The investor explores possibilities according to personal requirements, but does not yet have a concrete product or company in mind. We captured our ideas in rapid prototyping on paper prototypes, which allowed us to communicate ideas quickly without spending a lot of time or heart and soul on the development. This process was exciting and helpful, as for the first time the ideas in the team's heads became really tangible and thus also open to discussion.

In our subsequent discussions, we analyzed the positive aspects of each idea, as well as those that needed improvement or were less interesting. We focused our attention on the most important screens: Value input, result page, and detail page.
We found the biggest challenge in the result list, as this by nature includes a ranking. Content that is presented first seems to be more important at first. We also saw the weighting of the criteria in the input as well as in the list as one of the biggest challenges.
With the planned testing in mind, we decided not to include too many details in the screens in order not to overstrain the test persons and to be able to collect feedback on the fundamental ideas behind the screens. We, therefore, ignored the challenges of criteria weighting and the order of the companies on the results page for this first round and planned to work on them in further rounds when the complexity increases and the cornerstones are verified.
The result of our first ideation session was a draft of a rough screenflow for the use case exploration. The screens of this draft, which are especially important for the first testing, were the input of the criteria as well as the detail page and the result page. From the feedback on the whole process as well as on the individual screen, we hoped to continue working in a way that would fully meet the needs and requirements of the user group.

Concepts
In the following, we briefly describe this first draft and the ideas behind it. The starting point of this exploration of alternatives is that an investor does not yet have a concrete company to invest in mind, however, he or she has a set of criteria and concerns. Based on these, a stock should be found.

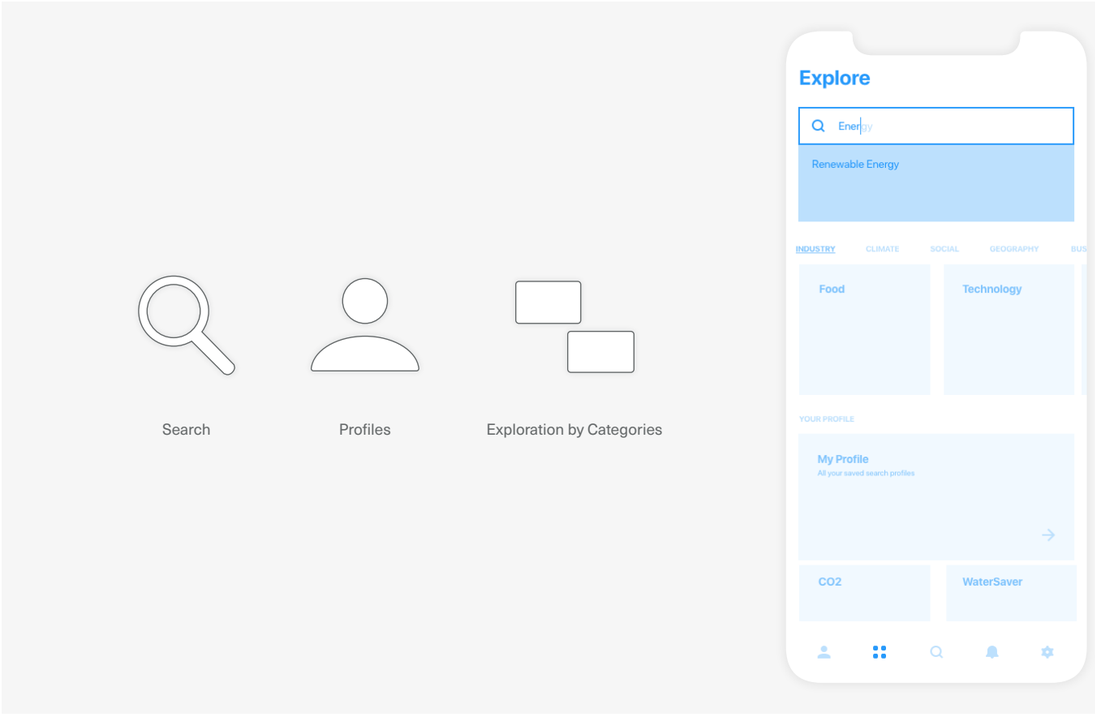


Fig. 69 Concept Exploration; Source: own diagram

The basic idea behind the exploration front page is that the search with criteria is useful for as many investors as possible. In our tests, we found that both free input and suggestions are welcome. For this reason, it is possible to enter your criteria, but also to select from ready-made but customizable search profiles. It is also intended to allow exploration by categories, such as the geographical location of a company or industry. In this specific example, CO2 neutrality is particularly important to the investor. This wish is entered into the search and corresponding possible criteria are suggested. In this case, the investor decides that the criterion CO2 neutrality until 2030 should be applied. The criterion must be measurable if a comparison of the results is wished. It is best to have a target against which the different companies can be measured.

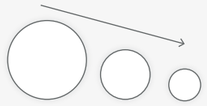
Ranking and comparison by criteria

Info about performance and development

Costumization of criteria

Sorting by preference

Personally relevant info is Highlighted



Contro over info amount and depth

Transparent and trusted sources

Experience company through visuals

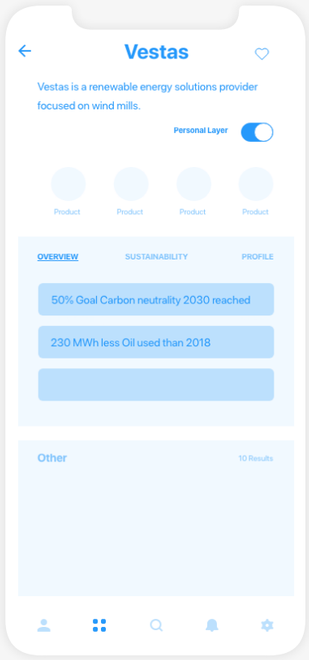


Fig. 70 Concept Result Page; Source: own diagram

Fig. 71 Concept Detail Page; Source: own diagram

The personal request is then translated as a criterion and corresponding top performers are highlighted. In this case, Vestas is ahead, having already achieved 50% of its goal. This is a ranking that is sorted exclusively according to the individual criteria. It should be possible to switch between the defined criteria and to get an idea of the performance. The rankings can differ depending on the criteria. The overall evaluation and weighting in this concept are ultimately up to the investor himself. Results that do not fit or perform poorly are presented less prominently.

The next step could be a detail page with an overview of info, data, and reports. Here, too, the information relevant to the criteria should be presented in a visually prominent way. It should also be possible to switch between the overview, general sustainability, and profile information or other categories. Finally, all data should be visible and no information should be withheld. It is particularly important that the reports and information can be traced back and that sources are critically reviewed. This should lead to a solid basis for decision-making and evaluation with meaningful information.

A further feature that is outlined on this screen is the ability to experience the product portfolio through photo or video material.

It should also be possible to buy and save a share in a watchlist, but this has only been touched upon here with the icons and has not yet been further developed.

We see this design as the basic framework of the exploration mechanism on which further ideas and improvements will be based. In the further course of the project, it will be clarified how information can be meaningfully linked to the criteria, how we can present information in a clear and understandable, simple way and how good, overall comparability between the alternatives can be established.

Visualizations

While searching for inspiration on visualizing the financial and non-financial information of companies quickly two categories emerged, these are wether a single value is viewed or if there are multiple values to be compared and set in relation.
Within these categories, the visualizations are sorted for the values they are best suited for, meaning exact values, if values are portrayed over time or visualizations best suited for qualitative data.

Conclusion
While it is helpful to open one's horizon and elaborate which of the displayed possibilities fits the context and information best, it also has to be recognized that oftentimes especially considering the requirements set for this exact service, the things that have been around for a long time are best recognized and understood by most users. Therefor simple, conservative but still informative and easily comparable visualizations like the line graph and bar graph as well as a spider diagram will play a role in the solution created.

exact values

Icon + Number

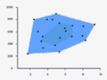
Solid Gauge Chart

Bullet Graph

over time

Progress Bar

Line Graph



Bagplot

Timeline

Bargraph

qualitative

Explain big changes in development

Development & Cause

displaying the inter-relationships between data in a matrix

Non-ribbon Chord Diagram

identify potential factors causing an overall effect
Causes are usually grouped into major categories

Fishbone Diagram

displays a list of events in chronological order

quickly perceiving the most prominent terms

Word Cloud

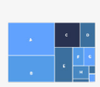
the person of interest is the inner circle, the second circle is divided in two (each side is one parent)...

Fan Chart (Geneaology)

exact values

comparing proportions to provide a quick overview
of the relative size of data

Proportional Area Chart (Icon)



Each branch of the tree is given a rectangle, which is then tiled with smaller rectangles representing sub-branches

Treemap

bars with lengths proportional to the values that they represent

Bar Chart
(Horizontal, Vertical, Radial)

display two set of opposites in a horizontal and vertical axis using Cartesian coordinates

2x2 Matrix

over time

Data, hierarchy and rate of change

Slope chart

small quick estimation

Sparkline

Comparing Ranks

Bump Chart

visualize two or three different points in time, or to triangulate different viewpoints

Dumbbell Plot

llustrate the start and finish time in time period blocks

Gantt Chart

	A	B	C
X	$40	240	48
Y	$50	200	59
Z	$60	310	79

arranging data in rows and columns

Table Chart

qualitative

Dot Plot

shows the relationship between items, at each intersection
a relationship is either absent or present

Matrix Diagram

data visualization type where the individual values contained in a matrix destinguish through variations in coloring

Heat Map

Fig. 72 Visualizations; Source: based on Data Viz Project 2020

Data

Vestas as an Example
Deep research went into the content thas was prepared for the prototype of this service. To keep it manageable without needing to rely on external providers of non-financial information and in order to transparently display the data with confidence, vestas was chosen to be shown as an example for the deeper information hierarchies of the application.
Vestas as a renewable energy solution provider in this exact industry surely is an option for the users we defined, being intentional with the companies and the impact of their products on the world. Vestas doesn't have the most elaborate sustainable reporting practice so it was also a goal to know how information can be gathered and later put into comparison with competitors in the industry.

The first focus was on gathering quantitative data on their environmental and social performance over the years. This ended up being an enormous list with big potential to lead to useful insights.

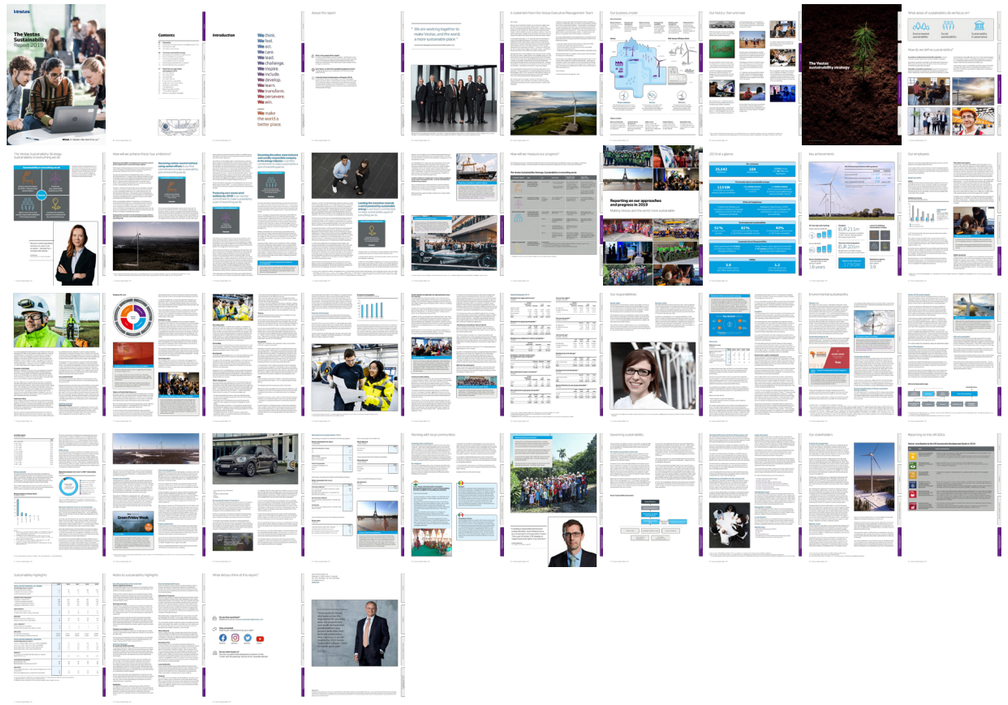


Fig. 73 Vestas Sustainability Report 2019; Source: based on Vestas Windsystems A/S 2019

Categories	Measure	Value	KPI	Year	% ren.	Source	Page
Energy Consumption	All Energy	638	1.000 MWh	2019		Sustainability Report 2019	41
Energy Consumption	All Energy	614	1.000 MWh	2018		Sustainability Report 2018	4
Energy Consumption	All Energy	569	1.000 MWh	2017		Sustainability Report 2017	4
Energy Consumption	All Energy	567	1.000 MWh	2016		Sustainability Report 2017	4
Energy Consumption	All Energy	516	1.000 MWh	2015		Sustainability Report 2017	4
Energy Consumption	All Energy	501	1.000 MWh	2014		Sustainability Report 2017	4
Energy Consumption	All Energy	586	1.000 MWh	2013		Sustainability Report 2017	4
Waste Disposal	All Waste	85	1.000 t	2019		Sustainability Report 2019	41
Waste Disposal	All Waste	81	1.000 t	2018		Sustainability Report 2018	4
Waste Disposal	All Waste	71	1.000 t	2017		Sustainability Report 2017	4
Waste Composition	All Water	473	1.000 m3	2019		Sustainability Report 2019	41
Water Consumtion	All Water	470	1.000 m3	2018		Sustainability Report 2018	4
Water Consumtion	All Water	454	1.000 m3	2017		Sustainability Report 2017	4
Water Consumtion	All Water	428	1.000 m3	2016		Sustainability Report 2017	4
Water Consumtion	All Water	427	1.000 m3	2015		Sustainability Report 2017	4
Water Consumtion	All Water	366	1.000 m3	2014		Sustainability Report 2017	4
Water Consumtion	All Water	512	1.000 m3	2013		Sustainability Report 2017	4
Air Emissions	CO2 All	109	1.000 t	2019		Sustainability Report 2019	41
Air Emissions	CO2 All	101	1.000 t	2018		Sustainability Report 2018	4
Air Emissions	CO2 All	86	1.000 t	2017		Sustainability Report 2017	4
Air Emissions	CO2 All	84	1.000 t	2016		Sustainability Report 2017	4
Air Emissions	CO2 All	74	1.000 t	2015		Sustainability Report 2017	4
Air Emissions	CO2 All	79	1.000 t	2014		Sustainability Report 2017	4
Air Emissions	CO2 All	100	1.000 t	2013		Sustainability Report 2017	4
Air Emissions	CO2 Direct	71	1.000 t	2019		Sustainability Report 2019	41
Air Emissions	CO2 Direct	69	1.000 t	2018		Sustainability Report 2018	4
Air Emissions	CO2 Direct	60	1.000 t	2017		Sustainability Report 2017	4
Air Emissions	CO2 Direct	58	1.000 t	2016		Sustainability Report 2017	4
Air Emissions	CO2 Direct	49	1.000 t	2015		Sustainability Report 2017	4
Air Emissions	CO2 Direct	50	1.000 t	2014		Sustainability Report 2017	4
Air Emissions	CO2 Direct	56	1.000 t	2013		Sustainability Report 2017	4
Air Emissions	CO2 Indirect	38	1.000 t	2019		Sustainability Report 2019	41
Air Emissions	CO2 Indirect	32	1.000 t	2018		Sustainability Report 2018	4
Air Emissions	CO2 Indirect	26	1.000 t	2017		Sustainability Report 2017	4
Air Emissions	CO2 Indirect	26	1.000 t	2016		Sustainability Report 2017	4
Air Emissions	CO2 Indirect	25	1.000 t	2015		Sustainability Report 2017	4
Air Emissions	CO2 Indirect	29	1.000 t	2014		Sustainability Report 2017	4

Fig. 74 Quantitative Information of Vestas; Source: own diagram

Recent Goals

Another kind of data, more qualitative though but also quantifiable, are goals and strategies. They have been especially important to our users for evaluating if the company is acting in a sustainable way and trying to better. Also in consideration of sustainability not only as an ecological aspect, with goals the future prospects of a company in regards to legislation and trends can be elaborated.

Some Companies set goals to be backed up by reportings in the future, some set vague goals, as for vestas the goals in figure 76 are the most highlighted by the company itself.

With goals, the specific description and target are essential for providing a framework and accountability over the years. As seen in the goal “To be the safest, most inclusive and socially responsible workplace in the energy industry” the performance of competitors is not static so specifying it as the “reduction of the rate of total recordable injuries to 0.6 by 2030” is a necessity.

GOAL	KPI	INITIATIVES	MEDIUM-TERM TARGET (2025)	LONG-TERM TARGET (2030)
To become a carbon-neutral company by 2030, without using any carbon offsets	Gram CO_2/kWh	• Reducing emissions in Vestas' operations • Reducing emissions in the supply chain	Reduce absolute carbon emissions in scope 1 and 2 by 55 percent by 2025 compared to 2018, without using any carbon offsets	Reduce absolute carbon emissions in scope 1 and 2 by 100 percent - by 2030, compared to 2018, without using any carbon offsets Reduce carbon emissions in scope 3 by 45 percent per MWh generated, by 2030
To produce zero-waste wind turbines by 2040	Percent recyclability by weight	Increasing blade and hub recyclability	Increase blade and hub recyclability to 50 percent, by 2025	Increase blade and hub recyclability to 55 percent, by 2030
To be the safest, most inclusive and socially responsible workplace in the energy industry	Per one million working hours	Reducing total recordable injuries	Reduce rate of total recordable injuries to 1.5, by 2025	Reduce rate of total recordable injuries to 0.6 by 2030
	Percent	Increasing number of women in leadership positions*	25 percent women in leadership positions by 2025	30 percent women in leadership positions by 2030
	Percent	increasing women in Vestas Wind Systems A/S' Board of Directors	37.5 percent women in Board of Directors by 2021	
	Percent	Expanding access to inclusive leadership and unconscious bias training	Inclusive leadership and unconscious bias training mandatory part of all talent and leadership training by 2021	Inclusive leadership and unconscious bias training mandatory part of all talent and leadership training
To lead the transition towards a world powered by sustainable energy	Commitments: • To take a leading role in driving electrification and decarbonisation beyond the power sector • To team up with sustainability leaders to drive change • To support our partners in their journey to become more sustainable			

Fig. 76 Recent Goals of Vestas; Source: based on Vestas Windsystems A/S 2020: 40

Year	Target	Framing	Measure Info	Value	KPI	Source	Page
2019	2030	To become a carbonneutral company by 2030, without using any carbon offsets	Reduce absolute carbon emissions in scope 1 and 2 by 100 percent - by 2030, compared to 2018, without using any carbon offsets	109	Gram CO2/kWh	Sustainability Report 2019	16
2019	2030	To produce zero-waste wind turbines by 2040	Increase blade and hub recyclability to 55 percent, by 2030	44	% recyclability by weight	Sustainability Report 2019	16
2019	2030	To be the safest, most inclusive and socially responsible workplace in the energy industry	Reduce rate of total recordable injuries to 0.6 by 2030	3,9	per million hours	Sustainability Report 2019	16
2019	2030	To be the safest, most inclusive and socially responsible workplace in the energy industry	30 percent women in leadership positions by 2030	19	percent	Sustainability Report 2019	16

Fig. 75 Recent Goals and Reporting of Vestas; Source: own diagram

Past Goals
Providing the users with information on past goals and reporting for it is another important feature to allow them to estimate the credibility and determination of the company trying to fulfill the recent goals they set.
One of Vestas' past goals can also be somewhat related to their carbon neutrality goal for 2030, as their goal from 2015 until 2020 also was to achieve a reduction in their carbon footprint. Interesting to see is that over these 5 years Vestas even exceeded their goal 2 times and having to adjust it from 5% to 10%. The only inconsistency is that with the statement of exceeding this goal in the sustainability report of 2019 no quantitative data is presented to back this claim up.

Looking at this data it seems that Vestas is determined to reach set goals and even better not limited and satisfied with reaching goals prematurely and confident to adjust those, achieving even better results in the end.

Year	Target	Framing	Measure Info	Value	KPI	Source	Page
2015	2020	Reduce Product Waste by 3%	A material or component which is not recycled or reused at end-of-life.	3,7	g Waste per kWh	Sustainability Report 2015	24
2016	2020	Reduce Product Waste by 3%	A material or component which is not recycled or reused at end-of-life.	4	g Waste per kWh	Sustainability Report 2016	27
2017	2020	Reduce Product Waste by 7%	A material or component which is not recycled or reused at end-of-life.	0,178	g Waste per kWh	Sustainability Report 2017	24
2018	2020	Reduce Product Waste by 7%	A material or component which is not recycled or reused at end-of-life.	0,178	g Waste per kWh	Sustainability Report 2018	24
2019	2020	Reduce Product Waste by 10%	In 2016, we set a target to reduce product waste by 3 percent by 2020: upon meting this target in 2017 – with a 12.5 percent reduction, we set a further and more ambitious target of a 7 percent reduction for the 4 MW Platform. However, the LCAs of the 4 MW Platform turbines showed a 4.5 percent reduction of product waste between 2017 and 2020 - falling short of the 7 percent reduction target.	–		Sustainability Report 2019	30

Year	Target	Framing	Meassure Info	Value	KPI	Source	Page
2015	2020	Reduce Carbon Footprint by 5%	The sum of the net greenhouse gas emissions that contribute to global warming. Quantified by 6.6 grams CO equivalents/kWh.	6,9	g CO/KWh	Sustainability Report 2015	7
2016	2020	Reduce Carbon Footprint by 5%					
2017	2020	Reduce Carbon Footprint by 10%	The sum of the net greenhouse gas emissions that contribute to global warming. Quantified by 5.95 grams CO2 equivalents/kWh	6,6	g CO/KWh	Sustainability Report 2017	22
2018	2020	Reduce Carbon Footprint by 10%	The sum of the net greenhouse gas emissions that contribute to global warming. Quantified by 5.95 grams CO2 equivalents/kWh	6,6	g CO/KWh	Sustainability Report 2018	18
2019	2020	Reduce Carbon Footprint by 10%	In 2019, we reached our 2020 target of a 10 percent reduction in product carbon footprint. With the LCAs of the 4 MW Platform, we also exceeded our goal achieving a 27 percent reduction in product carbon footprint between 2017 and 2020. We achieved this reduction through increased power production and turbine optimisation to reduce material requirements per kWh delivered.	–		Sustainability Report 2019	30

Fig. 77 Past Goals of Vestas; Source: own diagram

Filter

In preparation for a detailed Usecase and to show the usefulness of displaying non-financial data alongside financial data in a comprehendible way and to test the strengths of this concept, we chose filters based on popular preferences out of multiple categories.

Some of these data, to provide useful insights, needed to be set in relation, in this example for comparing emissions and energy usage due to difference in the production of wind energy generators and solar energy generators comparison can be achieved by setting them in relation to the cumulated power of the generator solutions produced.

The Average we use in the following is only based on these three companies.

Visualizations of gathered Data

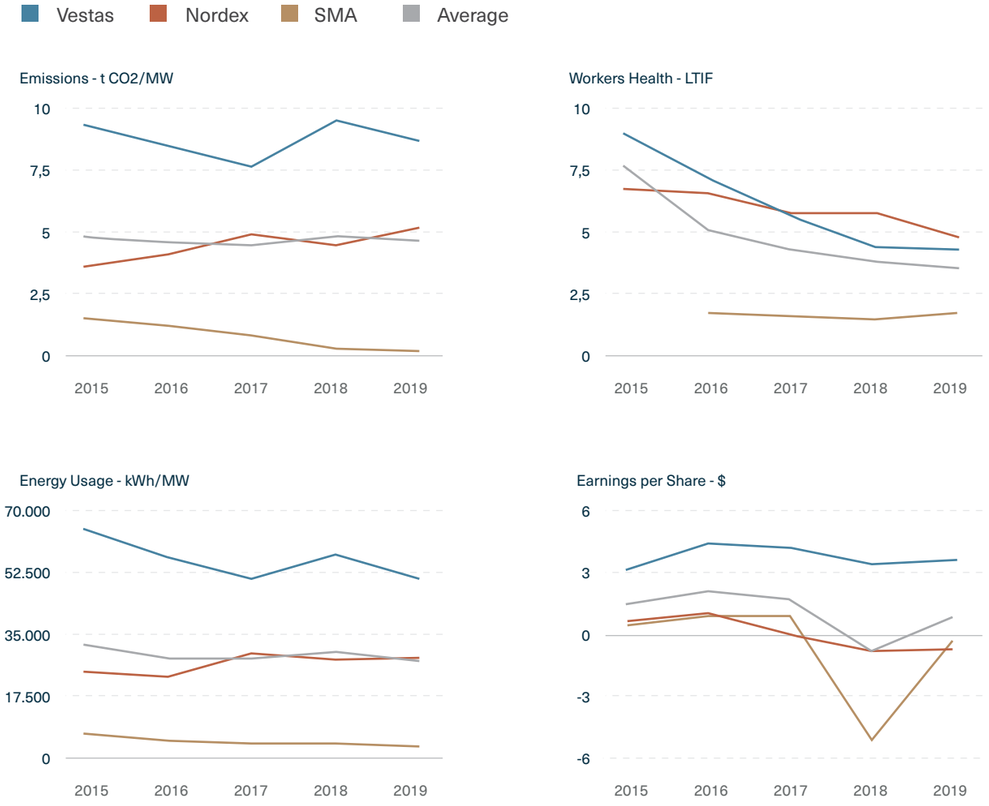


Fig. 78 Visualizations of gathered Data; Source: own diagram

Emissions - t CO2 / MW

Year	SMA	Source SMA	Nordex	Source Nordex	Vestas	Source Vestas
2015	1,55	Non Financial Report 2015 p. 2	3,65	Nachhaltigkeitsbericht 2016 p. 70	9,31	Sustainability Report 2017 p. 4
2016	1,28	Non Financial Report 2017 p. 11	4,146	Nachhaltigkeitsbericht 2016 p. 70	8,44	Sustainability Report 2017 p. 4
2017	0,9	Non Financial Report 2017 p. 11	4,984	Nachhaltigkeitsbericht 2019 p. 73	7,65	Sustainability Report 2017 p. 4
2018	0,38	Non Financial Report 2019 p. 42	4,591	Nachhaltigkeitsbericht 2019 p. 73	9,46	Sustainability Report 2018 p. 4
2019	0,32	Non Financial Report 2019 p. 42	5,182	Nachhaltigkeitsbericht 2019 p. 73	8,64	Sustainability Report 2019 p. 41
	-79,35%		+41,97%		-7,21%	

Workers Health - Lost time incident frequency (LTIF)

Year	SMA	Source SMA	Nordex	Source Nordex	Vestas	Source Vestas
2013	-	-	-	-	9,8	Sustainability Report 2017 p. 4
2014	-	-	8,6	Nachhaltigkeitsbericht 2016 p. 53	11,8	Sustainability Report 2017 p. 4
2015	-	-	6,6	Nachhaltigkeitsbericht 2016 p. 53	8,7	Sustainability Report 2019 p. 41
2016	1,64	Non Financial Report 2017 p. 12	6,4	Nachhaltigkeitsberich 2017 p. 47	6,9	Sustainability Report 2019 p. 41
2017	1,51	Non Financial Report 2017 p. 12	5,6	Nachhalrigkeitsbericht 2018 p. 51	5,3	Sustainability Report 2019 p. 41
2018	1,41	Non Financial Report 2019 p. 43	5,6	Nachhaltigkeitsbericht 2019 p. 56	4	Sustainability Report 2019 p. 41
2019	1,68	Non Financial Report 2019 p. 43	4,6	Nachhaltigkeitsbericht 2019 p. 56	3,9	Sustainability Report 2019 p. 41
	+2,43%		-28,12%		-43,48%	

Energy Usage - kWh / MW

Year	SMA	Source SMA	Nordex	Source Nordex	Vestas	Source Vestas
2013	9.900	Nachhaltigkeitskennzahlen 2014 p. 2	-	-	129.847	Sustainability Report 2017 p. 4
2014	10.760	Nachhaltigkeitskennzahlen 2014 p. 2	23.081	Nachhaltigkeitsbericht 2016 p. 67	81.795	Sustainability Report 2017 p. 4
2015	6.660	Nachhaltigkeitskennzahlen 2016 p. 2	24.135	Nachhaltigkeitsbericht 2016 p. 67	64.921	Sustainability Report 2017 p .4
2016	4.490	Non Financial Report 2017 p. 11	22.819	Nachhaltigkeitsbericht 2017 p. 57	56.944	Sustainability Report 2017 p. 4
2017	3.690	Non Financial Report 2017 p. 11	29.306	Nachhaltigkeitsbericht 2019 p. 71	50.636	Sustainability Report 2017 p. 4
2018	3.750	Non Financial Report 2019 p. 42	27.519	Nachhaltigkeitsbericht 2019 p. 71	57.512	Sustainability Report 2018 p. 4
2019	3.090	Non Financial Report 2019 p. 42	28.096	Nachhaltigkeitsbericht 2019 p. 71	50.562	Sustainability Report 2019 p. 41
	-53,60%		+16,41%		-22,11%	

Earnings per Share - $

Year	SMA	Source SMA	Nordex	Source Nordex	Vestas	Source Vestas
2013	1,92	Annual Report 2014 p. 2	0,14	www.finanzen.net/bilanz_guv/nordex	0,40	Annual Report 2014 p. 8
2014	-5,16	Annual Report 2014 p. 2	0,48	www.finanzen.net/bilanz_guv/nordex	1,80	Annual Report 2014 p. 8
2015	0,41	Annual Report 2019 p. 2	0,65	www.finanzen.net/bilanz_guv/nordex	3,10	Annual Report 2019 p. 16
2016	0,85	Annual Report 2019 p. 2	1,03	Geschäftbericht 2017 p. 142	4,40	Annual Report 2019 p. 16
2017	0,87	Annual Report 2019 p. 2	0,00	Geschäftbericht 2017 p. 142	4,20	Annual Report 2019 p. 16
2018	-5,06	Annual Report 2019 p. 2	-0,86	Geschäftbericht 2019 p. 139	3,40	Annual Report 2019 p. 16
2019	-0,25	Annual Report 2019 p. 2	-0,73	Geschäftbericht 2019 p. 139	3,60	Annual Report 2019 p. 16
	-190,97%		-212,3%		+16,13%	

Fig. 79 Gathered Data of 3 Companies; Source: own diagram

Priority Guides

Priority Guides are an approach in which the content of a solution is first considered and prioritized according to importance. In contrast to mock-ups, visual elaborations do not play a role for the time being. It is more important to be clear about what kind of content should be the focus of the solution and in what order the content can be presented purposefully.

We used this method for all essential App Screens of our solution, our Key Screens. For this we first thought about the type of content and prioritized it in a second round. In the next step we filled this structure with actual content, text and images.

This way we could make sure that in the visual elaboration the important contents were louder, i.e. more present than the less important ones.

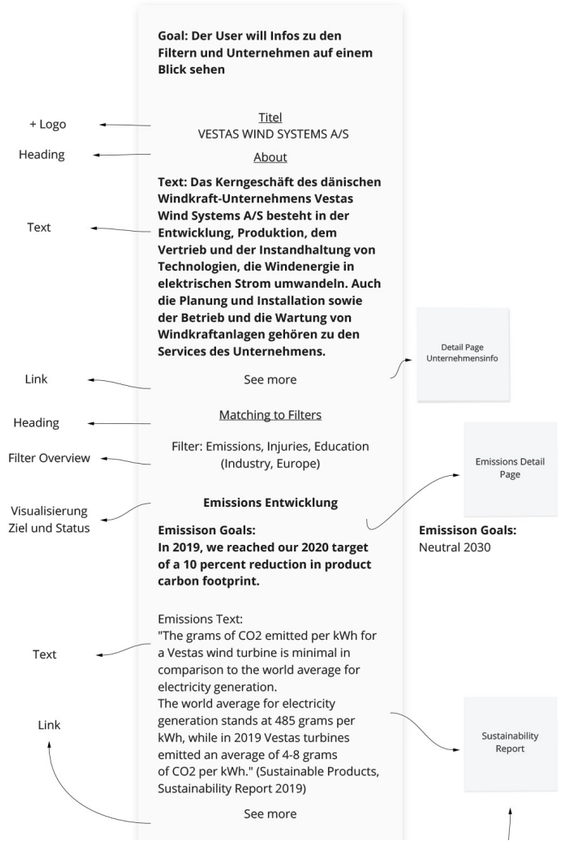


Fig. 80 Detailed Priority Guide; Source: own diagram

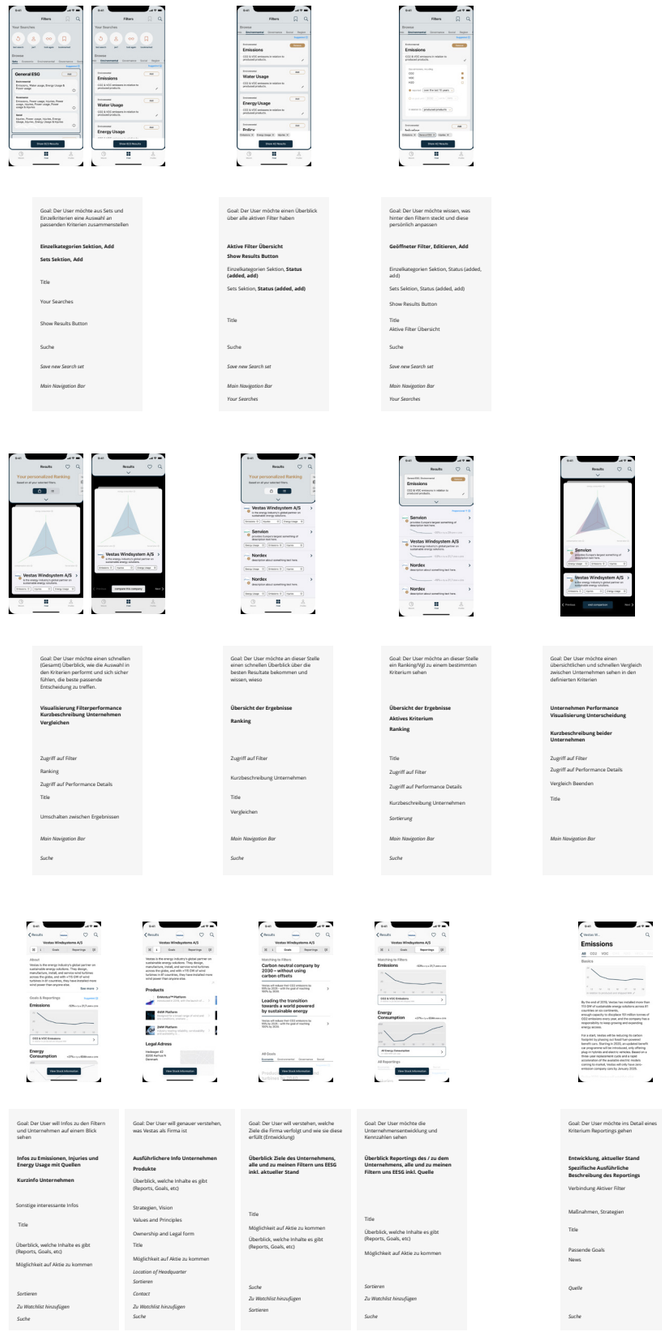


Fig. 81 Priority Guides; Source: own diagram

Prototype and Test

In our prototype, we concentrate on the main functions and elements needed to complete use case 1. Once this main framework is established, all other use cases can be based on the structure we defined there and adopted in the same sense. To do this, we need to make sure that the prototype is relevant and that the value we want to create with our service based on all our previous knowledge is actually created.

Based on our ideas from the Ideation, we have built a remotely testable prototype. During our work on this prototype there were multiple iteration loops that were discussed in the team. Since we mainly discussed the functionality, not all screens are pixel accurate at this point.

We created the prototype rather as a sketch, made the process clickable and tested it remotely with two of our experienced single investors. Here we gained insights to further iterate and improve the concept.

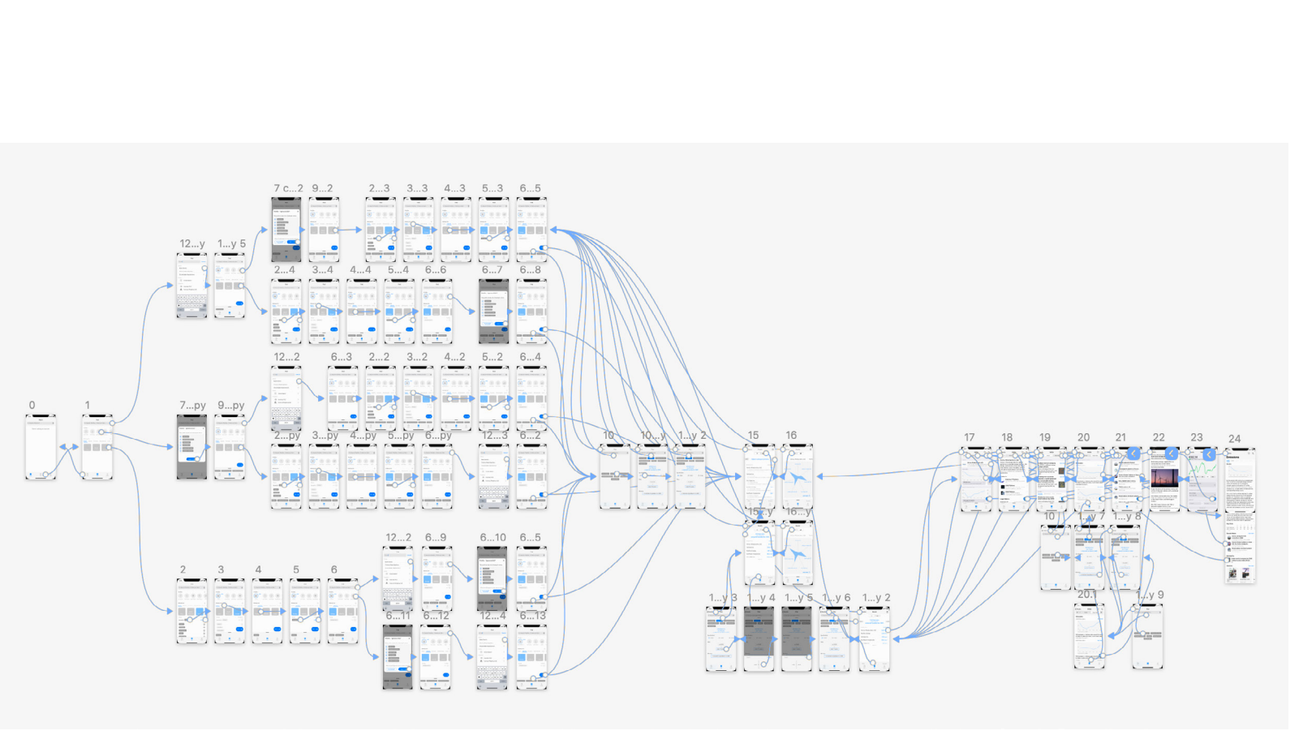


Fig. 82 Test Arrangement; Source: own diagram

Location within the app

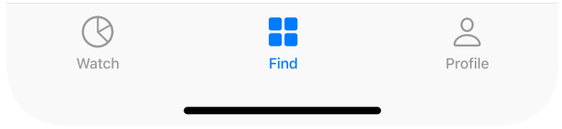


Fig. 83 Main Navigation; Source: own diagram

In our prototype, there were three main areas within the navigation.

The first area is called Watch in the prototype and was later renamed Monitor. This is where the portfolio is located with the products that were purchased by the investors. Furthermore, it is possible to switch to watchlists, where the user has saved companies in order to be notified when there is something interesting about them, e.g. in the news or when prices fall. Both of these functions are at the core of all brokers or investment related services, and since they are the ones that the user keeps track of on a longer term basis, this was also the entry point of the prototype. Later in the process, we added a fourth area to the navigation, Home, which replaced the Portfolio as the entry point.

The second part selected Discover is the part for finding and exploring new companies and stocks. This menu item is the unique selling point of our solution. It allows the user to add his own value and criteria to a product search and map it to company data.

The third and last part is the so-called Profile. There all necessary and legal information is accessible, including bank account data and other settings.

Exploration

Concept

The functionality that makes our solution special and has not been available in existing services so far is finding a personally suitable investment product based on individually defined criteria - basically creating your own filter.

All filters that influence the search for a company are easily accessible, from the straightforward, direct search for a specific search profile at the top, to the curious discovery of profiles, to the exploration of all kinds of underlying criteria.

Individual filters can be added when selecting a set of criteria, in this case the Europe region. It is also possible to simply add all individual filters.

The blue button on the right side always shows the number of results for the criteri-ons currently selected.

At the bottom all selected filters are always visible. They remain there during the whole process, as they are editable in every step and influence most subsequent screens.

When a filter is clicked, it can be edited depending on the filter type. In this case, it can be specified more precisely, or the default configuration, which is suggested by the system as the most suitable, can be adapted to personal needs.

In this example, we have defined the filter to refer to the products produced and shipped in megawatts.

User Feedback and Conclusion

In testing, both testing partners have understood that the number of results changes when criteria are added. As the experienced investor 1 expressed it: “It is really good that you can always see how many results are still in the basket.

As for the criteria themselves, it was difficult for the testers to see the meaning and the behavior behind them. Experience Investor 2 found “the tags in the exploration screen were somehow ambiguous, but later (in the results and filter screen) almost too specific as it could be”. A positive surprise for the testers was the functionality of always being able to access the filters by pulling them up.

Although it was difficult for our testers to identify with the example, as they them-selves preferred other criteria than those given in the test, they rated this function-ality positively in terms of user-friendliness. One of the testers mentioned: “It’s kind of reasonable once you get used to it, and I think it doesn’t take long”. In terms of functionality, all the testers liked the criteria-based filters. The experienced Investor 2 put it this way:

“What i really love about this is that you can set filter based on your own criteria, and let the app do the ranking.”

In summary, the concept was accepted and liked. But there were still usability questions to be addressed.

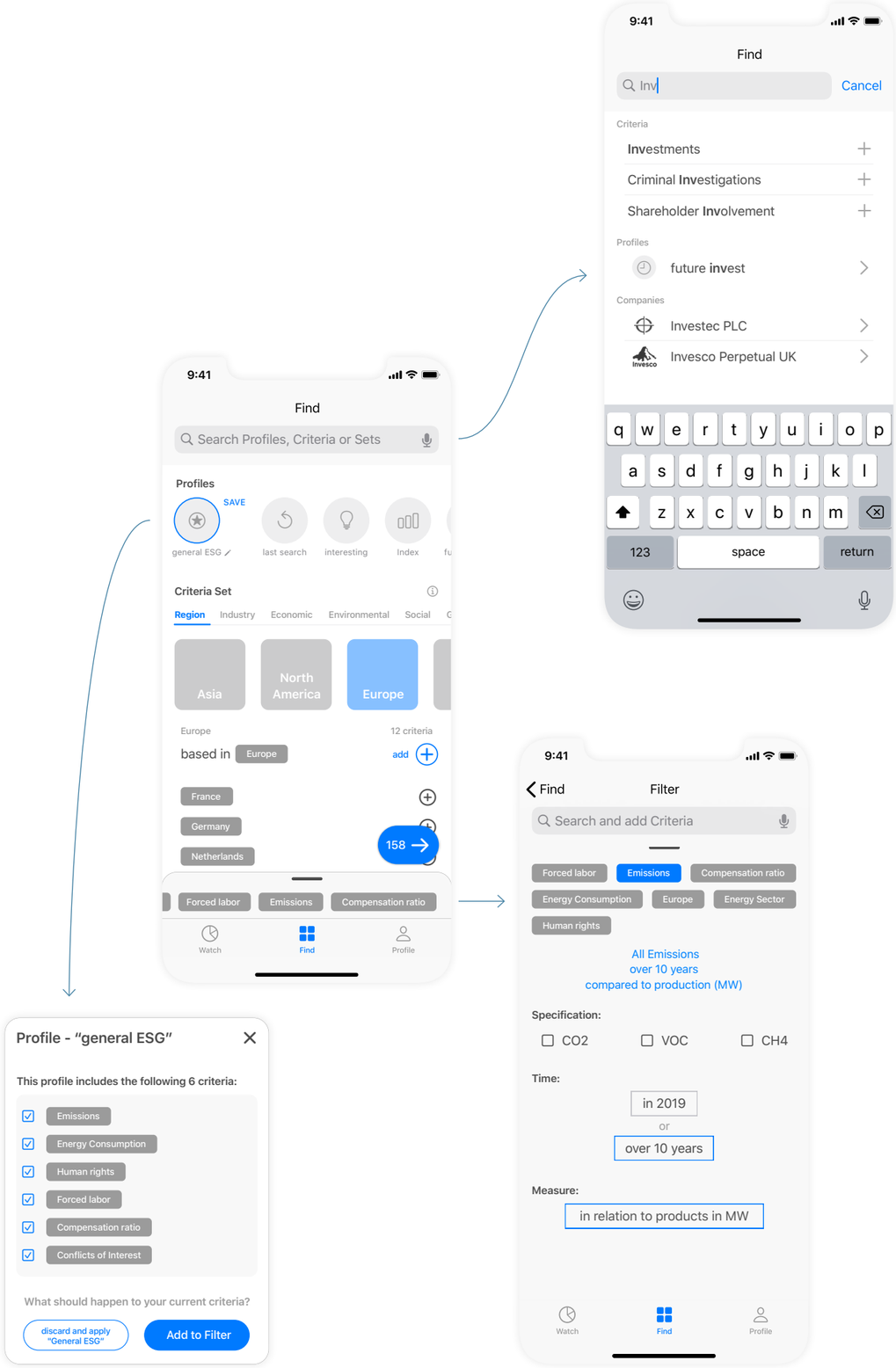


Fig. 84 Test Exploration; Source: own diagram

Results

Concept
After selecting filters, the result screen follows. Companies that match the criteria are displayed and sorted according to their performance in the various filters. This results in a personalized ranking.

We have integrated different views: A general overview, in which all filters are combined and individual views of the defined individual filters.
The overall ranking is based on the calculation of the performances in all individual results per filter.

User Feedback and Conclusion
The results screen generally convinced with its functionality. One investor said: “Oh it ranks them, that’s cool!” and “A list is the best way to display the results”. In regard to the chart the investor said: “This [chart] is very useful for me. I get a detailed overview”.
The change between the different lists and illustrations was mostly clearly evaluated. Especially the lists with the individual criteria gave the missing useful insights into the performance of the companies. However, access to and editing of the filter as in the exploration chapter explained above was considered to be in need of improvement. The experienced Investor 1 was concerned:

The displayed ranking was a difficult topic.It was not understood how the ranking was composed, whether the numbers indicated school grades and referred to a “global” benchmark or similar. If you only rank within the results, then you don’t need elaborate benchmarks to which you can refer for each criterion, which is good”.

Experienced investor 2 “would definitely not trust a rank, but the funny thing is [...] I can see all this information [leading to the rank] for myself, if I trust the underlying baseline data, I ultimately trust the rank because I can look it up”. Even with the fear that in a narrow selection of companies, which are clearly not the best, e.g. in terms of emissions, the rankings are led by a number of companies, it became clear: “It’s about things that are important to me, yes. So you don’t try to force your own opinion [as a service provider], which is good, otherwise people would stop using the app. This customizability is the key. Usually when I see rankings, I don’t think it’s me who decides how the ranking goes”.

“Which is nice that it is quite compact”, says the experienced Investor 1, and so we try to further clarify and simplify this promising and accepted flow of results.

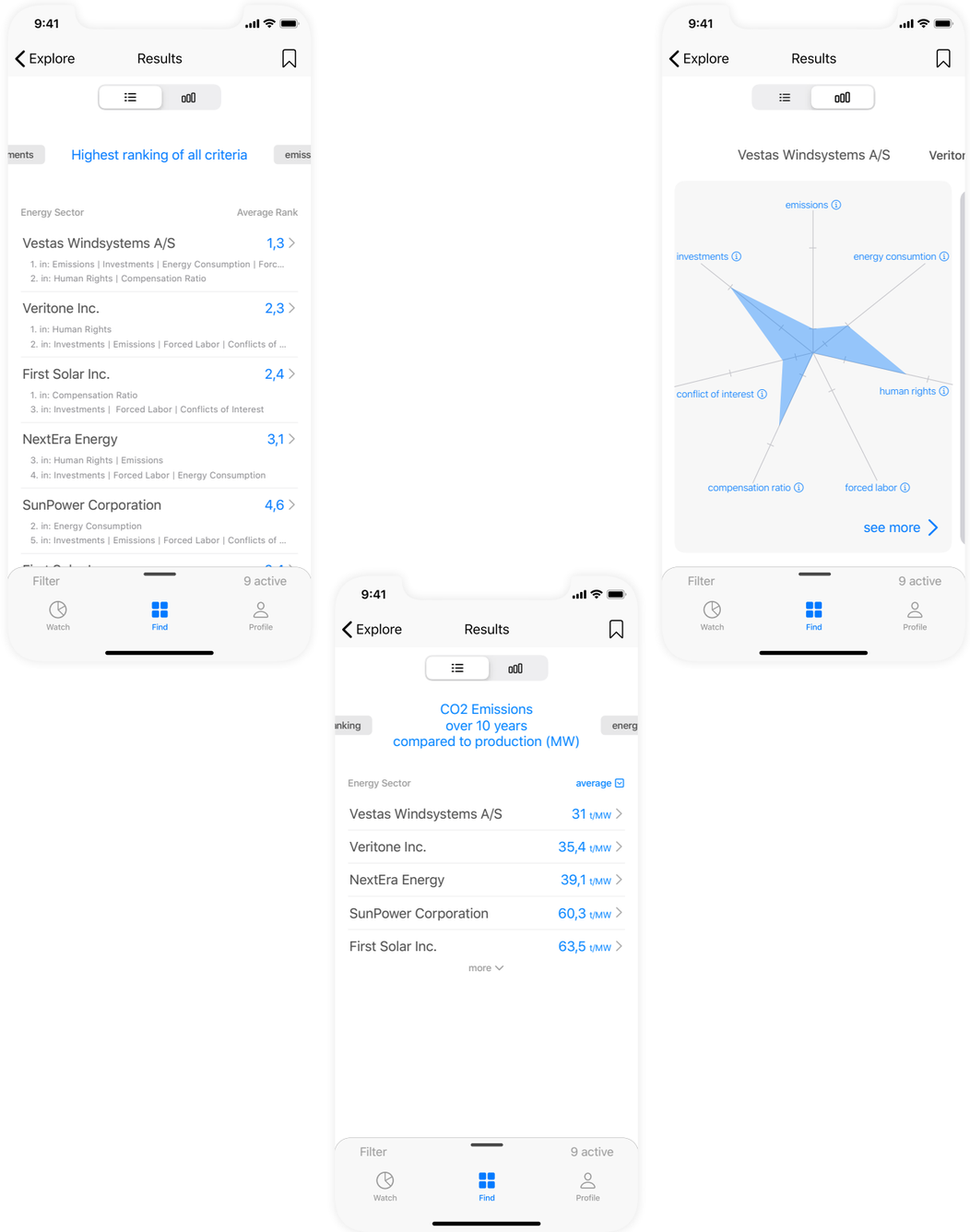


Fig. 85 Test Results; Source: own diagram

Company Details

Concept
Detailed information about Vestas Windsystems A/S can be found on the company's overview page. On the overview page, all relevant data related to the selected criteria is displayed in a visual overview. This system is already different from others, as the most striking information there is usually the share price. In our approach, this information is of secondary importance and only appears in the stock information.

The page divides the content into different categories, between which you can switch: Overview, Company Information, Goals, Reports and News. Content is displayed in such a way that it can be easily scanned and absorbed. For a more detailed view, it is possible to view topics on the detail page which contain larger amounts of data, such as we have created for emissions as a prototype. Cross-references and sources can also be viewed from here.

It is also possible to add a company to a watchlist on the screen.

User Feedback and Conclusion
The detailed information about the company, its objectives and reporting was positively received by users. Experience Investor 2 gave us an advice on the goals: "I want to see how well they perform in relation to their goals". For us, this means that in further iterations we should bring the goals and reporting together so that the user can check whether the companies have achieved their goals, also in comparison to other companies in the industry.
Investor 1 mentioned that "there may be [...] a lack of high-level overview. I might be overwhelmed by all the graphs", and suggests implementing the graph from the results screen as an overview on the details page.
Investor 1 partly did not understand the wording and was confused: "What is VWSA? I do not know what that means".
Another interesting aspect of this test was the surprise and confusion that investors felt after they discovered the stock price chart and realized that they had not missed it at first. Investor 1 said, "Ah okay, that's interesting, we talked for 25 minutes and this is the first time I've seen a chart with a stock price. [...] for my personal consideration the share price is not the most important thing [...] so it somehow makes sense there and I can always access the share price".
The opinion of the experienced investor 1 makes us confident: "The concept makes sense. I wouldn't know something like that already exists."

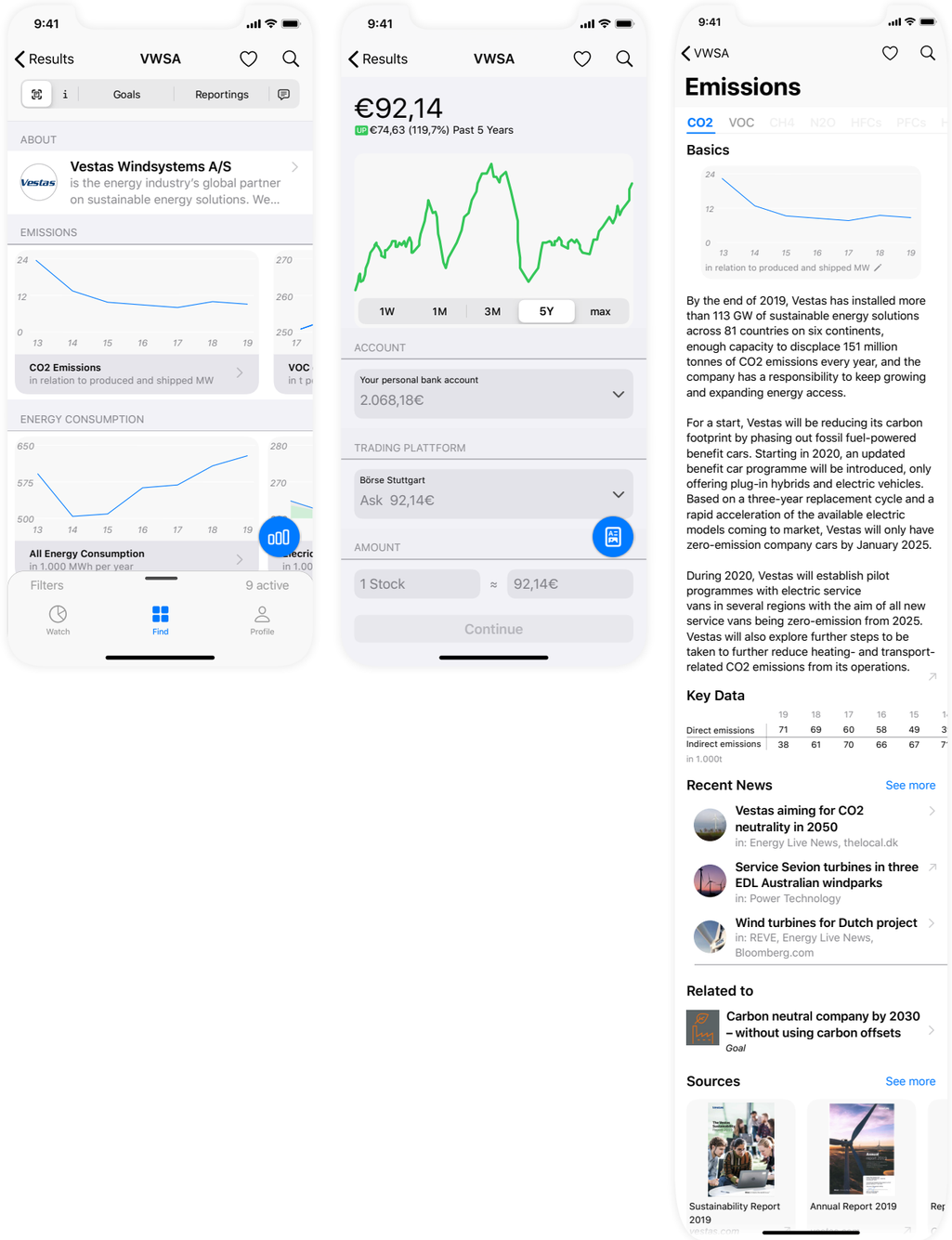


Fig. 86 Test Company Details 1; Source: own diagram

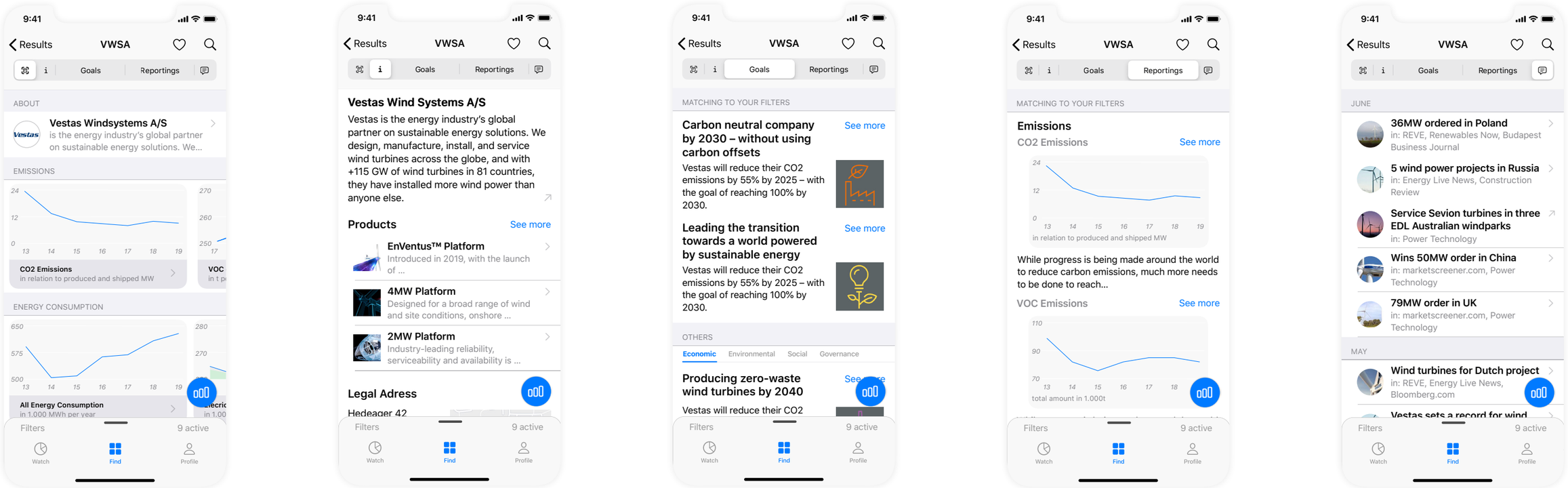


Fig. 87 Test Company Details 2; Source: own diagram

Solution

In the chapter Solution we explain our project by means of a use case. In this case we guide you through individual screens of the application and point out special features and design arguments.

The starting point of the use case is that a user with some experience and capital is looking for a suitable share. The user has certain requirements and rough ideas, such as that the company is strongly committed to climate protection, but also performs well financially. However, the user does not yet have concrete companies in mind.

In this chapter we also briefly discuss the brand identity of our solution.

Key Features

incorporate enables individual sustainability definitions and requirements to be included in the search for an investment product. Using personalised and intelligent filters, private investors can tell the system their criteria and receive information about alternatives.

Different levels of detail offer investors the opportunity to deal with information according to their interests and experience.

A special feature of the solution is also the qualitative comparison of two alternatives in the defined filters. Strengths and weaknesses can thus be analysed more precisely.

In the monitor area the development of already purchased shares can be analysed. For this purpose, investors select filters about which they wish to be informed.

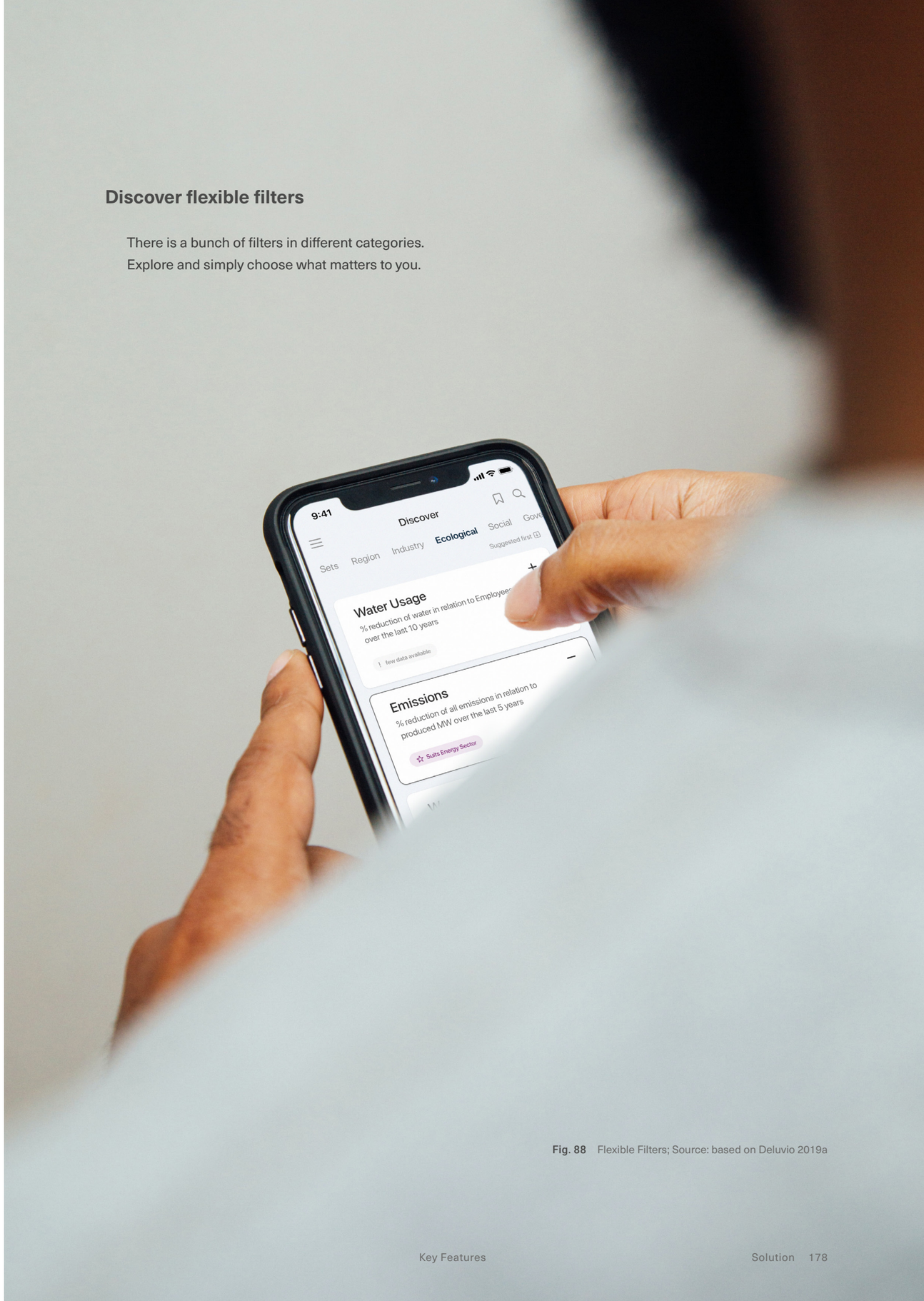


Fig. 88 Flexible Filters; Source: based on Deluvio 2019a

Personalized Ranking

The ranking of the results is based on the defined filters and is therefore not only more comprehensible, but also tailored to your requirements.

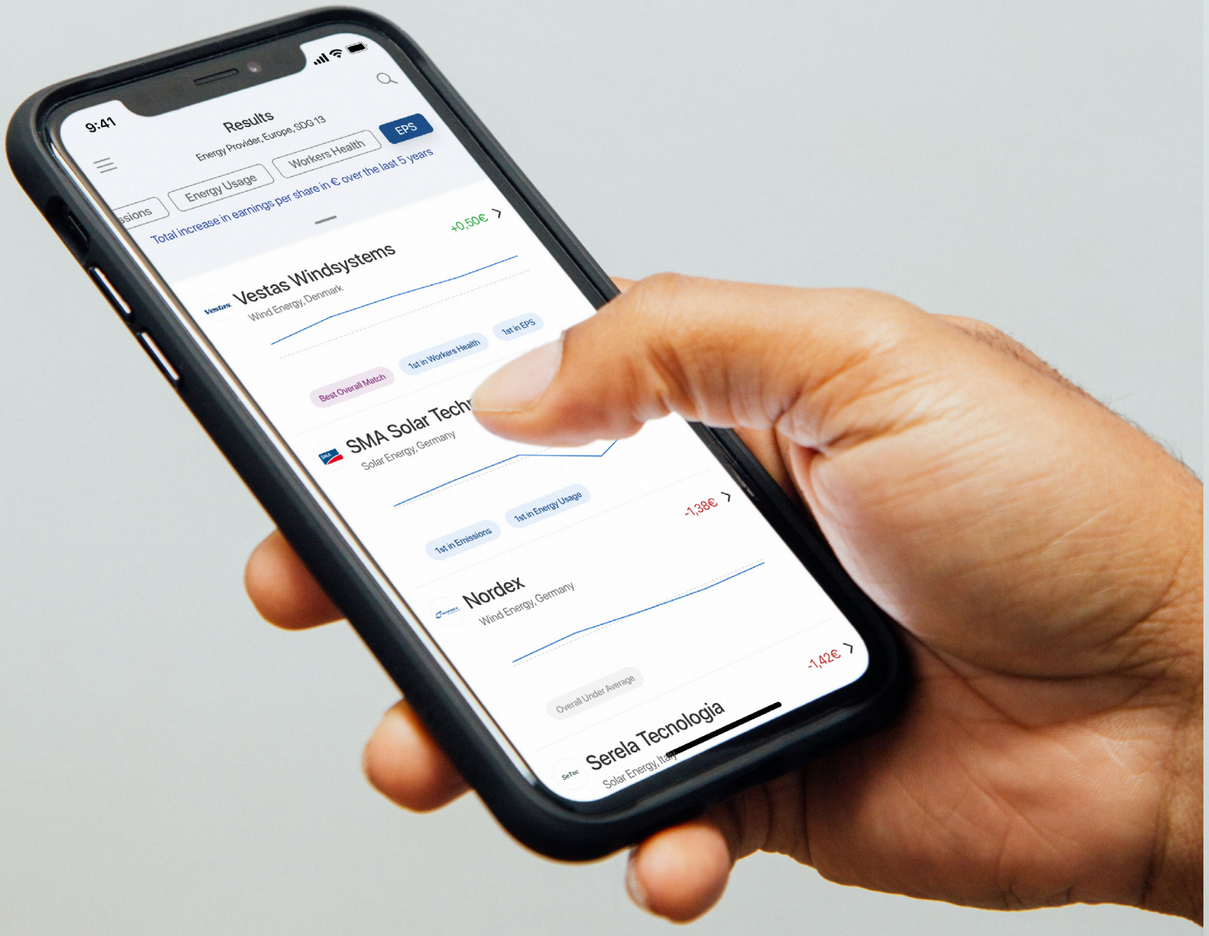


Fig. 89 Personalized Ranking Single Filter; Source: based on Deluvio 2019b

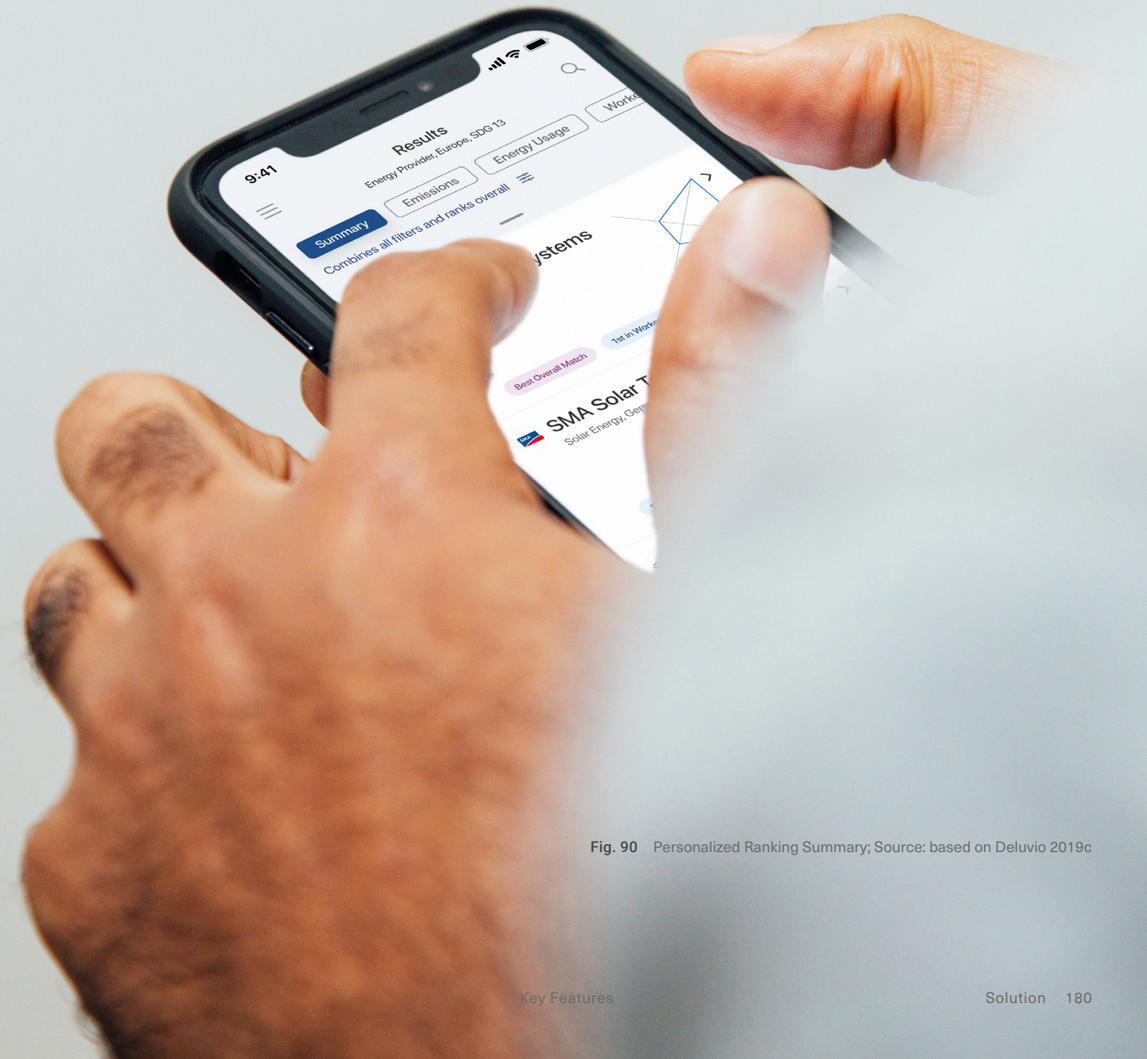


Fig. 90 Personalized Ranking Summary; Source: based on Deluvio 2019c

Performance Comparison

The comparison feature allows you to contrast alternatives in single filters or holistically. It is designed to support you in your decision making.

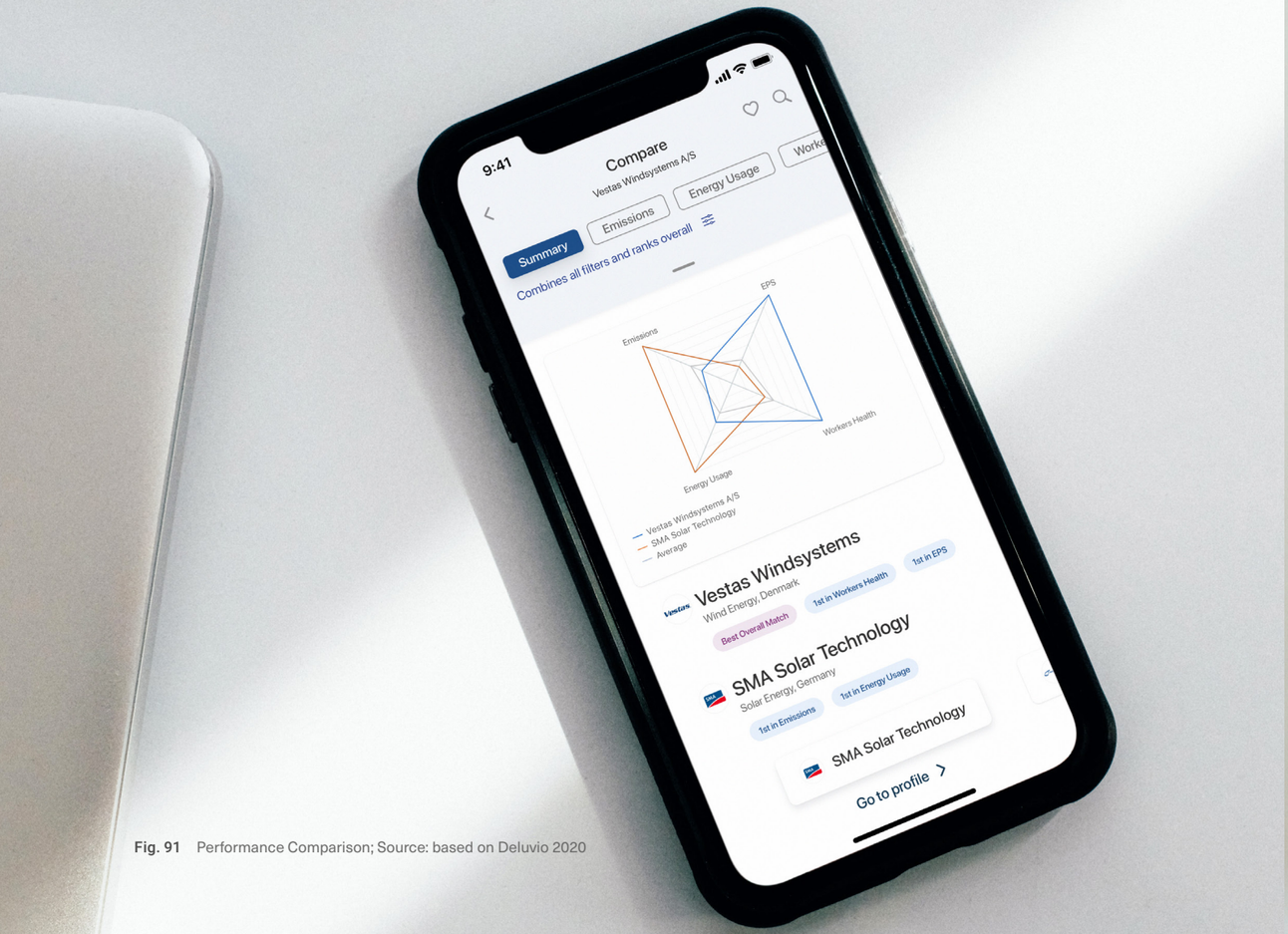


Fig. 91 Performance Comparison; Source: based on Deluvio 2020

Just the right information

The app first gives you an overview. If you then wish to go deeper into specific points, you can find more information on the detail pages.

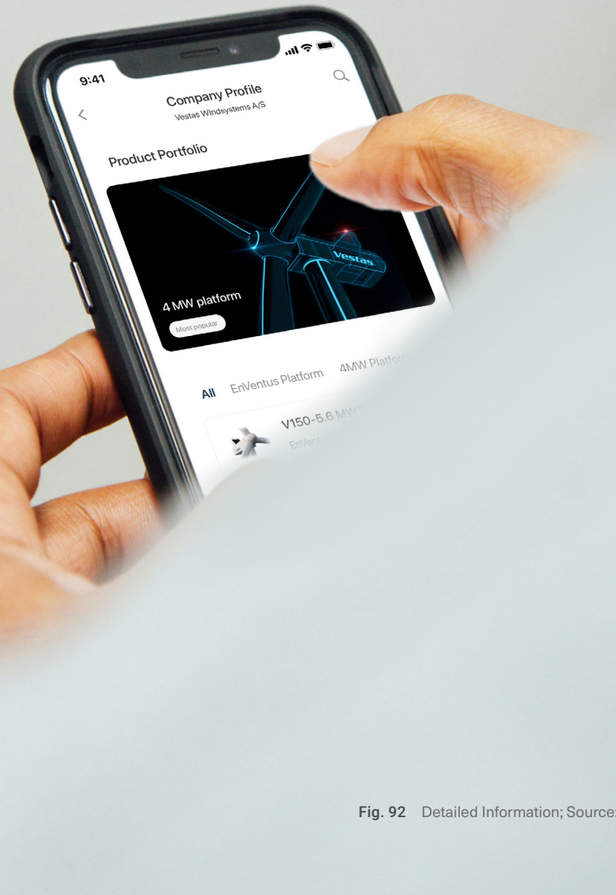
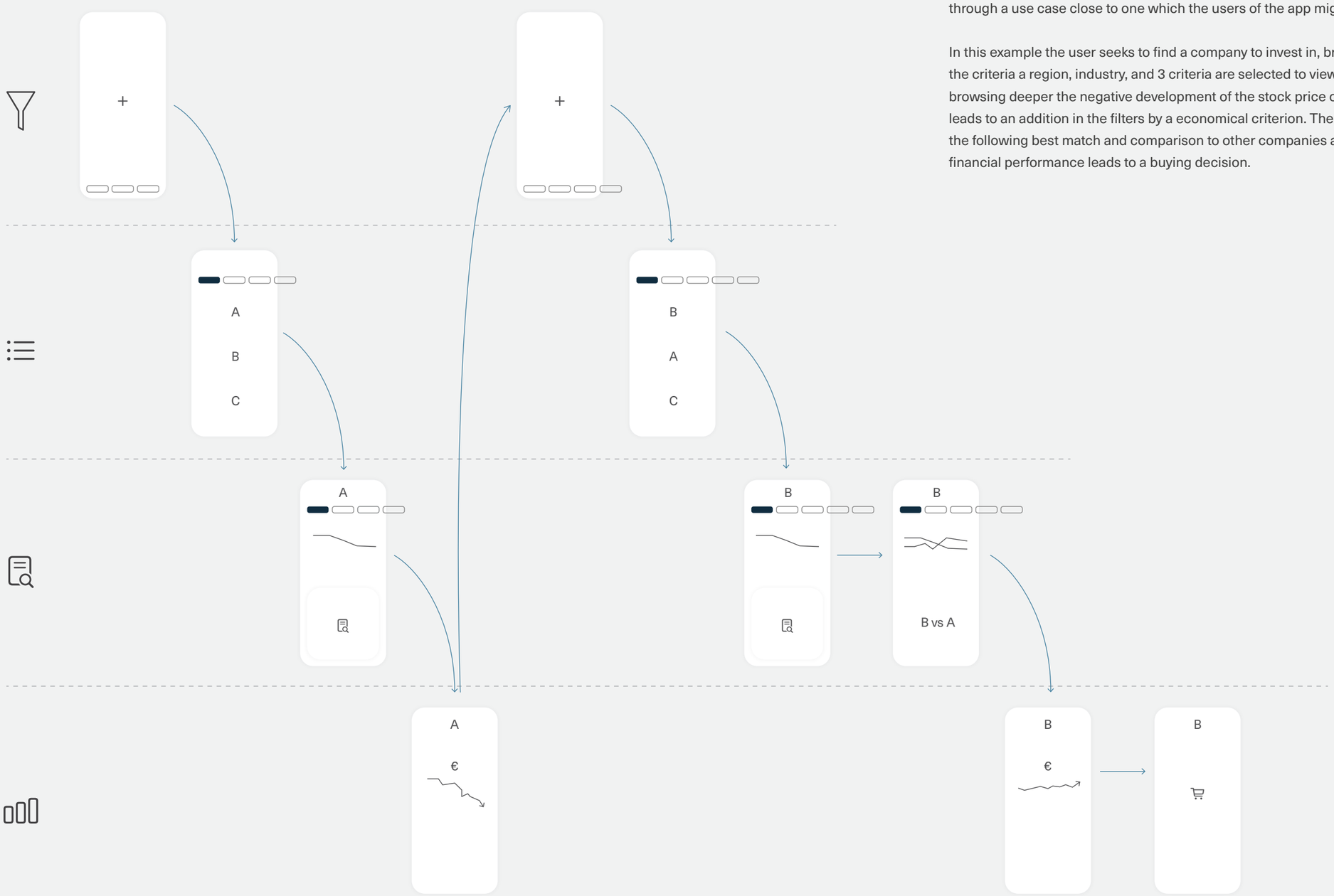


Fig. 92 Detailed Information; Source: based on Deluvio 2019d



Solution Use Case

The detailed features and the benefits of the solution are most easily explained through a use case close to one which the users of the app might experience.

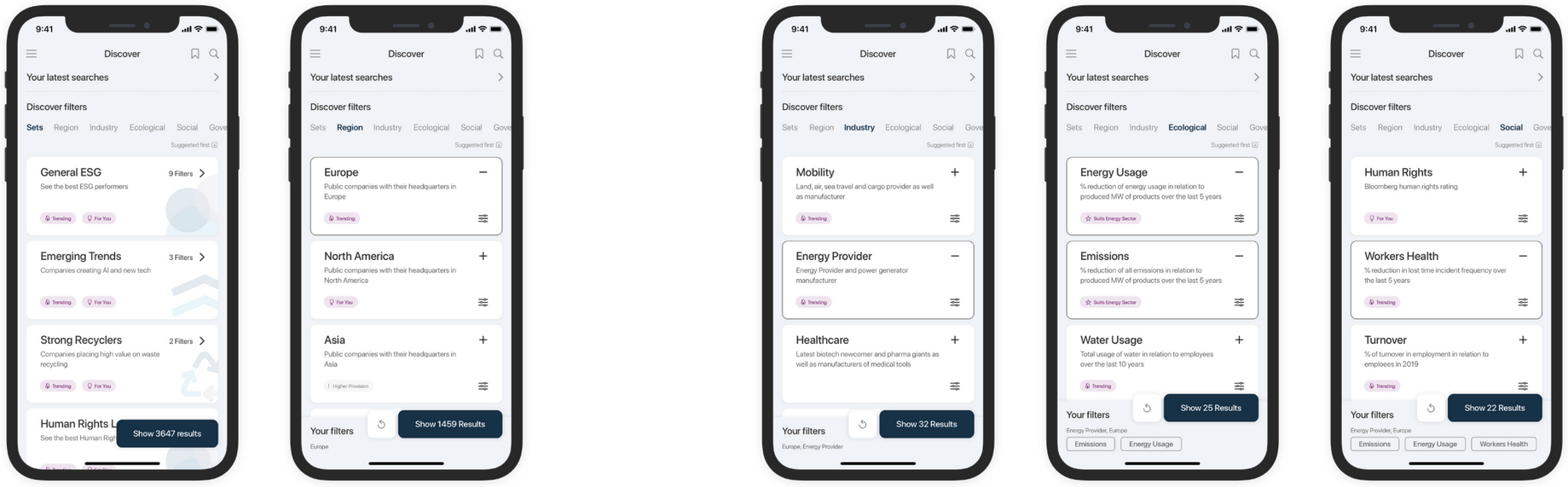
In this example the user seeks to find a company to invest in, browsing through the criteria a region, industry, and 3 criteria are selected to view the results. While browsing deeper the negative development of the stock price of the best matching leads to an addition in the filters by a economical criterion. The detailed look into the following best match and comparison to other companies as well as promising financial performance leads to a buying decision.

Fig. 93 Solution Use Case; Source: own diagram

Selection of filters

In the Discover function of the application, the user starts to search for alternatives that provide convincing performance in their requirements. For this, he or she creates a catalog of essential criteria. In this example, the filters Europe, Energy Sector, Emissions, Energy Usage, and Workers Health are selected.

At this point, it was particularly important to us that the design requirements we had defined for the diversity of personal requirements and flexibility of decision-making processes were taken into account and incorporated. The Discover function enables the user to integrate his or her own understanding of sustainability and individual criteria into the process of choosing a product.



01 Discover - Start Screen
The Discover function starts with this view. Here the user can add individual filters or pre-defined sets to the search.

02 Selection of filters
The following screens show how the user makes his or her selection of personally relevant filters from different categories.

Fig. 94 Filter Selection; Source: own diagram

Editing of a filter

In the next step of the use case, the user processes the emission filter. CO2 emissions, which are particularly close to the user's heart, now take center stage. Using the editing function, changes can easily be made and filters can be adapted to the user's own interests.

This function is based on our knowledge that requirements can be very individual. Our own design requirements flexibility, diversity, and autonomy were decisive elements in the development of this function.

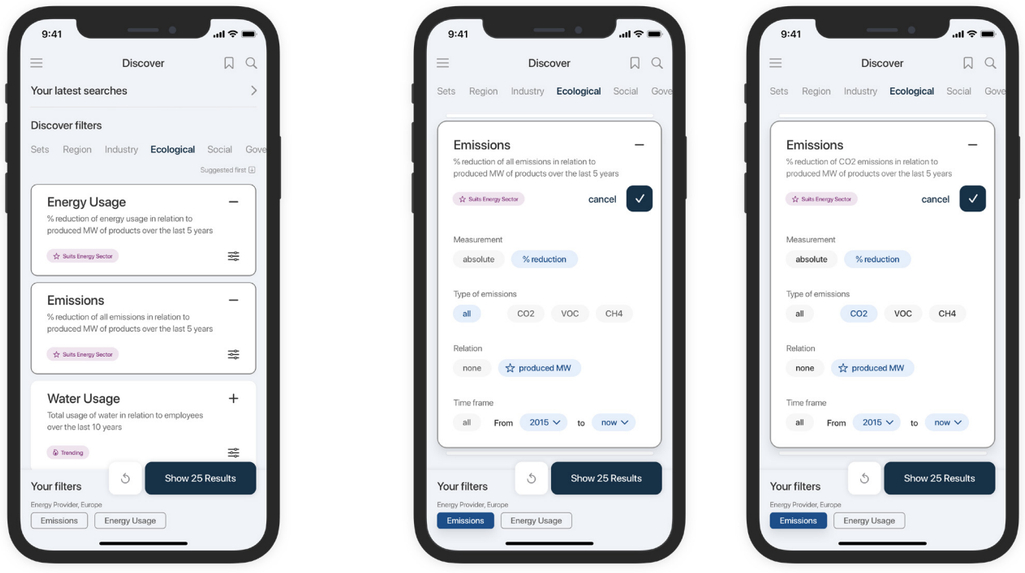


Fig. 95 Filter Editing; Source: own diagram

03 Editing of the emission filter
The user wants to specify the emission filter for CO2 emissions. For this purpose, he/she selects the editing icon.

The following two screens show that the user has adjusted and saved his or her selection of emissions.

Overview of result list

After the user has confirmed his or her selection, suitable alternatives are presented in a sorted list. The summary page provides the user with an overview of the alternatives. Here, all defined filters are merged and serve as the basis for the personalized ranking. In this example, the solar power company SMA Solar Technology is the Best Overall Match.

One of our design requirements is that the application should reduce tedious, unnecessarily time-consuming work. With the Summary feature, the user gets important information at a glance. The transparent communication of the rating process ensures traceability and credibility. The user can save the effort of compiling evaluations and performances within single filters.

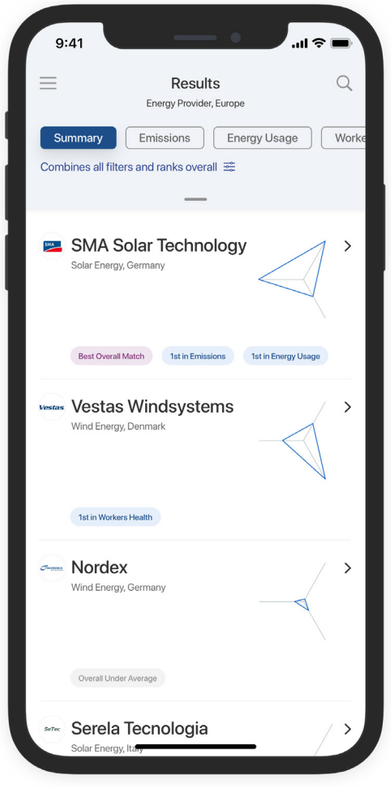


Fig. 96 Result List Summary; Source: own diagram

04 Getting an overview
The user gets an overview of suitable alternatives and their overall performance in the defined filters in the summary.

View all performances in filters

The user does not only want to look at the overall performance but also get an overview of particular performances. To do this, he/she switches between the defined individual filters using the menu bar and gains an overview within these filters. The ranking adapts accordingly.

Guided by our solution requirements quality before quantity and the appropriate amount of complexity at the right time, we have made this part of the application easy to understand and put the focus on qualitative performance, i.e. on non-financial reporting.

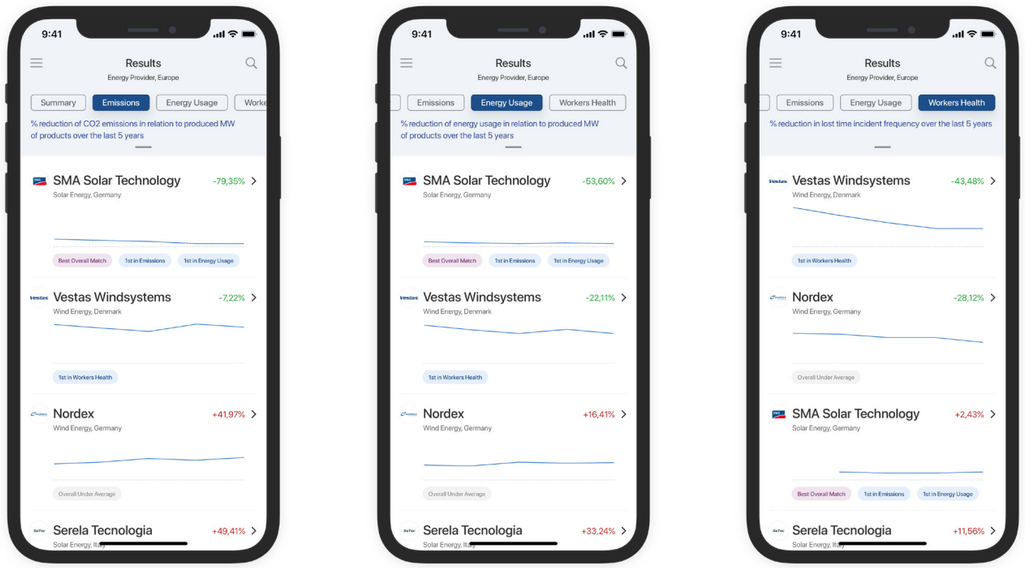


Fig. 97 Performance single Filter; Source: own diagram

05 Switching over single filters
The user switches between the filters, which act as a menu and determine the ranking.

Review the Best Overall Match

In our example, the user decides to take a closer look at the Best Overall Match SMA Solar Technology, because it caught his/her interest after the first overview. He or she is directed to the company overview, where he or she first receives a more detailed summary of all relevant information about the product. Here too, it is possible to switch between the individual filters and the overview.

At this point, we go into the second depth of information. It was important to us not to flood the user with information that does not interest him or her. For this reason, we have designed the process as an ever deeper immersion in products and their information.

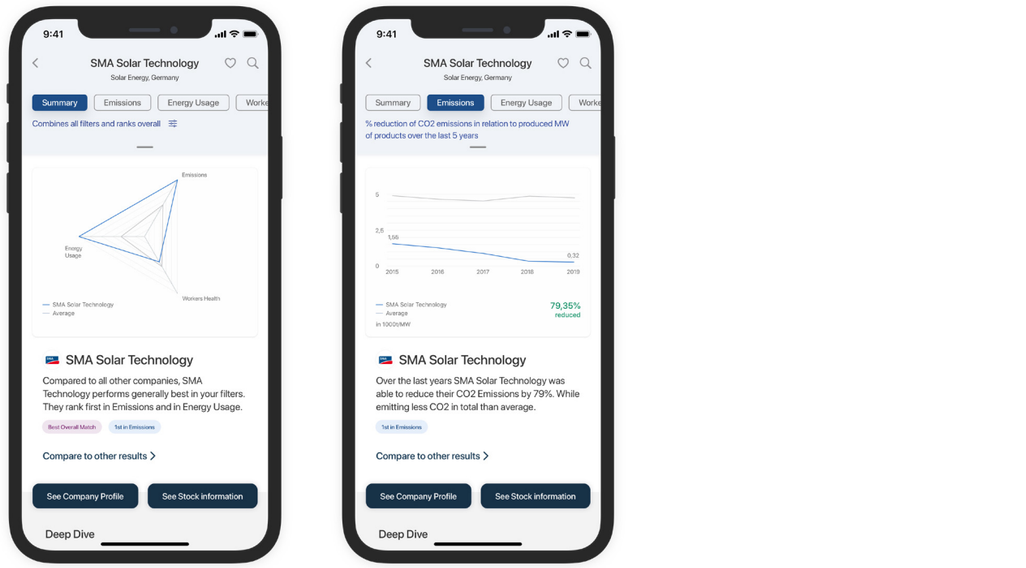


Fig. 98 SMA Overview; Source: own diagram

06 Analysis of one company
The user decides to take a closer look at the Best Overall Match company SMA Solar Technology in the product overview.

Checking out the stock information

SMA Solar Technology has convinced the user in terms of quality. Therefore, in the next step, the user wants to review the financial performance of the company in the past. Unfortunately, he or she finds that the investment product has experienced a strong downward trend. For the user, however, the financial performance of his investments is just as important. For this reason, he or she decides against a purchase.

This is the first time that the share value and performance are displayed in the application. According to the set requirement quality before quantity, a company should convince with its non-financial performance first. This does not mean, however, that the share price development is insignificant. It is only visible later in the application.

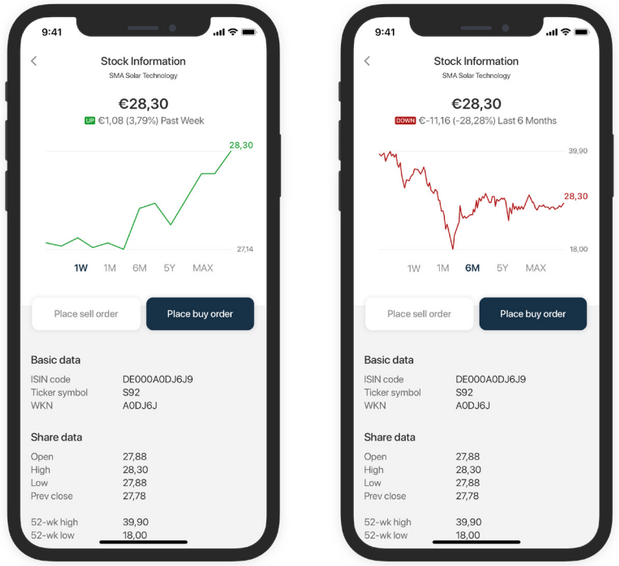


Fig. 99 SMA Stock Information; Source: own diagram

07 Analysis of technical data
The user switches between the filters, which act as a menu and determine the ranking.

Adjusting the search criteria

The user decides to adapt the search for a suitable product and add a financially relevant filter, earnings per share. Furthermore, he or she adds an SDG goal that interests him or her. With the adjusted search, the user hopes to find products that convince in terms of both qualitative and quantitative performance.

Flexibility in the decision-making situation is essential even within a process. It must be possible to add, change, or remove filters for the search at any time. The dynamic filter system enables precise searches that lead to personalized results.

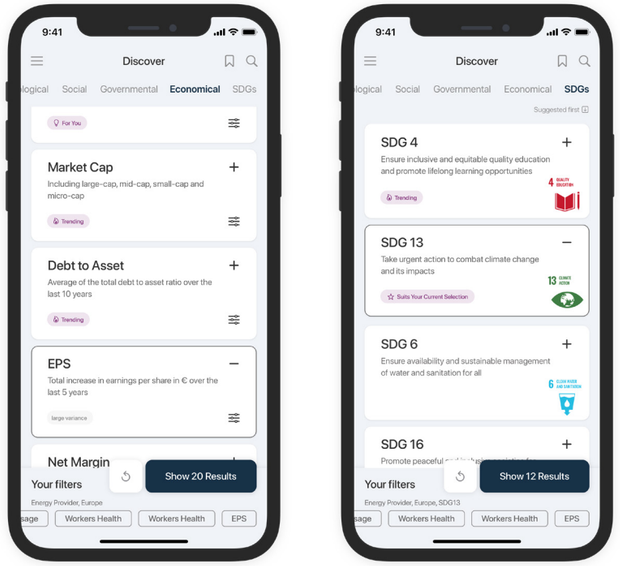


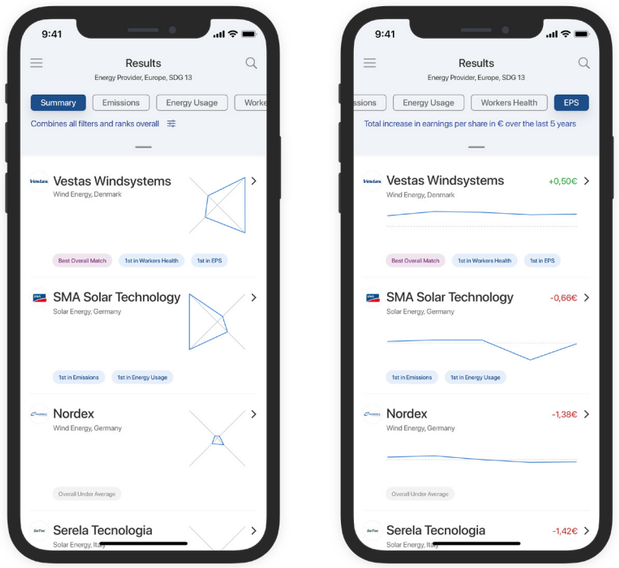
Fig. 100 Adding new Filters; Source: own diagram

08 Adding new filters
The user decides to adjust his search and add a financial filter as well as an SDG goal to the requirements catalog.

Adjusted results and ranking

The newly added filter EPS has changed the sorting of the results. The user notices that Vestas Windsystems A/S is now the Best Overall Match and that it performs very well in the EPS filter. For this reason, the user decides to take a closer look at the company and learn more about it.

On the new summary screen, you can see that the triangular visualization has become a quadrangle. This is due to the newly added filter, which is also visually integrated into the catalog. The information adapts to the conditions of the user.



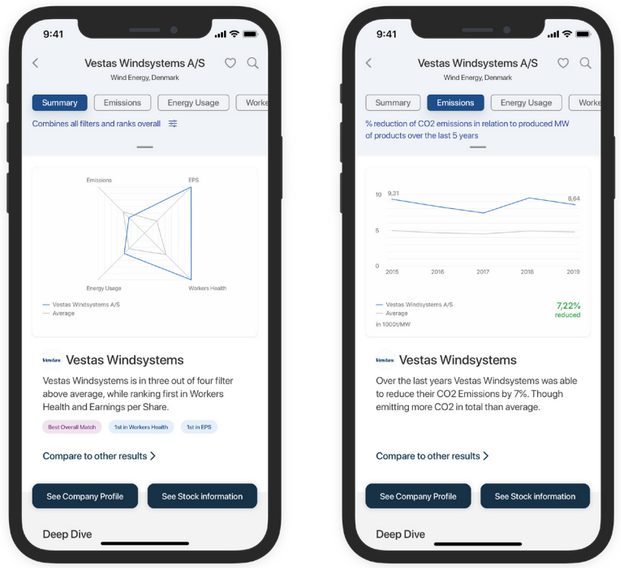
09 Renewed consideration
Again the user receives a list of products. He/she recognizes that now another company is the Best Overall Match.

It is perceivable to the user that the new Best Overall Match Vestas delivers very well in EPS in contrast to SMA.

Fig. 101 Results 4 Filter; Source: own diagram

Getting to know a new company

Following the same principle as before, the user now receives more detailed information about Vestas Windsystems A/S in a company overview. Here he or she is again informed in greater depth about the overall performance, visually displayed in a spider diagram. The user also switches through the individual filters and can see how the company performs to the average of the results.



09 Company Overview
The user can see that the company is in first place in two filters and overall always performs above average.

Fig. 102 Vestas Overview; Source: own diagram

Diving deeper into contents

The user now has an overview of company performance in the filters and would thus like to delve deeper into the content. Under the upper overview section, he/she will find a section called Deep Dive. Here the user can find out about company goals, reports, and news that match the defined filters.

In the design of this feature, the solution requirements Guided by time, for what is important, Autonomy and Quality over Quantity take a central role. The amount of work that would be necessary to obtain and organize specific information without the application would be considerable. This work is relieved from the user and he or she can clearly view which data and information are available for his or her requirements.

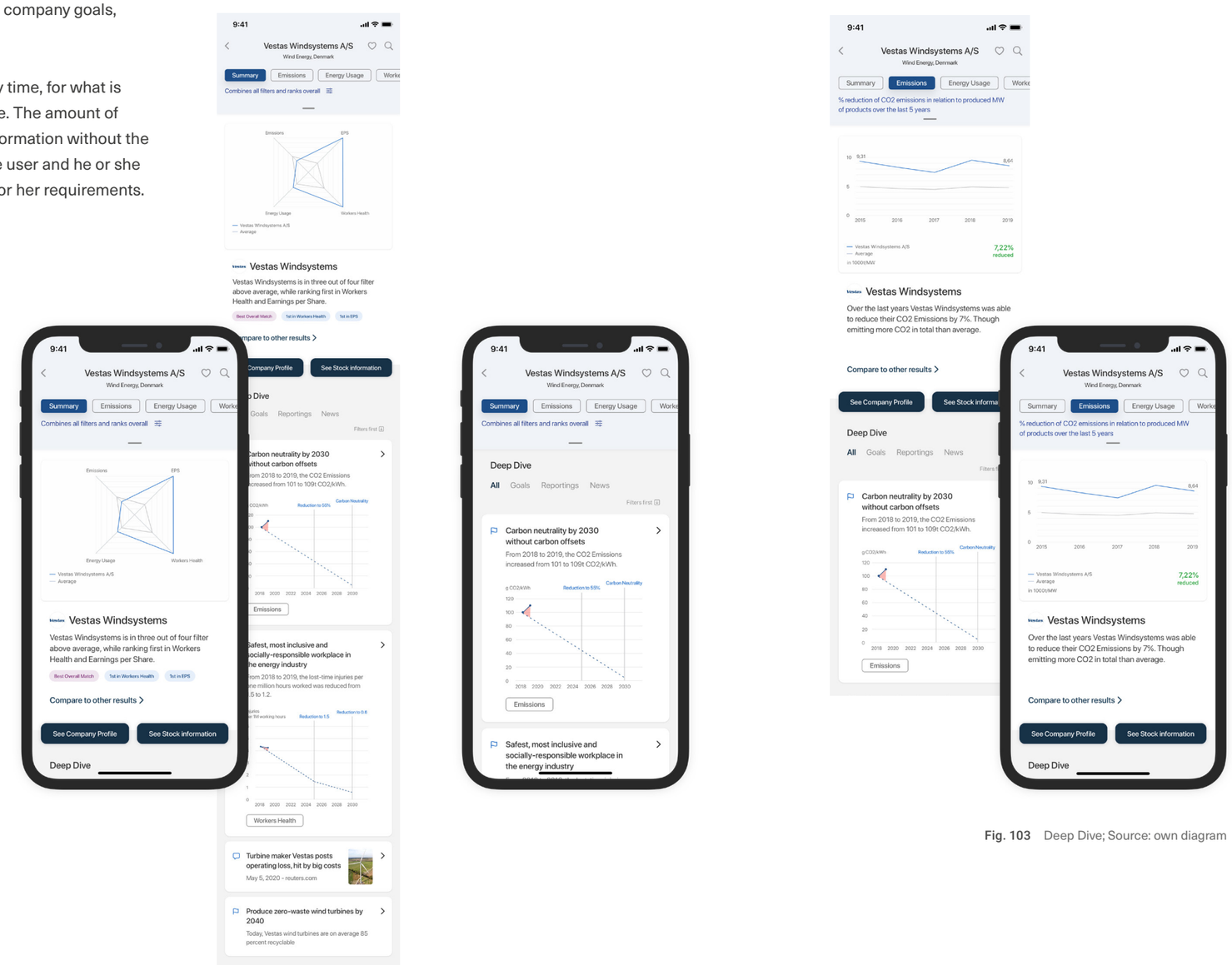


Fig. 103 Deep Dive; Source: own diagram

10 Diving deeper into contents
The user informs him or herself about goals, reports, and news highlighted according to the filters.

Targeted research on Detail Pages

In the deep dive, the user has come across the goal of Co2 neutrality by 2030. Since this is a topic that interests and is important to the user, he/she would like to read more about it. The user is guided to a deeper depth of information, the detail page. Strategies, measures, and previous achievements are presented here. The sources are also listed transparently and are checked by the user.

A design requirement that runs through the entire application and is particularly noteworthy at this point is credibility and trustability. Our research has shown that investors attach particular importance to transparent source listing and verification. For this reason, our solution presents all external content in a fully transparent and traceable manner.

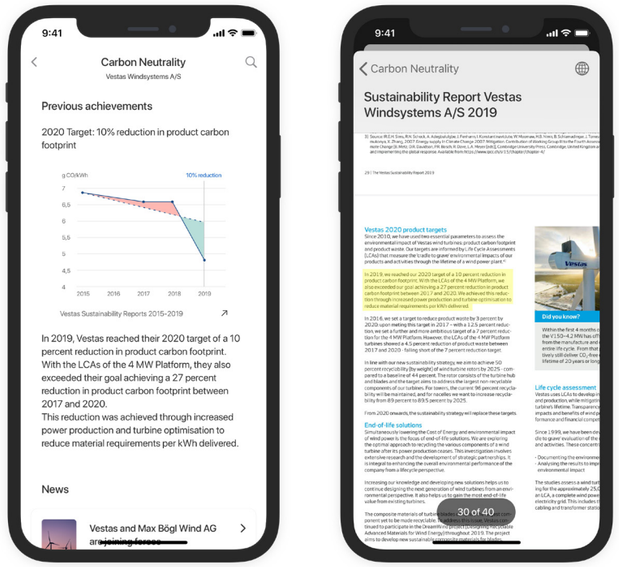


Fig. 104 Detail Page and Sources; Source: own diagram

11 Research detailed info
The user reads on related goals and additional information and also checks the sources for the presented data.

Establishment of Connections

At this point, the user has already read up on his filters and is very interested in the company. He/she would like to take a brief look at the company profile to see what long-term strategies the company is pursuing. On the profile, he also reads something about the management and sees which companies are among the strongest competitors.

The special feature to be found on this screen is that company information such as the product portfolio is presented in a tangible way. In addition to the information provided by the management, pictures of the corresponding persons are displayed. We have designed this in the spirit of the solution requirement Positive Experiences.

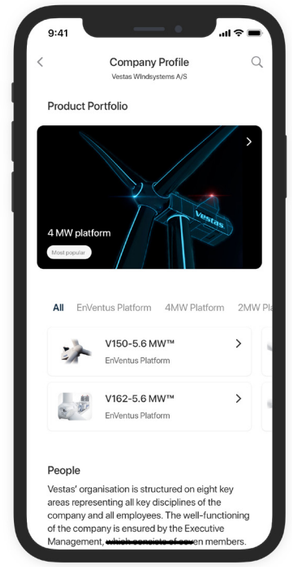
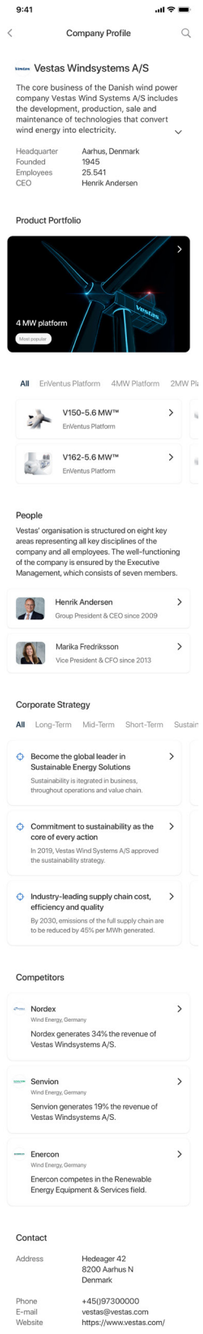


Fig. 105 Company Profile; Source: own diagram

12 Picturing the company
The user reads about the long-term strategies of the company and the product portfolio. He/she can now imagine more about the company.



Comparison of results

The user wants to check how Vestas Windsystems A/S performs compared to the previous Best Overall Match SMA Solar Technology. To do this, he or she selects the feature Compare to other results in the Company Overview. Here, the visualizations of the overall and individual performances in the filters are superimposed on each other and additionally compared to the average. Vestas Windsystems A/S ultimately convinces the user because of the significantly better performance in the EPS Filter and strong overall performance.

The qualitative comparison is a feature based on the idea that not only stock values can be compared directly. It also enables the user to understand and check how the rating is generated.

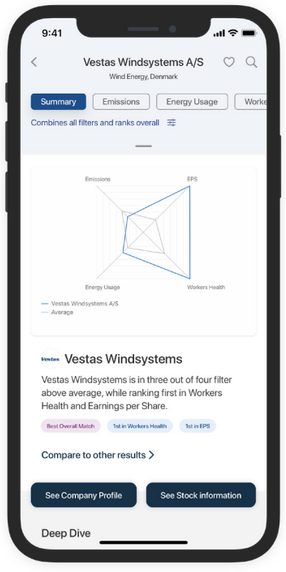
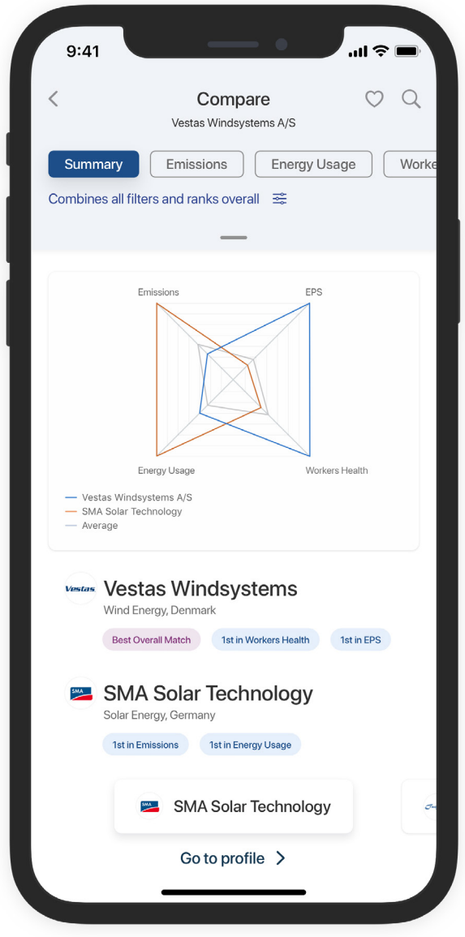
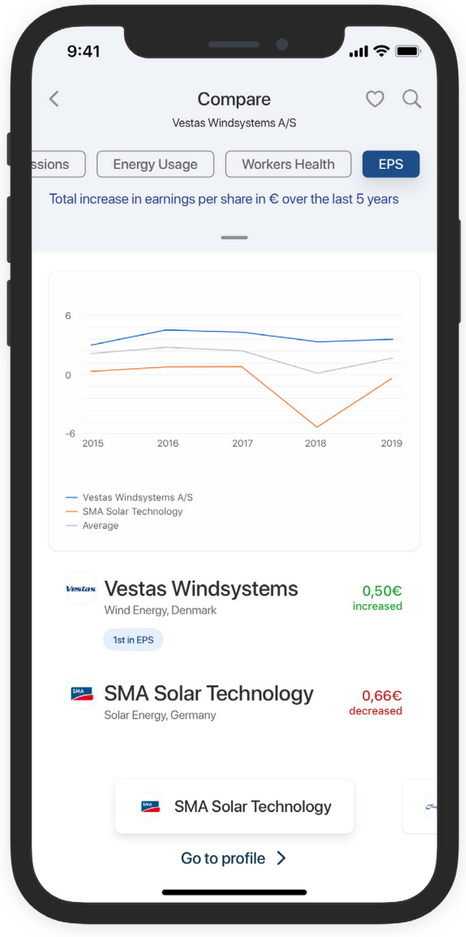


Fig. 106 Comparison of Companies; Source: own diagram

12 Qualititative comparison
The user starting from the overview of a company can compare all data to set filters with the other companies from the results.





Stock Information and Checkout

Since the user is qualitatively satisfied and convinced, he or she now wants to look at the development of the share value. Since this turns out positive and the user expects further positive growth based on the information consumed, he/she decides to buy the share. The user is guided through a checkout process and completes the investment out of conviction.

Our application aims to enable users to invest in stocks they are convinced of and which match their personal requirements and sustainability values. Ultimately, we want to connect investors and companies that share values, beliefs, and goals.

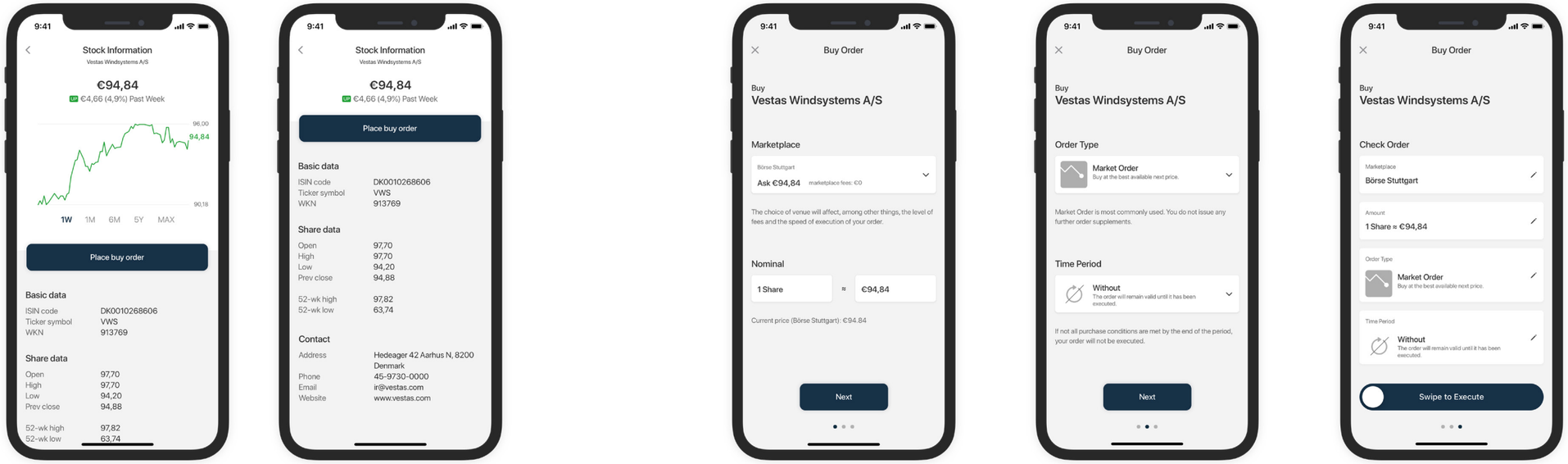


Fig. 107 Stock Information and Checkout; Source: own diagram

13 Action out of conviction
The user likes the positive development of the share value and believes in further growth. He/she opts for the product and buys.

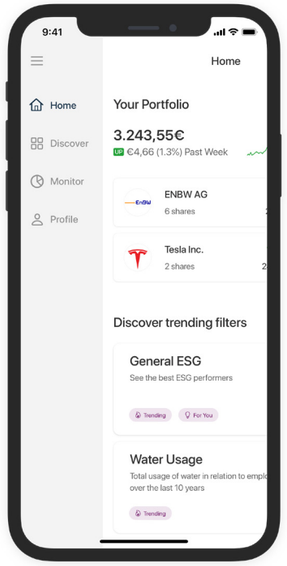
Home Screen and Portfolio

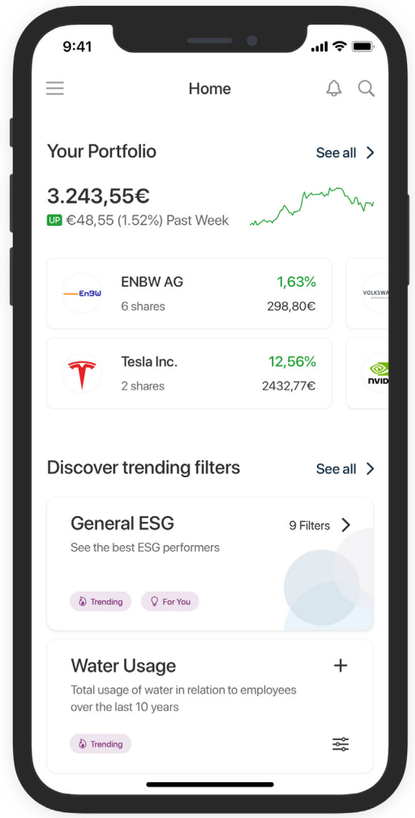
When launching the app, an overview of the most relevant information regarding the users' portfolio, watchlist, and interests in discovering new stock is given.
Most important is the portfolio, including the most recent and interesting news. The value is in focus here as return is the reason to invest and the main indicator for any further possible action.

On the portfolio screen itself, a more broad overview is provided on the included stocks and companies, including the relevant filter updates. As those filters were the reason to buy the share, they can indicate if the company and it's reporting develops the way the user intended it.

Menu

As the focus of users is quality based decisions, no quick browsing and back and forth between all parts of the app are required. By that, the focus is more on the displayed information or part of the app.





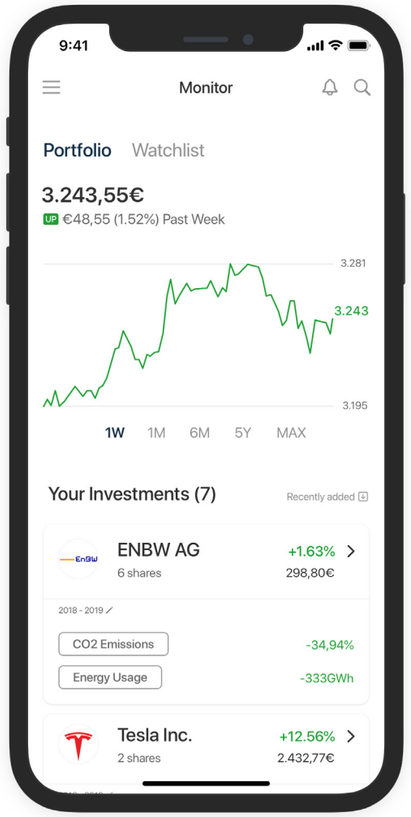


Fig. 108 Home and Portfolio; Source: own diagram

Appendix

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Statement of Authorship

We hereby declare that we are the sole authors of this bachelor thesis and that we have not used any sources other than those listed in the bibliography and identified as references. We further declare that we have not submitted this thesis at any other institution in order to obtain a degree.

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