The Impact of Proactive Decision-Making on the Sustainable Investing Behaviour of Individuals

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Abstract

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Proactive decision-making is a recently developed concept, which has been shown to have positive benefits on individuals. This study was a part of a broader research in investigating the financial consequences of proactive decision-making at MCI | The Entrepreneurial School® University of Applied Sciences in Innsbruck, Austria. Therefore, this study follows the academic guidelines used at MCI. The thesis is written according to the regulations of the APA Publication Manual (7th edition) and the MCI standards.

This study aimed to further validate the concept by investigating its effects on one of behavioural finances current developments, sustainable investing behaviour. To create meaningful comparisons, the effect of financial literacy was also measured against sustainable investing behaviour. Despite the critical role that sustainable investment may play in changing financial markets to a more sustainable direction, our knowledge of practical measures to stimulate sustainable investment behaviour is currently inadequate.

Participants (N = 155) answered an online questionnaire during the spring of 2023. Results of the questionnaire were analysed using a quantitative research method. One implication of this research is that the lack of unison academic definition for sustainable investing might cause confusion in individuals. However, the results of this study were inconclusive and further research in the topic is necessary since sustainable investing play an important role in the future of transforming the financial markets to a more sustainable way.

Key words
Proactive decision-making; Financial literacy; Sustainable investing behaviour; Behavioural finance

Table of contents

List of figures/tables/abbreviations

1. Introduction and problem definition

Albert Einstein once said, “If I were given an hour to save the planet, I would spend 55 minutes defining the problem and five minutes resolving it”. Currently our planet is in dire need of saving. In 2017, more than 15 000 scientists (Ripple et al., 2017) from around the world issued a warning to humanity. Stating that “humanity has failed to make sufficient progress in generally solving these foreseen environmental challenges, and alarmingly, most of them are getting far worse” (p. 1026).

Financial markets are also mandated to transition to a more sustainable way. For example, The Paris Agreement (2018) adopted by 196 parties of the United Nations emphasises that financial flows work as a pathway in sustainable development. Recently The European Union presented its 2030 climate target plan (Commission & Innovation, 2021), which requires all sectors to develop to a more sustainable way, including financial markets. Sustainable investing is described as a strategic approach in which economic, social, and environmental (ESG) factors are considered while choosing and managing an investment portfolio (Avramov et al., 2022, p. 642).

Despite the global efforts for the growth of sustainable investing, there are some discrepancies across various geographical areas. Most of the academic research has been conducted in the Western countries (Gutsche et al., 2019; Gutsche, Wetzel, et al., 2020; Gutsche, Zwergel, et al., 2020; Vanwalleghem & Mirowska, 2020). The growth of sustainable investing is notable in the younger generation, particularly those born between 1981 and 1996, known as millennials. A Morgan Stanley Institute for Sustainable Investing survey (2021) revealed this shift in interest. According to the findings of this survey, millennials' interest in sustainable investing increased from 84% in 2015 to 99% in 2021, while the general population's interest increased from 71% to 79% (Morgan Stanley, 2021, p. 1). In addition to the interest it has attracted, the value of sustainable investing has also been rising. For instance, according to the United Nations Principles for Responsible Investing (PRI), the value of assets covered by these principles increased from 21 trillion to 121 trillion dollars during the past ten years (PRI, 2022). There are also financial motivations in moving to a more sustainable way of investing, as it can provide good returns for investors (Cunha et al., 2020, p. 7). Tomo & Landi (2016, p. 1) and Marszk (2019, p. 80) encourage academics and practitioners to further the understanding in topics like ethics, sustainability, and responsible investing.

Every day, people are involved in countless decision situations and making good

decisions has never been as topical as it is now. However, not everyone has the necessary capabilities to make them (Siebert & Kunz, 2016, p. 865). This led Siebert & Kunz to develop and validate the concept of proactive decision-making, in which the proactive cognitive skills and personality traits of individuals are emphasised (Siebert & Kunz, 2016, p. 875). Proactive decision-making is a relatively new idea in operational behavioural research, which has been shown to have positive effects on individuals. Firstly, it significantly influences the decision satisfaction (Siebert & Kunz, 2016, p. 874). Meaning that by applying cognitive decision-making skills, individuals can achieve superior levels of satisfaction in their decisions. Secondly, the enhancement of individual's belief in successfully completing the required action to fulfil a desired outcome (J. U. Siebert et al., 2020, p. 1171). This is defined by Bandura (1977, p. 193) as self-efficacy. Thirdly, (Siebert et al., 2020, p. 1184) provide a prelude in which a clear and positive relationship between proactive decision-making and individual's life satisfaction was found. Life satisfaction meaning how extensively an individual evaluates their life (Pavot et al., 2010, p. 152). Lastly, proactive decision-making was studied experimentally, and discovered that it is a skill that can be trained (Siebert et al., 2021, p. 276).

Our knowledge of practical measures to encourage sustainable investment is currently limited, despite the crucial role that sustainable investment may play in shifting to a more sustainable economy (Vanwalleghem & Mirowska, 2020, p. 1). In addition to researching the impact of proactive decision-making to sustainable investing, this study will explore the impact of financial literacy to sustainable investing. Financial literacy is determined by an individual's comprehension of essential financial concepts and their capabilities and confidence in making appropriate short-term decisions alongside with long-term financial plans, while also being mindful of fluctuating economic situations and life situations. (Remund, 2010, p. 284.)

Personality traits are a significant part of the proactive decision-making concept developed by Siebert and Kunz (2016), thus it is essential to determine other consequences of proactive decision-making, such as financial consequences. Personality traits can have a more significant impact to financial behaviours than financial literacy (Fernandes et al., 2014, p. 24). Sustainable investing behaviour has gained significance during the recent years, and it has not been studied alongside the proactive decision-making concept of Siebert and Kunz (2016). Therefore, this study aims to provide novel insight. Namely, whether proactive decision-making contributes a larger impact on the

sustainable investing behaviour of individuals than financial literacy. Thus, this study explores the following research question (RQ):

RQ: How does proactive decision-making and financial literacy impact the sustainable investing behaviour of individuals?

This paper is structured as follows. The aims and contributions of this research are presented in the second section. Followed by the literature review in section three, which provides the theoretical background for the constructs used in the research. The methodology of this study is provided in the fourth section. The fifth section introduces the results of the study, followed by the discussion of the results in section six. The paper concludes at chapter seven with the summary and possible limitations of the research followed by suggestions for future research.

2. Contribution and aims of the research

As was highlighted in the introduction, proactive decision-making has positive effects on individuals. Upon completion of this research, it could be distinguished whether sustainable investing behaviour is positively influenced by proactive decision-making. Furthermore, this study will further test and validate the scale of proactive decision-making, which was developed by Siebert & Kunz (2016). In addition to the relationship between these constructs, the influence of financial literacy to sustainable investing behaviour is researched. This will produce meaningful comparison between the influences of proactive decision-making and financial literacy to sustainable investing behaviour.

As proactive decision-making is a relatively new concept, no prior research has taken place which analyses sustainable investing behaviour of individuals and proactive decision-making. The research gap is highlighted in the literature review below. The initial contribution of this study can be categorized as academic since the thesis project is a component of a broader research into the financial consequences of proactive decision-making. This study aims to build on the groundwork created by prior studies and expand the findings in proactive decision-making, financial literacy, and sustainable investing behaviour.

However, I believe that the study will have a managerial contribution as well. As the study will produce new data and a better comprehension between proactive decision-making, financial literacy, and sustainable investing behaviour. The latter being one of the most topical developments recently in behavioural finance. With this study, I also aim

to contribute to finding incentives to move financial behaviours towards a more sustainable way. Furthermore, everyone is required to make decisions daily. Therefore, the aim of this study is to make a positive impact on the individuals who read this research. First, by motivating people to be more proactive. Secondly, by shifting their financial behaviour towards a more sustainable way. Given that the Earth is currently undergoing an ecological crisis and that humanity needs to find incentives to enhance sustainable behaviour, sustainability is at the forefront of being the most important development of our time.

3. Literature review

3.1. Proactive decision-making

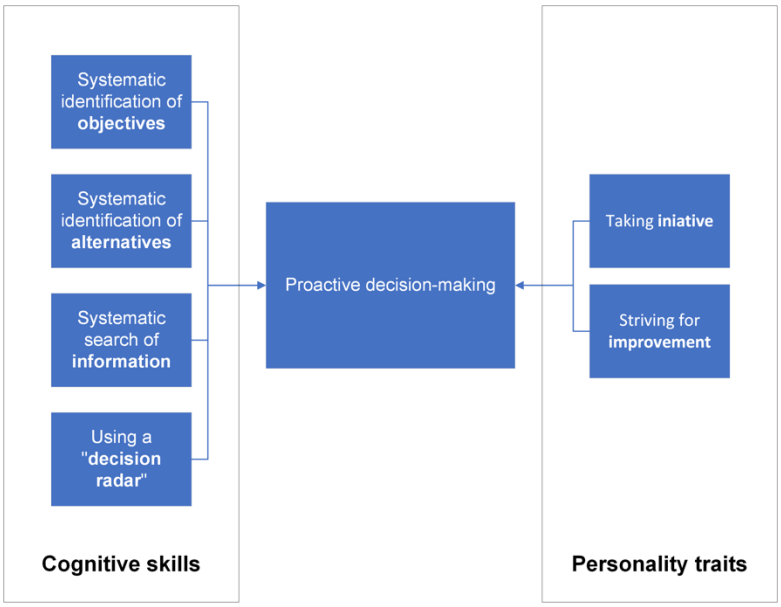
Humans make countless decision in their daily life, which are varied in their content by significance. These decisions typically follow a common structure in which an individual assesses the possible options and selects an option that provides the desired result (Byrnes, 2002, p. 208). This type of a process can be described as problem structuring method, which is defined by Rosenhead (2013, p. 1162) as an approach to handling a problem in which the purpose is to assist in structuring a problem instead of directly deriving a solution. One example of problem structuring is outlined by Furby and Beyth-Maron (1992, pp. 3–4) as a five-step process that should be completed for an individual to secure the optimal choice that is based on their beliefs and values to increase their well-being. First, one should identify all viable alternatives. Followed by determining the possible consequences that these alternatives might cause. The third step is to consider the desirability of the consequences. In the fourth step, one should evaluate the likelihood of these consequences. The fifth and final step is to identify the best alternative, which is grounded in a specified decision rule. An example of said rule is to choose the option that provides the best increase in the decision-makers wellbeing. The approach is defined by Keeney (1992) as alternative-focused thinking. This type of an approach can be too narrow and reactive, which does not lead to the identification of all possible alternatives. Furthermore, this type of an approach is typically used to solve problems that are caused by certain circumstances which are not in the control of the decision-maker. In addition, the identified objectives are often addressing the consequences that are of interest (Keeney, 1992, pp. 44–47). As Keeney identified that alternative-focused thinking is too reactive, he provides a more proactive alternative to creating decisions and searching

decision opportunities, called value focused thinking (1992). As the name suggests, the emphasis is on the decision-makers values. They should be incorporated at the very beginning of the decision-making process and then used in each step of the process. The successful addition of values in the decision-making process can provide more attractive consequences of possible decisions (Keeney, 1992, pp. 3–4).

The key elements in decision-making are values, vision, (Keeney, 1992, p. 3), and objectives (J. Siebert & Keeney, 2015, p. 1145). In the context of proactive behaviour, Keeney further defines that values guide proactive individuals and that these individuals use their vision for development. Objectives on the other hand serve as the basis for creating alternatives in a decision situation, guidance in systematic search for information, and eventually making decisions. In decision-making situations, individuals cannot be proactive if they are not aware of their objectives in the specific decision situations. Reactive and passive individuals accept the alternatives that are given to them in decision situations, thus not striving for more ambitious goals or values. (Siebert & Kunz, 2016, p. 867.) This realisation leads to conceptualisation of proactive decision-making, which combines decision theory, psychology, and behavioural operational research (Siebert & Kunz, 2016, p. 867). Proactive behaviour is grounded in certain personality traits and cognitive skills. For example, Bateman and Crant (1993, p. 103) define proactive behaviour as “the relatively stable tendency to affect change”. In organisational behaviour, proactive behaviour has been identified to have a positive influence in entrepreneurial intentions (J. Crant, 1996), individuals’ objective and subjective career success (Seibert et al., 1999), career planning (Frese et al., 1997), and transformational leadership (Bateman & Crant, 1993). In addition to these academic fields, proactive individuals apply cognitive skills and personality traits in decision situations. Four distinct cognitive skills and two personality traits were developed and validated by Siebert & Kunz (2016) to conceive proactive decision-making, these are illustrated in Figure 1.

Figure 1

Dimensions of proactive decision-making



Note. Four cognitive skills and two personality traits that are included in the concept of proactive decision-making model (Siebert & Kunz, 2016, p. 868).

These proactive cognitive skills can be learned or picked up spontaneously. However, having these skills alone is not enough; application of these skills is required. "Proactive decision-making summarises the purposeful use of cognitive skills and certain foresighted personality traits of the decision-maker" (J. Siebert & Kunz, 2016, p. 875).

3.2. Proactive cognitive skills

Proactive behaviour in decision situations is only possible when one identifies objectives and alternatives (Keeney, 1992, p. 49). A proactive person is active in seeking information that is helpful in evaluating alternatives that match their relevant values purposefully (Keeney, 1992, p. 42). Furthermore, future orientation is crucial to proactive individuals as they strive to act before future events to prevent possible issues in their decision situations (Frese & Fay, 2001, p. 140).

First, proactive individual identifies objectives systematically. Second, they continue to systematically identify alternatives that relate to the previously identified objectives. These steps are crucial as the use of objectives increases the quality and quantity of alternatives (J. Siebert & Keeney, 2015, p. 1146). Third, proactive individual

searches for information systematically. For example, Keeney (1992, pp. 270–271) suggests a prompt and comprehensive collection of information about relevant values in the specific decision situation. Additionally, proactive individuals relate back to the identified objectives and alternatives when systematically searching for information. The fourth and final cognitive skill is using a so-called decision radar. By using the decision radar, individuals are aware of the impact of their decisions. They approach their decisions in a strategic manner, in which they proactively consider the decisions of others by taking a bird's-eye view of the decision situation. (J. Siebert & Kunz, 2016, p. 868).

3.3. Proactive personality traits

Personality traits are persistent patterns of thoughts, feelings, and behaviours that reflect a propensity to respond in certain ways under certain conditions (Roberts, 2009, p. 140). Reactive individuals rely on external factors in decision-making, whereas proactive individuals take initiative in decision situations (Bateman & Crant, 1993, p. 105). The meaning of taking initiative is two-fold for proactive individuals. Not only does it describe the initiative position in decision situations, but also that proactive individuals strive to modify actively the environment which they inhabit (Ashford & Black, 1996, p. 203). Lastly, proactive individuals strive to have distinguishable effect either on themselves or on their environment (Grant & Ashford, 2008, p. 4), meaning that they are interested in making a difference. In other words, proactive individuals strive for improvement in decision situations. (J. M. Crant, 2016, p. 436). According to Siebert and Kunz (2016, p. 868) individuals cannot be proactive without striving for improvement in their decision situations.

The cognitive skills of taking initiative and striving for improvement are regarded as different qualities in decision-making processes as they have an impact on the effectiveness of decision-making processes. Both qualities are required for proactive decision-making. An individual will not achieve proactivity in decision-making if they exert energy to strive for improvement without taking initiative or vice-versa (J. Siebert & Kunz, 2016, p. 868).

3.4. Sustainable investing behaviour

Essentially, the way people invest is mostly influenced by financial factors such as perceived risk and expected financial gain (Cubas-Díaz & Martínez Sedano, 2018, p. 16). Furthermore, making rational decisions is central to conventional conceptions of

investment behaviour (Singh & Yadav, 2021, p. 52). The goal of behavioural finance is to explain how people think about money and investing. Specifically, to clarify and better understand the behaviours of individual investors. Not only the emotional processes, but also the decision-making process of individuals (Ricciardi & Simon, 2000, p. 2.) One of behavioural finance's most important advancements as of late, is the rise of sustainable investing. There are different terms used for sustainable investing, such as ESG investing (Schanzenbach & Sitkoff, 2020, p. 1) and impact investing (Hockerts et al., 2022, p. 937). This study is conducted by generally using sustainable investing behaviour.

Individuals are expecting businesses to care about its stakeholders ethically, which includes protecting the environment and raising awareness of the need to operate environmentally, socially, and economically responsibly (Schmid et al., 2021, pp. 443–444). In Europe for example, the European Union has responded to the expectations by implementing a strategy to finance sustainable growth. This strategy involves integrating sustainability into investment advice given to individual investors (European Commission, 2018).

McLachlan & Gardner (2004, pp. 16–19) identified some differences between socially responsible investors and conventional investors. Namely in the importance of ethical issues, investment decision-making style, and in the perception of moral intensity. Socially responsible investors consider the ethical aspects of potential investments, while conventional investors are less likely to consider such issues when making investment decisions (McLachlan & Gardner, 2004, p. 18). Furthermore, the study suggests that socially responsible investors invest more time and effort in assessing available information on potential investments to determine whether a particular company meets certain ethical standards. Yet the absence of universal criteria for identifying socially responsible companies may also play a role in the time and effort spent in making investment decisions (McLachlan & Gardner, 2004, pp. 18). Finally, the results indicated that socially responsible investors tend to have a higher level of moral intensity than conventional investors (McLachlan & Gardner, 2004, p. 19). The results indicated that there were no noticeable differences in the sociodemographic background, importance of financial returns, and investment strategy of these two types of investors. However, there are varied results when it comes to the importance of financial returns. Lewis and Mackenzie (2017, p. 186) indicate that sustainable investors appear to be just as interested in the financial performance of their investments as conventional investors. On the other hand, Riedl and Smeets (2017, p. 23) conclude that sustainable investors are more willing

to sacrifice financial performance in order to invest according to their preferences.

Additional characteristics of sustainable investors are that they seem to regard investing as an extension of their identity, applying their social ideals and principles into their financial lives too (McLachlan & Gardner, 2004, p. 19). Gutsche, León and Ziegler (2019, p. 16) suggest that sustainable investors receive strong non-financial utility from investing sustainably. When it comes to sustainability, individuals tend to display consistent behaviour. Sustainable consumers appear to place a greater emphasis on sustainability in their investment decisions compared to mainstream consumers (Brunen & Laubach, 2022, p. 59). Furthermore, Brunen and Launach (2022, p. 59) show that sustainable lifestyle has a significant and positive relation in the allocation of sustainable assets in an individual's investment portfolio. Moreover, some make sustainable investment choices as a way to indicate to others that they are behaving sustainably (Riedl & Smeets, 2017, p. 24). In addition, Riedl and Smeets (2017, p. 25) highlight that sustainable investors tend to have longer investment horizons. Meaning that individuals who are more patient are more likely to be knowledgeable about sustainable investments and to make sustainable investment decisions. Indicating that sustainable investing behaviour is associated with future orientation. Corporate and private investors' investment requirements now take on a new dimension because of the rise of social, environmental, and ethical concerns in recent years, which are reflected in topics like climate change, corporate social responsibility, fair trade, gender equality, and child labour, among others (Schmid et al., 2021, p. 435).

3.5. Financial literacy

The barrier to access financial markets as an individual investor is increasingly lower than what it used to be. Individual investors face an increasing responsibility whilst at the same time the range of choice in financial products has also widened. As more people have access to financial markets and products, it's noteworthy to assess how capable humans are to partake in the financial world. Alba & Hutchinson (1987, p. 411) define financial literacy as a specialised type of consumer expertise on managing one's financial matters or specifically human capital related to personal finances. Financial literacy is used specifically to assess people's ability to analyse financial information, make financial decisions based on the accumulated information (Lusardi & Mitchell, 2013, p. 2), According to the traditional microeconomic perspective on the decisions people make about saving and spending, an individual who is completely rational and knowledgeable

will save a portion of their income for the future (Lusardi & Mitchell, 2013, p. 3).

Individuals' financial literacy can be assessed using specific knowledge questions. These questions cover topics such as interest rates, risk, and compounding of interest. Along with the impacts of inflation, discounting, and the distinction between nominal and real values. For example, by asking questions such as: "Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?" (van Rooij et al., 2011, p. 452). Although it is important to note that financial literacy measures can only provide an estimate of what people need to know to make better financial decisions for their future. Lusardi and Mitchell (2013, p. 10) highlight that even the most detailed measures might not indicate accurate financial literacy and that there are risks of measurement errors. Some studies have also noted that individuals perceived financial literacy differs from their actual level of financial literacy. For example, while a majority of respondents gave themselves a relatively high score of financial literacy, only a third were able to answer the precise questions correctly (Lusardi & Mitchell, 2013, p. 15) Evidently, there are implications of how various demographic factors such as individuals' income, gender, and age influence individuals' financial literacy. A gender gap exists in financial literacy, meaning that men generally have a higher score in financial literacy scales (Caratelli & Ricci, 2011, p. 10; Lusardi et al., 2010, p. 37). Regarding the influence of age in financial literacy, empirical research highlights that financial literacy is lower for young as well as old individuals in comparison to the age groups in between (Caratelli & Ricci, 2011, p. 10; Lusardi & Mitchell, 2010, p. 9).

Education, gender, income, and wealth crucially implicate an individual's participation in the stock market. Notably, financial literacy provides just as significant indicator for the participation in the stock market (van Rooij et al., 2011a, p. 461). Individuals who possess a greater understanding of finance may be more knowledgeable about the development of the advancements in the financial sector. As a result, it is plausible that such individuals would be more informed about sustainable investment options. Regarding personal sustainable investment practices, those who are financially literate are likely to incur lower costs associated with acquiring information, as they are better equipped to locate, assess, and comprehend pertinent information prior to making sustainable investment choices (Gutsche et al., 2021, p. 4; Gutsche, Wetzel, et al., 2020,

p. 20).

3.6. Financial literacy and sustainable investing behaviour

As the financial markets are shifting towards a more sustainable way, individual investors have the possibility to allocate their assets in more sustainable investment products. Financial literacy is needed to make informed investment decisions and to achieve competent market returns. (Filippini et al., 2021, p. 30.) Studies in literature have indicated that having better understanding of financial concepts and products is associated with exhibiting more financially responsible behaviour namely, planning and saving for retirement (Lusardi & Mitchell, 2006; van Rooij et al., 2011b), stock market participation (van Rooij et al., 2011a), and portfolio diversification (Kimball et al., 2010).

There are existing studies that link financial literacy and sustainable investing behaviour. These studies implicate that high levels of financial literacy correlate with the knowledge of sustainable investing, however the results in sustainable investing behaviour are varied. For example, (Aristei & Gallo, 2021, p. 15) highlighted the likelihood of dealing with ethical financial organizations increases by more than 14 percents for every unit rise in the number of right answers to questions about financial literacy. Similar results were recorded by (Gutsche, Wetzel, et al., 2020, p. 20). Subsequently, these two variables did not have a positive link for individual investors in Japan. Rather financial literacy increased the awareness of sustainable investing opportunities, but the increase did not translate to sustainable investing behaviour (Gutsche et al., 2021, pp. 9–11).

Financial literacy and environmental awareness are factors that typically increase individuals' preferences for ethical financial companies, thus having a significant impact in the promotion of sustainable investments (Getzner & Grabner-Kräuter, 2004, p. 265). Anderson and Robinson (2021) surveyed a large sample of Swedish households to research how pro-environmental attitudes translated to investment decisions. They concluded that pro-environmental households are financially disengaged, meaning that they are less likely to hold stocks, check pension balances, or partake in active green retirement planning options (Anderson & Robinson, 2021, pp. 1566–1569). However, high financial literacy did translate to green financial engagement, such as selecting ESG-labelled funds (Anderson & Robinson, 2021, p. 1571).

Emphasis on improving individuals' financial literacy could lower the barrier for sustainable investing of individuals. Sustainable investment products are typically more

intricate than their conventional counterparts, which means that individuals with limited financial knowledge may incur higher processing costs in understanding relevant information. As a result, they are less likely to invest in a sustainable manner (Gutsche, Zwergel, et al., 2020, p. 119). Aristei and Gallo (2021, p. 17) conclude similarly that objective financial literacy has a significant contribution in the possibility to prefer sustainable financial companies. Thus, suggesting that lower levels of financial literacy acts as a significant hindrance to sustainable investment behaviour.

Therefore, the first hypothesis is as follows:

Hypothesis 1: Financial literacy positively influences individuals sustainable investing behaviour.

3.7. Proactive decision-making and sustainable investing behaviour

At this moment there is a research gap between the proactive decision-making model (Siebert & Kunz, 2016) and the sustainable investing behaviour of individuals. However, some research has been done which is closely related to the proactive decision-making model of Siebert and Kunz (2016). For example, Vanwalleghem and Mirowska (2020) researched the stimulation of sustainable investing by displaying positive environmental images to individuals. The results suggest that individuals viewed sustainable investing options in a better light after seeing positive environmental images. This impact was more noticeable in people with proactive personalities (Vanwalleghem & Mirowska, 2020, p. 4). These results provide a prelude to further the study of proactive decision-making and sustainable investing behaviour. As proactive-decision making is a model that considers proactive personality traits and cognitive skills of an individual.

Previous research has found that personality traits are associated with various economic outcomes (Becker et al., 2012) and more specifically with financial behaviours such as savings behaviour (Gerhard et al., 2018), and stock market participation (Gherzi et al., 2014). Since there were no noticeable differences in the sociodemographic background between conventional investors and sustainable investors (McLachlan & Gardner, 2004, p. 17), the differences between these two types of investors could be due to differences in cognitive and personality dimensions (McLachlan & Gardner, 2004, p. 20). Investors that feel poorly informed about sustainable investments are less likely to partake in sustainable investing. (Gutsche, Zwergel, et al., 2020, p. 120) This suggests that there is a need for more information about sustainable investment opportunities and to train individuals in systematic information search. As proactive individuals have been

found to have an association with financial behaviours and when considering the cognitive skills and personality traits required in proactive decision-making, the following hypothesis is suggested:

Hypothesis 2: Proactive decision-making positively influences sustainable investing behaviour of individuals.

4. Methodology

4.1. Research design

The research used the following specified design, in order to produce a study that can be replicated, meaning that any future researcher can use the following methods to replicate similar results (Bell et al., 2019, pp. 58–59). The conducted research was exploratory, which aimed to measure and describe relationships between variables (Saunders, 2019, p. 188), specifically proactive decision-making, financial literacy, and sustainable investing behaviour. The research aimed to provide novel findings to existing studies and was influenced by them. Thus, this study was conducted by following a similar research design as these existing studies. The proactive decision-making scale by Siebert and Kunz (2016) was developed in quantitative research. Fernandes et al. (2014) examined studies which linked financial literacy to various financial behaviours, such as investing behaviour. Studies of financial literacy (Lusardi & Mitchell, 2010; van Rooij et al., 2011a, 2011b) are rooted in quantitative research. Subsequently Gutsche et. al (2021) investigated the determinants of individual sustainable investing behaviour with quantitative research. Therefore, this study followed a quantitative research design by collecting numerical data, which allowed to deduct a comprehension of the relationship between theory and research (Bell et al., 2019, p. 164).

The data for this research was collected from a wide range of participants at a certain point in time through an online questionnaire. Thus, the research was cross-sectional (Bell et al., 2019, p. 45). The research was conducted within the natural environment of individual investors as the aim was to understand the relationship between proactive decision-making, financial literacy, and sustainable investing behaviour of individual investors. As it was not feasible to collect data from the full population, a sampling strategy was selected (Saunders, 2019, p. 294). The sampling strategy in this study was probability sampling with a representative sampling by way of simple random sampling (Saunders, 2019, p. 308). The sampling method selected was validated with a

pre-test from the collected data.

4.2. Research method

Using an online survey allowed the collection of large number of data economically and, in general, provided data that was easy to explain and understand (Saunders, 2019, p. 193). The selected method offered advantages in the context of the research done for a bachelor's thesis. Namely, that it provided a possibility for an economical and faster research than for example face-to-face interviews. The method was also convenient considering the respondents as it allowed the completion of the questionnaire at their own pace and point of time (Bell et al., 2019, pp. 233–234).

Participants in this study answered certain statements and questions about themselves, proactive decision-making, financial literacy, and sustainable investing behaviour. The items for proactive decision-making were derived from the scale developed by Siebert & Kunz (2016), in total 22 statements. These statements were focused on the six distinct dimensions of proactive decision-making; systematic identification of objectives, systematic identification of alternatives, systematic search for information, using a decision-radar, taking initiative, and striving for improvement. These items were on a 7-point Likert scale which ranges from (1) "disagree very strongly" to (7) "agree very strongly" (J. Siebert & Kunz, 2016, p. 869). Items of financial literacy were drawn from Fernandes et al. (2014) that followed scales developed by Van Rooij et al. (2011a). Respondents gave answers to a total of 12 multiple choice items, which measured financial knowledge by statements that required simple or no calculations. These statements asked questions relating to return on investment, risk level of investment assets, and general understanding of finance. Each statement which measured the financial literacy always had one right answer. The three items relating to sustainable investing behaviour were derived from Gutsche et al. (2021). Firstly, the respondents were asked to answer whether they've heard of sustainable investing before this survey by answering either "Yes" or "No". Followed by two multiple choice items about the respondents' current level of sustainable investing behaviour and future interest in sustainable investing. Lastly, the participants answered to items relating to their demographic backgrounds. These items asked about their age, location, gender, income, and level of education. This type of data can be used to create models of certain relationships between variables and offer potential justifications for such associations. The complete questionnaire can be found in the appendix at the end of the thesis. The

responses to the online questionnaire were collected by using Prolific, an online research tool, which is specifically designed to be used in academic research. The responses were collected in The United Kingdom during the spring of 2023. In total 155 respondents completed the online questionnaire.

Certain disadvantages must be considered when conducting research with the selected method. The collection of data might not be as extensive as what could be achieved with other methods. For example, respondents might stop responding to the survey abruptly and the items in the questionnaire might not be high quality (Saunders, 2019, p. 194). However, in the context of this study these disadvantages were avoided as the items in the online questionnaire were derived from previous high-quality studies and therefore can be trusted to provide quality data for the study. Furthermore, the items in the questionnaire were selected to directly address the researched constructs. Lastly, to maximise the cooperation from the respondents the survey was designed to be completed in a timely fashion. On average it took the respondents approximately 18 minutes to complete the online survey.

4.3. Data analysis

To facilitate statistical analysis, the collected data had to be transformed into a classification and format (Bell et al., 2019, p. 42). Statistical analysis of the data was done through RStudio, a free data analysis tool for the R programming language (Posit team, 2023). The R programming language is free and open source. The programming language has been designed with an emphasis on computational statistics.

When asking certain closed questions, it's possible that some relevant responses won't be included in the data. Another drawback is that different respondents may have different interpretations of the questions. The results might have been skewed, because these interpretations might not be recorded (Bell et al., 2019, pp. 250–253). The data was carefully evaluated to ensure the validity of the data before conducting any analysing. The use of RStudio ensured that the methods conducted are highly reproducible, shareable, testable, scalable, and deployable by others with baseline skills of the programming language R or similar programming languages (Hair et al., 2021, p. 34). The sample contained five respondents who had not completed all items in the questionnaire. Therefore, their responses were excluded from the analysis. Furthermore, after inspection of the data, 15 other respondents were identified to have given unreliable responses in the survey and were therefore excluded. 135 respondents were left in the

dataset after this data manipulation. After this initial manipulation, the answers of the dataset were then converted to numerical data to facilitate statistical analysis.

In the construct of proactive decision-making, the most proactive answer to the statements was “strongly agree”, thus these questions were coded from 1 (“strongly disagree”) to 7 (“strongly agree”). However, three questions (INT_1, INT_2, and INT_3) regarding the taking initiative dimension are counter formulated. Meaning that the most proactive answer to these three statements is “strongly disagree”. Thus, these are coded as 1 (“strongly agree”) to 7 (“strongly disagree”).

As there was only one correct answer for each question in the financial literacy construct, the right answer was coded to 1 and other answers were coded to 0. Furthermore, the responses measuring financial literacy of individuals were summed up per respondent. Thus, resulting in the best possible outcome of 12 correct answers per respondent.

The questions measuring the sustainable investing behaviour are all treated as dependent variables and coded individually. SUS_1 measured the awareness of sustainable investing which was coded as 1 (“Yes”) and 0 (“No). SUS_2 measured the allocation of sustainable investments in the respondent’s portfolio. These answers were coded from 0 (“Don’t know”) to 7 (“100 %”). Lastly, SUS_3 measured whether the respondent wants to either keep investing or start investing in sustainably in the future. These answers were coded as, 0 (“Do not know”), 1 (“Yes, I want to invest in sustainable investments in the future”), 2 (“Yes, I want to keep investing in sustainable investments in the future”), and 3 (“No”). The question sets relating to each construct were then constructed to respective scales and data frames.

After the responses were coded accordingly, the dataset was suitable for statistical analysis. Firstly, the demographics of the respondents were analysed to evaluate the participants’ diversity regarding their age, education, employment, income level, and gender. Secondly, the constructs were then assessed by performing mean analyses for each individual construct and where suitable, counting the correct answers and number of answers for specific questions. Thirdly, the constructs were evaluated by using Cronbach’s alpha statistical test, which is used to measure the consistency of the answers in a specific set of questions and to figure out if the answers are internally consistent (Saunders, 2019, pp. 800–801). Lastly, regression analyses were conducted for the constructs to test the hypotheses and to answer the research question. Namely, the relationship between the dependant variable of sustainable investing behaviour and

independent variables of proactive decision-making and financial literacy.

5. Results

5.1. Analysis of the demographics

The respondents of the survey were all from the United Kingdom. The age of the respondents varied between 18 to 79 years old. 10% of the respondents belonged to the age group of 18 to 25 years old. The largest age group in the respondents being 26 to 35 years old, total of 39 % of the respondents. 23 % of the respondents belonged to the age group of 36 to 45 years old. 27 % of the respondents were in the two older age groups. 82 of the respondents in the survey identify themselves as male, 52 identify themselves as female, and one respondent did not prefer to mention the gender which they identify with the most. One respondent has a lower secondary education. Most of the respondents had either higher secondary education or more advanced form of education. 44 % of the respondents have a bachelor's degree or equivalent. 81 of the respondents were working as an employee. The income levels of the respondents varied from £0 to £130,000 and the median income for the respondents was £36,000. The demographics of the respondents can be observed below in Table 1.

Table 1

Demographic results

Demographic	**Amount**	**Percentage**
Gender		
Male	82	60.741 %
Female	52	38.519 %
Prefer not to say	1	0.741 %
Age		
18-25	14	10.370 %
26-35	53	39.259 %
36-45	31	22.963 %
46-55	18	13.333 %
55 and above	19	14.074 %
Education level		
Primary education school	0	0.000 %

Demographic	Amount	Percentage
Lower secondary education	1	0.741 %
Higher secondary education	27	20.000 %
Post-secondary	35	25.926 %
Bachelor's or equivalent	60	44.444 %
Master's or equivalent	9	6.667 %
Doctoral or equivalent	3	2.222 %
Employment		
Working as an employee	81	60.000 %
Working as self-employed	6	4.444 %
Unemployed and looking for work	12	8.889 %
A homemaker or stay-at-home parent	13	9.630 %
Student	12	8.889 %
Retired	4	2.963 %
Other	7	5.185%
Income		
Minimum		£0
Maximum		£130,000
Median		£36,000

Note. The demographic background of the respondents in the survey.

5.2. Reliability analysis

In order to confirm that the questions utilised provide an adequate level of consistency to accurately assess the constructs, a Cronbach's alpha statistic was calculated. The proactive decision-making construct was created from the 22 questions that were asked from the participants, with the Cronbach's alpha value being 0.94. The financial literacy construct was created from the 12 questions, with the Cronbach's alpha value being 0.77. The three questions measuring the sustainable investing behaviour were considered individually, therefore testing the reliability of these items was not necessary. A summary of the results is portrayed below in Table 2.

Table 2

Cronbach's alpha results

Construct	Cronbach's alpha value
Proactive decision-making	0.94
Financial literacy	0.77

Note: Results indicating suitable levels of consistency for the two constructs.

5.3. Descriptive statistics

As mentioned previously, the proactive decision-making construct was created by using 22 statements, which the respondents answered with items on a 7-point Likert scale. The most proactive statement to these questions was "strongly agree" (7). However, three statements concerning the taking initiative dimension were negatively worded, thus the most proactive answer to these statements was "strongly disagree" (7). These statements were reverse coded to ensure that the most proactive answer was represented accurately.

Starting with the four cognitive skills (Objectives, Alternatives, Information, and Decision radar) in the proactive decision-making model, the range of the average response for each individual item varied from 4.622 (ALT_1) to 5.881 (INF_3). The average response to each cognitive skill varied from 5.071 (Alternatives) to 5.773 (Information). Subsequently the average response for each individual item in the two personality traits (Initiative, and Improvement) ranged from 3.838 (INI_2) to 5.519 (IMP_2). The average response to each personality trait varied from 4.269 (Initiative) to 5.354 (Improvement). The results are summarised below in Table 3.

Table 3

Proactive decision-making results

Construct/Dimension	Item	Mean	Dimension mean
Proactive decision-making			
Objectives	OBJ_1	5.792	
	OBJ_2	5.755	
	OBJ_3	5.296	5.614
Alternatives	ALT_1	4.622	
	ALT_2	4.926	
	ALT_3	5.267	
	ALT_4	5.467	5.071

Construct/Dimension	Item	Mean	Dimension mean
Information	INF_1	5.807	
	INF_2	5.630	
	INF_3	5.881	5.773
Decision Radar	RAD_1	5.511	
	RAD_2	4.756	
	RAD_3	5.674	
	RAD_4	5.370	
	RAD_5	5.644	5.391
Initiative	INI_1	4.074	
	INI_2	3.838	
	INI_3	4.304	
	INI_4	4.860	4.269
Improvement	IMP_1	5.038	
	IMP_2	5.519	
	IMP_3	5.504	5.354

Note: The mean values for all items in the proactive decision-making construct.

There were in total 12 questions measuring financial literacy of individuals. The questions varied from items measuring basic financial literacy to more advanced financial literacy. The individual questions always had one right answer and multiple wrong answers or statements such as "Don't know" or "Refuse to answer". For each question, if the respondent answered correctly, the answer was set to one (1). Wrong and other answers were set to zero (0). The average responses to the questions measuring financial literacy varied between 0.259 (FL_12) to 0.844 (FL_8). For the whole construct of financial literacy, the average response was 0.649. Summarising the number of correct answers, respondents scored an average of 7.785 correct answers of possible 12. Tables 4 and 5 below summarises these results.

Table 4

Financial literacy results

Construct	Item	Mean	Dimension mean
Financial literacy	FL_1	0.837	
	FL_2	0.696	

Construct	Item	Mean	Dimension mean
	FL_3	0.541	
	FL_4	0.822	
	FL_5	0.741	
	FL_6	0.800	
	FL_7	0.607	
	FL_8	0.844	
	FL_9	0.770	
	FL_10	0.422	
	FL_11	0.444	
	FL_12	0.259	0.649

Note: The mean values for all items in the financial literacy construct.

Table 5

Financial literacy summary of correct responses per question

Construct	Correct answers	Respondents	Dimension mean
Financial literacy	1	3	
	2	3	
	3	4	
	4	7	
	5	10	
	6	19	
	7	15	
	8	18	
	9	12	
	10	14	
	11	19	
	12	11	7.785

Note: The summary of correct answers for each question in the financial literacy construct and the mean value of the correct answers.

Lastly, we investigate the results of the sustainable investment behaviour of the sample population. The first question (SUS_1) asked whether the respondents had heard of sustainable investments before taking part in this survey. 90 respondents had heard of

sustainable investments before taking part in this survey, representing 66 % of the sample population. The second question (SUS_2) asked the current share of sustainable investments of their investments. Subsequently, 45 respondents, which represents 33 % of the population, did not know the share of sustainable investments in their investments. Additionally, 42 respondents answered that they hold no sustainable investments, and 48 respondents did not know whether they hold sustainable investments or not. 36 respondents have less than 40 % of their current investments in sustainable investments. The third and final question (SUS_3) asked about the future intentions to invest in sustainable investments. 50 respondents answered that they want to invest in sustainable investments in the future, while 19 respondents answered that they want to keep investing in sustainable investments in the future. Additionally, 24 answered that they do not want to invest in them in the future, while 42 respondents were indecisive of their future intentions to invest sustainably in the future. The results are summarised below in Tables 6, 7, and 8.

Table 6

Sustainable investing behaviour, awareness results

Construct/Dimension	Yes	No	Mean
Sustainable investing behaviour (SUS_1)			
	90	45	1.333

Note: The count and mean value of the respondents response to awareness of sustainable investing.

Table 7

Sustainable investing behaviour, share of investments results

Construct/Dimension	Share	Respondents	Mean
Sustainable investing behaviour (SUS_2)			
	0%	42	
	More than 0% to 20%	22	
	More than 20% to 40%	14	
	More than 40% to 60%	3	
	More than 60% to 80%	1	

Construct/Dimension	Share	Respondents	Mean
	More than 80% to 100%	1	
	100%	1	
	Don’t know	48	1.281

Note: The count of sustainable investments of the current investments for the respondents and the mean value for the dimension

Table 8

Sustainable investing behaviour, future intentions results

Construct/Dimension	Respondents	Mean
Sustainable investing behaviour (SUS_3)		
Yes, I want to invest in sustainable investments in the future	50	
Yes, I want to keep investing in sustainable investments in the future	19	
No	24	
Don’t know	42	1.185

Note: The count of responses to the future intentions to invest in sustainable investments in the future and the mean value.

Finally, linear regressions were done in order to answer the two hypotheses and the research question of this study. The three individual sustainable investing behaviour questions were the dependant variables, while the constructs of financial literacy and proactive decision-making were tested separately as independent variables. The summary of these results can be observed in table 9 below.

Table 9

Regression results

Construct/Statistic	SUS_1	SUS_2	SUS_3
Financial literacy			
Coefficient	-0.087	0.135	-0.026
P-Value	0.0000001	0.002	0.428
Multiple R-Squared	0.269	0.072	0.005
Proactive decision-making			
Coefficient	-0.095	0.184	-0.067
P-Value	0.084	0.264	0.589
Multiple R-Squared	0.022	0.009	0.002

Note. The linear regression results taken from R-Studio.

6. Discussion

Sustainable investing is increasingly prevalent in today's financial market, this study was conducted to provide novel findings in the relationship between the variables of proactive decision-making and sustainable investing behaviour of individuals. The effect of financial literacy was also measured to create meaningful comparison and to further understanding of the sustainable investing behaviour of individuals. Firstly, this chapter addresses the outlined hypotheses of the study. Secondly, this chapter considers the general implications and limitations of this research, followed by recommendations for future research in the fields of this study.

6.1. Financial literacy and sustainable investing behaviour

The common use of financial literacy is to assess people's ability to make sense of financial information and make decisions based on the information (Lusardi & Mitchell, 2013, p. 2.). Financial literacy is assessed by specific questions relating to topics such as interest rates, risk, and compounding of interest, for example (van Rooij et al., 2011, p. 452). To validate the data gathered about financial literacy, Cronbach's alpha value was calculated. Acceptable values for the calculation of Cronbach's alpha range between 0.70 to 0.95 (Tavakol & Dennick, 2011, p. 54). The subsequent value of 0.77 confirmed a suitable level of consistency within the construct of financial literacy.

The participants can be described as financially literate. The mean values for the

12 questions ranged from 0.259 (FL_12) to 0.844 (FL_8). The mean value for the whole construct was 0.649, meaning that for the majority of questions, the participants answered correctly. Subsequently, financial literacy can be observed, when looking at the summary of correct answers per question. The majority of the sample population correctly answered at least seven questions out of the 12 questions in the construct. The mean value for the correct answers was 7.785. In confirming the first hypothesis, the relationship between financial literacy and the individual sustainable questions was tested. Financial literacy had a small negative influence on the first sustainable investment behaviour construct, which measured the awareness of sustainable investing. The awareness decreased by 8.7% with each 100% increase in financial literacy. Subsequently, the multiple R-squared value indicates that financial literacy accounts for 26.9% of the variation in the awareness of sustainable investing. Furthermore, the p-value of 0.0000000001 is far smaller than the accepted level of significance ($p < 0.05$), meaning that the results are statistically significant. The second sustainable investment behaviour question asked about the current share of sustainable investments of the sample population. The findings of the relationship with financial literacy showed that the share of investments increased by 13.45% with each 100% increase in financial literacy, furthermore the p-value of 0.002 is smaller than the accepted level of significance, meaning that the results are statistically significant. However, the multiple R-squared value indicates that financial literacy accounts for only 7.2% of the variation in the level of sustainable investments. Lastly, the future intentions to invest sustainably was measured with the third question measuring the sustainable investing behaviour of the sample population. A negative relationship was identified between these two variables, future intentions of sustainable investing decreased by 2.6% with each 100% increase in financial literacy. However, the multiple R-squared values shows that financial literacy only explains 0.5% of the variation in the future intentions of sustainable investing, and the p-value of 0.428 is larger than the accepted level of significance ($p < 0.05$), meaning that the results are not statistically significant. Considering these results, the first hypothesis must be rejected.

In contrast to the hypothesised relationship, the findings of this study provided no evidence to support the notion that financial literacy has a positive impact to the sustainable investing behaviour of individuals. There was only a positive relationship between the share of sustainable investments in the investments of the sample population. One interpretation of these results is that financially literate individuals were more aware

of the type of investment in their portfolio. These findings support previous research in which the number of correct answers in financial literacy questions increased the likelihood of dealing with sustainable financial companies (Aristei & Gallo, 2021, p. 15). Interestingly in this sample population the awareness of sustainable investments had a negative relationship with financial literacy, contradictory to previous research (Gutsche et al., 2021, pp. 9–11). However, Gutsche et al. (2021) continue that being financially literate was negatively correlated in being a sustainable investor, despite having lower barriers to achieve this behaviour than people with lower financial literacy. The results of this study highlight a similar outcome. Meaning that high financial literacy doesn't necessarily translate into sustainable investing behaviour, although does help to identify the type of investments one holds. However, as there is no universally accepted definition of sustainable investing, sustainability in this context might have a completely distinct meaning for each individual (Paetzold et al., 2015, p. 201). Two thirds of the respondents had heard of sustainable investments before taking part in this survey, but they might not know what is actually meant by them. This confusion is further exhibited in the sample population as some respondents had answered that they had not heard of sustainable investments before the survey, however they still answered that they knew the current share of sustainable investments of their investments.

6.2. Proactive decision-making and sustainable investing behaviour

The concept of proactive decision-making has recently emerged in the field of operational behavioural research and has been shown to have positive effect on individuals (J. Siebert & Kunz, 2016; J. U. Siebert et al., 2020, 2021). This study aimed to further test and validate the proactive decision-making scale that was developed by Siebert & Kunz (2016). During the statistical analysis of the data gathered from the online questionnaire, the consistency of the proactive decision-making scale was validated by calculating the Cronbach's alpha. The calculation produced a high value of 0.94, which confirms the internal consistency of the answers in the online questionnaire. However, a result of more than 0.90 might indicate that there are some unnecessary items in the scale and that some items should be dropped from the proactive decision-making construct (Tavakol & Dennick, 2011, p. 54).

The respondents consider themselves to be quite proactive individuals. Regarding the four cognitive skills (Objectives, Information, Alternatives, and Decision Radar) in the proactive decision-making construct, the mean response for each dimension varied

between 5.088 (Alternatives) and 5.825 (Information). Meaning that on average the respondents answered between “somewhat agree” (5) and “agree” (6) on the 7-point Likert scale. Additionally, the lowest mean value for the individual questions regarding the dimensions was 4.650 (ALT_1) with the statement being “I excel at identifying opportunities”. The highest mean for the individual question was 5.934 (INF_3) for the statement “I double-check my information sources to be sure to have the right facts before making decisions”. A slightly larger divide can be observed in the answers regarding the two personality traits (Initiative and Improvement). The mean score for the initiative dimension was 4.838 which corresponds in being the lowest mean value for all the six dimensions in the construct. This might implicate that the respondents can have a tendency in being reactive in decision situations. However, no concrete conclusions can be made since the value is still in the higher side of the Likert scale. Subsequently the improvement dimension recorded a mean value of 5.474. When looking at the individual mean values, the lowest recorded value was 3.832 (INI_2) for the statement “I tend to react to given circumstances rather than changing them actively”. The highest individual mean value in the personality traits was 5.489 (IMP_2) for the statement “I am constantly on the lookout for new ways to improve my life.”.

Out of the 137 respondents in the sample, 90 (67%) respondents had heard of sustainable investments before taking part in the survey. From these 90 respondents, 27 did not know the current share of sustainable investments in their investments and further 18 respondents said that they hold no sustainable investments. Out of the total sample population 48 individuals responded that they hold no sustainable investments at the time of the survey. 50 individuals responded that they want to invest in sustainable investments in the future and further 19 individuals responded that they want to keep investing in sustainable investments in the future. 24 individuals said that they do not want to invest in sustainable investments in the future, while 42 individuals were indecisive about their future intentions to invest in a more sustainable fashion. These results might also indicate the confusion as to what is meant by sustainable investments.

While testing the second hypothesis of the study we look at the relationship between the proactive decision-making construct and the individual sustainable investing behaviour questions. Proactive decision-making was found to have a small negative influence on the first sustainable investment behaviour construct, which measured the awareness of sustainable investing. The results indicated that the awareness decreases by 9.5% with each 100% increase in proactive decision-making. Furthermore, the multiple

R-squared value indicates that proactive decision-making only accounts for 2.2% of the variation in the awareness of sustainable investing. Finally, the p-value of 0.083 is slightly greater than the accepted level of significance ($p < 0.05$), thus preventing any generalisations. The second sustainable investment behaviour question asked about the current share of sustainable investments of the sample population. The results measuring this relationship indicated that the share of investments increased by 18.43% with each 100% increase in proactive decision-making. This positive relationship supports the second hypothesis of a positive impact, however the p-value of 0.2638 is far greater than the accepted level of significance ($p < 0.05$), thus indicating that the results are not statistically significant. Meaning that no general implications can be made between these two variables. Furthermore, multiple R-squared value indicates that proactive decision-making only accounts for 0.95% of the variation in the level of sustainable investments. The third and final question measured the intentions to invest in sustainable investments in the future. Future orientation is an important aspect in both proactive individuals (Frese & Fay, 2001, p. 140) and sustainable investing behaviour (Riedl & Smeets, 2017, p. 25). As the results of the proactive decision-making construct suggests, the sample population consider themselves as being proactive individuals. However, the results indicate a negative relationship with the proactive decision-making construct and future intentions for sustainable investing. The future intentions decreased by 6.7% with each 100% increase in proactive decision-making. However, the multiple R-squared value shows that proactive decision-making only explains 0.2% of the variation in the future intentions of sustainable investing. Additionally, the p-value of 0.589 is much greater than the accepted level of significance ($p < 0.05$), which means that the results of this relationship are not statistically significant. With these results in mind, the second hypothesis must also be rejected.

As was with the relationship between financial literacy and sustainable investing behaviour, this result could be interpreted similarly. Meaning that the vagueness of the definition of sustainable investments limits the possibility for the participants to clearly understand what is meant by sustainable investments. Another interpretation of these results is that while our respondents are future oriented in their thinking, they are unclear of their future goals. When asked whether the participants agreed with the following statement: “I consider future events in my current decisions”, results indicate a relatively high value (RAD_3 $M = 5.674$). However, when asked about their long-range goals with a more proactive statement “I spend a lot of time identifying long-range goals for myself”,

it returned a lower value (RAD_2 $M = 4.76$). This future orientation is highlighted by the results that 37% of the respondents want to invest in sustainable investments in the future. The respondents have considered sustainable investing for their future investments, but they have failed to translate this consideration into action and set a long-term goal for sustainable investing in the future.

6.3. General implications, limitations, and future research

This study aimed to extend the research of the proactive decision-making concept by Siebert and Kunz (2016), namely by investigating the relationship between the concept to sustainable investing behaviour. In order to create a meaningful comparison, the relationship of financial literacy to sustainable investing behaviour was also investigated in this study. Financial literacy was found to have an impact on the sustainable investing behaviour. A negative impact on the awareness of sustainable investments and future intention. However, a positive impact was found in the current share of sustainable investments, which can be interpreted that financially literate people are more aware of their investments. Regarding the concept of proactive decision-making and sustainable investing behaviour, there are some findings to consider. Namely, that the results of this study indicate that the proactive decision-making concept might not be directly applied to financial behaviours such as sustainable investing. The results indicate that the sample population can be described as proactive. However, when measuring the relationship between the construct of proactive decision-making and sustainable investing behaviour, the relationship was found to be mostly negative. Nonetheless, the results of this study between the constructs were statistically insignificant, and no general implications can be derived from these results. As this thesis was part of a larger study in the financial consequences of proactive decision-making, one possibility for further research could be to conduct research which narrows down on specific sustainable investing behaviours and / or products.

Some of the statements in the proactive decision-making concept are rather general and some are more proactive than others. For example, OBJ_1 “I try to be clear about my objectives before choosing” is less proactively worded than for example, INF_1 “I actively seek for information to improve my decision-making”. Furthermore, considering the generalness of the statements, they could be modified to mention financial goals and sustainability to better study the financial consequences of proactive decision-making. Additionally, previous research has shown that an individual cannot be proactive

in their decision situations if they only strive for improvement without taking initiative or vice-versa. (J. Siebert & Kunz, 2016, p. 868). For the sample population in this study, the taking initiative personality trait was the lowest scoring dimension in the proactive decision-making concept. Both personality traits are important for an individual to be proactive, further research could be done to directly test the relationship between these personality traits and financial behaviours, such as sustainable investing for example. Additionally, previously conducted research has pointed out that personality traits are linked with various economic effects (Becker et al., 2012). More precisely to financial behaviours such as savings behaviour (Gerhard et al., 2018) and stock market participation (Gherzi et al., 2014). Furthermore, these personality traits can even have a more distinct effect to financial behaviours than financial literacy (Fernandes et al., 2014).

Sustainable investing behaviour was measured by only three questions, which in turn were used as individual constructs, that measured the awareness of sustainable investments, current share of sustainable investments, and future intentions of sustainable investing. Proactive decision-making and financial literacy were measured by using constructs that were validated by prior research. Therefore, the results of sustainable investing behaviour in this study might not be an accurate representation of the sample populations sustainable investing behaviour. Additionally, as has been highlighted in previous studies relating to sustainable investing, the vagueness of what is meant by the term might be a hindrance to concretely study this financial behaviour.

This study, like almost all research designs, has limitations. The first limitation concerns the sample method which was used. While probability sampling does provide ample advantages for generalisation, the disadvantage is that using this type of method in research is time-consuming and requires a large sample, in order to generalise the results of the study. Given that all participants in the survey resided in The United Kingdom of Great Britain and Norther Ireland, no further generalisations could be made to a wider demographic area. This type of a study could create meaningful comparisons if, for example researching people from multiple countries and / or regions. Additional limitation in this study is that the data was collected via a single method in which the participants were required evaluate their skills. This type of a method is known to have flaws, such as respondents being influenced by a bias that leads them to answer questions in a way that casts them in a more favorable light (Podsakoff & Organ, 1986, p. 535).

Future research should be conducted to address the limitations of this study. While the selected sampling method is suitable for this type of research, a larger sample size

would provide more suitable levels of generalisability of the results and ensuring that each unit of the population has an equal chance of being included, thus increasing the chances of collecting statistically significant results. Furthermore, a larger sample size would allow meaningful comparisons between demographic background of the participants in the research. As mentioned previously, there is a lack of a unison definition of what is meant by sustainable investments, which in turn could increase the barrier for factual responses for the respondents. Furthermore, future research in the sustainable investing behaviour could be supplemented with open-ended questions, which have provided complementary results in measuring sustainable finance literacy (Filippini et al., 2021, pp. 20–30). They continue to suggest that research in financial knowledge should be supplemented with open-ended questions (Filippini et al., 2021, p. 31).

7. Conclusion

Sustainable investments play a crucial role in transitioning towards a more sustainable economy (Vanwalleghem & Mirowska, 2020, p. 1) and have gained significance during the recent years. This study was part of a broader research in the financial consequences of the recently developed proactive decision-making scale (J. Siebert & Kunz, 2016), which utilises cognitive skills and personality traits of individuals. This study was investigated the impact of proactive decision-making to sustainable investing behaviour of individuals. As the insights of the study between these two variables were novel, the impact of financial literacy to sustainable investing behaviour was also researched, in order to create meaningful comparisons.

This study was conducted using a quantitative approach in which individuals in The Great Britain of United Kingdom and Northern Ireland were asked to evaluate their proactive decision-making skills, financial literacy, and sustainable investing behaviour by asking their awareness, current share, and future intentions to invest in a sustainable manner. After cleaning the data, a sample population of 135 participants were left to analyse. The results of the sample population were analysed by using regression analysis. These results suggested that financial literacy has a small negative impact on the awareness and future intentions of sustainable investments and a small positive impact on the level of sustainable investments. The results of proactive decision-making to sustainable investing behaviour were statistically insignificant, thus ruling out any conclusive statements as to how proactive decision-making influences the sustainable

investing behaviour of individuals.

Fernandes, Lynch, and Netemeyer (2014) suggest that personality traits have a more significant impact on the financial behaviours than financial literacy. As Siebert and Kunz state that individuals cannot be proactive without utilising both personality traits (taking initiative and striving for improvement), future research could be conducted specifically measuring the relationships of these personality traits and financial behaviours, such as sustainable investing for example. Furthermore, readers of this study should be encouraged to not only take initiative, but also strive for improvement in their decision situations. Additionally, readers of this study should consider sustainable investing as a viable option in their future investments. However, as has been highlighted in existing literature, currently there is a lack of unison meaning for sustainable investing. Therefore, future research could be conducted with specific sustainable investing behaviours, such as ESG investing (Schanzenbach & Sitkoff, 2020, p. 1) and impact investing (Hockerts et al., 2022, p. 937).

Considering the aims to validate and contribute to the research of the proactive decision-making scale by Siebert and Kunz, the results of this study are inconclusive and fail to provide any categorical findings. Financial literacy was found to have a small negative impact on the awareness and future intentions, however financial literacy had positive impact on the share of sustainable investments. Considering the limitations of this study, I suggest conducting additional research to obtain definitive findings that can be applied to a broader population. This type of a research is particularly crucial since sustainable investing holds significant importance in shifting the financial markets to a more sustainable way and to a larger extent the future of our planet.

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Appendix

Entrepreneurial and financial consequences of PDM

Start of Block: Introduction

Q1.1
Dear participant,

Thank you for taking some time to participate in our survey.

We are analyzing how individuals evaluate various constructs and how decision-making patterns, such as proactive decision-making, is related to that. We are pleased if you answer the following questions, which will take around 20 minutes to complete. Please keep in mind that there are no right or wrong answers, as we are interested in your evaluations. However, we encourage you to provide honest answers to the questions and statements. Participation is voluntary and you can withdraw from the survey at any time. According to GDPR we will keep the data confidential and use it for academic research only. To protect anonymity, the survey will not contain information that will personally identify you.

Important Note: For our research, we rely on high-quality data. Therefore, we require you to read the questions carefully and to follow the instructions provided. By continuing this survey, you indicate that you have read, understood, and accepted the general information provided and the requirement mentioned before.

Page Break

Q1.2 What is your Prolific ID?

_____

Q1.3 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Introduction

Start of Block: Proactive decision-making - Introduction

Q2.1 The following questions are related to the description given below. Thus, we kindly ask you to carefully read the short text. There is no option to go back.

Definition of proactive decision-making

Individuals can either proactively or reactively approach subsequent intentions and/or behavior. Proactive decision-making is an active and forward-looking approach. It connects the value-oriented and self-initiated decision-making of individuals who strive for improvement and, toward that end, adopt the following means: systematically identifying objectives; actively generating a variety of suitable alternatives; gathering information about opportunities and threats; and anticipating the outcomes that might follow from any chosen course of actions.

Q2.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Proactive decision-making - Introduction

Start of Block: Proactive decision-making - Scale

Q3.1 Please think about your decision-making skills and indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I try to be clear about my objectives before choosing. (1)	○	○	○	○	○	○	○
In general, I am aware of my objectives in a decision situation. (2)	○	○	○	○	○	○	○
For important decisions, I engage in systematic reflection, what I wish to achieve. (3)	○	○	○	○	○	○	○
I actively seek for information to improve my decision making. (4)	○	○	○	○	○	○	○
I systematically collect the decision-relevant information. (5)	○	○	○	○	○	○	○
I double-check my information sources to be sure to have the right facts before making decisions. (6)	○	○	○	○	○	○	○

I excel at identifying opportunities. (7)	○	○	○	○	○	○	○
I systematically use my objectives to create alternatives. (8)	○	○	○	○	○	○	○
I am good at finding ways to achieve my objectives. (9)	○	○	○	○	○	○	○
I think twice how I can achieve my objectives. (10)	○	○	○	○	○	○	○
I thoroughly think about when I make which decision. (11)	○	○	○	○	○	○	○
I spend a lot of time identifying long-range goals for myself. (12)	○	○	○	○	○	○	○
I consider future events in my current decisions. (13)	○	○	○	○	○	○	○
I am very aware of my thinking process in a decision-situation. (14)	○	○	○	○	○	○	○

I thoroughly consider how best to carry out a decision. (15)	○	○	○	○	○	○	○
In this question, please select 'Strongly disagree' (16)	○	○	○	○	○	○	○

Page Break

Q3.2 Please think about your abilities in taking initiative in decision-making and indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I usually wait for something to happen rather than taking the initiative. (1)	○	○	○	○	○	○	○
I tend to react to given circumstances rather than changing them actively. (2)	○	○	○	○	○	○	○
I do not make decisions unless I have to. (3)	○	○	○	○	○	○	○
I usually take the initiative myself rather than waiting for something to happen. (4)	○	○	○	○	○	○	○

Page Break

Q3.3 Please think about your abilities in improving situtations by your decisions and indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I am always looking for better ways to do things. (1)	○	○	○	○	○	○	○
I am constantly on the lookout for new ways to improve my life. (2)	○	○	○	○	○	○	○
I continually try to improve my current situation. (3)	○	○	○	○	○	○	○

Q3.4 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Proactive decision-making - Scale

Start of Block: General Self-Efficacy

Q4.1 Please think of your self-efficacy and indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I can always manage to solve difficult problems if I try hard enough. (1)	○	○	○	○	○	○	○
If someone opposes me, I can find the means and ways to get what I want. (2)	○	○	○	○	○	○	○
It is easy for me to stick to my aims and accomplish my goals. (3)	○	○	○	○	○	○	○
I am confident that I could deal efficiently with unexpected events. (4)	○	○	○	○	○	○	○
Thanks to my resourcefulness, I know how to handle unforeseen situations. (5)	○	○	○	○	○	○	○
I can solve most problems if I invest the necessary effort. (6)	○	○	○	○	○	○	○
I can remain calm when facing difficulties because I can rely on my coping abilities. (7)	○	○	○	○	○	○	○

When I am confronted with a problem, I can find several solutions. (8)	○	○	○	○	○	○	○
If I am in trouble, I can usually think of a solution. (9)	○	○	○	○	○	○	○
I can usually handle whatever comes my way. (10)	○	○	○	○	○	○	○
In this question, please select "Strongly disagree" (11)	○	○	○	○	○	○	○

Q4.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: General Self-Efficacy

Start of Block: Entrepreneurial alertness

Q5.1 Please think of your skills in finding and creating opportunities and indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I have frequent interactions with others to acquire new information. (1)	○	○	○	○	○	○	○
I always keep an eye out for new business ideas when looking for information. (2)	○	○	○	○	○	○	○
I read news, magazines, or trade publications regularly to acquire new information. (3)	○	○	○	○	○	○	○
I browse the Internet every day. (4)	○	○	○	○	○	○	○
I am an avid information seeker. (5)	○	○	○	○	○	○	○
I am always actively looking for new information. (6)	○	○	○	○	○	○	○

I see links between seemingly unrelated pieces of information. (7)	○	○	○	○	○	○	○
I am good at “connecting dots.” (8)	○	○	○	○	○	○	○
I often see connections between previously unconnected domains of information. (9)	○	○	○	○	○	○	○
I have a gut feeling for potential opportunities. (10)	○	○	○	○	○	○	○
I can distinguish between profitable opportunities and not-so-profitable opportunities. (11)	○	○	○	○	○	○	○
I have a knack for telling high-value opportunities apart from low-value opportunities. (12)	○	○	○	○	○	○	○

When facing multiple opportunities, I am able to select the good ones. (13)	○	○	○	○	○	○	○
In this question, please select 'Strongly disagree' (14)	○	○	○	○	○	○	○

Q5.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Entrepreneurial alertness

Start of Block: Entrepreneurial intentions

Q6.1 Please think of your (potential) entrepreneurial intentions and indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither disagree nor agree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I am ready to do anything to be an entrepreneur. (1)	○	○	○	○	○	○	○
My professional goal is to become an entrepreneur. (2)	○	○	○	○	○	○	○
I will make every effort to start and run my own firm. (3)	○	○	○	○	○	○	○
I am determined to create a firm in the future. (4)	○	○	○	○	○	○	○
I have seriously thought of starting a firm. (5)	○	○	○	○	○	○	○
I have the firm intention to start a firm some day. (6)	○	○	○	○	○	○	○
Being an entrepreneur implies more advantages than disadvantages to me. (7)	○	○	○	○	○	○	○
A career as entrepeneur is attractive to me. (8)	○	○	○	○	○	○	○

If I had the opportunity and resources, I'd start a firm. (9)	○	○	○	○	○	○	○
Being an entrepreneur would entail great satisfactions for me. (10)	○	○	○	○	○	○	○
Among various options, I would rather be an entrepreneur. (11)	○	○	○	○	○	○	○
To start a firm and keep it working would be easy for me. (12)	○	○	○	○	○	○	○
I am prepared to start a viable firm. (13)	○	○	○	○	○	○	○
I can control the creation process of a new firm. (14)	○	○	○	○	○	○	○
I know the necessary practical details to start a firm. (15)	○	○	○	○	○	○	○
I know how to develop an entrepreneurial project. (16)	○	○	○	○	○	○	○
If I tried to start a firm, I would have a high probability of succeeding. (17)	○	○	○	○	○	○	○

If I decided to create a firm, my close family would approve that decision. (18)	○	○	○	○	○	○	○
If I decided to create a firm, my friends would approve that decision. (19)	○	○	○	○	○	○	○
If I decided to create a firm, my colleagues would approve that decision. (20)	○	○	○	○	○	○	○
In this question, please select 'Strongly disagree' (21)	○	○	○	○	○	○	○

Q6.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Entrepreneurial intentions

Start of Block: Entrepreneurial behavior

Q7.1 Please think of your (potential) entrepreneurial behavior and indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I have experience in starting new projects or businesses. (1)	○	○	○	○	○	○	○
I am capable of developing a business plan. (2)	○	○	○	○	○	○	○
I know how to start a new business. (3)	○	○	○	○	○	○	○
I know how to do market research. (4)	○	○	○	○	○	○	○
I have invested in an informal manner in some business. (5)	○	○	○	○	○	○	○
I can save money to invest in a business. (6)	○	○	○	○	○	○	○
I belong to a social network that can promote my business. (7)	○	○	○	○	○	○	○

Q7.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Entrepreneurial behavior

Start of Block: Random

Q8.1 Please indicate your agreement with the following statement.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I like the color blue. (1)	○	○	○	○	○	○	○

End of Block: Random

Start of Block: Financial literacy - Introduction

Q9.1 **Introduction to questions related to financial literacy and behavior**

Although there is no clear definition of financial literacy, the term combines knowledge of and experiences in financial constructs. Financial behavior in turn reflects the resulting behavior in the context of financial constructs. Please try to answer the following questions as honestly as possible. This is especially true if you are not familiar with certain terminology.

Q9.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Financial literacy - Introduction

Start of Block: Financial literacy

Q10.1 Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be ale to buy:

- More than today with the money in this account (1)
- Exactly the same as today with the money in this account (2)
- Less than today with the money in this account (3)
- Don't know (4)
- Refuse to answer (5)

Q10.2 Do you think that the following statement is true or false? "Bonds are normally riskier than stocks."

- True (1)
- False (2)
- Don't know (3)
- Refuse to answer (4)

Q10.3 Considering a long time period (for example 10 or 20 years), which asset described below normally gives the highest return?

- ○ Savings accounts (1)
- ○ Stocks (2)
- ○ Bonds (3)
- ○ Don't know (4)
- ○ Refuse to answer (5)

Page Break

Q10.4
Normally, which asset described below displays the highest fluctuation over time?

- Savings accounts (1)
- Stocks (2)
- Bonds (3)
- Don't know (4)
- Refuse to answer (5)

Q10.5 When an investor spreads his money among different assets, does the risk of losing a lot of money:

- Increase (1)
- Decrease (2)
- Stay the same (3)
- Don't know (4)
- Refuse to answer (5)

Q10.6 Do you think that the following statement is true or false? "If you were to invest $1,000 in a stock mutual fund, it would be possible to have less than $1,000 when you withdraw your

money."

- ○ True (1)
- ○ False (2)
- ○ Don't know (3)
- ○ Refuse to answer (4)

Page Break

Q10.7 Do you think that the following statement is true or false? "A stock mutual fund combines the money of many investors to buy a variety of stocks."

- ○ True (1)
- ○ False (2)
- ○ Don't know (3)
- ○ Refuse to answer (4)

Q10.8 Do you think that the following statement is true or false? "A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less."

- ○ True (1)
- ○ False (2)
- ○ Don't know (3)
- ○ Refuse to answer (4)

Q10.9 Suppose you had $100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much money would you

have on this account in total?

- ○ More than $200 (1)
- ○ Exactly $200 (2)
- ○ Less than $200 (3)
- ○ Don't know (4)
- ○ Refuse to answer (5)

Page Break

Q10.10 Which of the following statements is correct?

- ○ Once one invests in a mutual fund, one cannot withdraw the money in the first year (1)
- ○ Mutual funds can invest in several assets, for example invest in both stocks and bonds (2)
- ○ Mutual funds pay a guaranteed rate of return which depends on their past performance (3)
- ○ None of the above (4)
- ○ Don't know (5)
- ○ Refuse to answer (6)

Q10.11 Which of the following statements is correct? If somebody buys a bond of firm B:

- ○ He owns a part of firm B (1)
- ○ He has lent money to firm B (2)
- ○ He is liable for firm B's debts (3)
- ○ None of the above (4)
- ○ Don't know (5)
- ○ Refuse to answer (6)

Q10.12 Suppose you owe $3,000 on your credit card. You pay a minimum of $30 each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to

eliminate your credit card debt if you made no additional new charges?

- ○ Less than 5 years (1)
- ○ Between 5 and 10 years (2)
- ○ Between 10 and 15 years (3)
- ○ Never (4)
- ○ Don't know (5)
- ○ Refuse to answer (6)

Q10.13 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Financial literacy

Start of Block: Numeracy

Q11.1 Imagine that we roll a fair, six-sided dice 1,000 times. Out of 1,000 rolls, how many times do you think the dice would come up as an even number? Of the values below, which is the most likely outcome?

- 157 (1)
- 298 (2)
- 512 (3)
- 754 (4)
- 919 (5)
- The answers above are equally likely (6)
- I do not know (7)

Q11.2 In the BIG BUCKS LOTTERY, the chances of winning a $10.00 prize are 1%. What is your best guess about how many people would win a $10.00 prize if 1,000 people each buy a single ticket from BIG BUCKS?

- 1 (1)
- 2 (2)
- 10 (3)
- 100 (4)
- 110 (5)
- The answers above are equally likely (6)
- I do not know (7)

Q11.3 If the chance of getting a disease is 20 out of 100, this would be the same as having a _____% chance of getting the disease.

- 0.02 (1)
- 0.2 (2)
- 2 (3)
- 2.0 (4)
- 20 (5)
- 25 (6)
- 200 (7)
- I do not know (8)

Q11.4 In the ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1 in 1,000. What percent of tickets of ACME PUBLISHING SWEEPSTAKES win a car?

- 0.001% (1)
- 0.01% (2)
- 0.1% (3)
- 1.0% (4)
- 1.1% (5)
- None of the above (6)
- I do not know (7)

Q11.5 If the chance of getting a disease is 10%, how many people would be expected to get the disease out of 1,000?

- 1 (1)
- 10 (2)
- 11 (3)
- 50 (4)
- 100 (5)
- 110 (6)
- 1,000 (7)
- I do not know (8)

Q11.6 If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

- 1 minute (1)
- 5 minutes (2)
- 10 minutes (3)
- 100 minutes (4)
- 1,000 minutes (5)
- 1 day (6)
- None of the above (7)
- I do not know (8)

Q11.7 A bat and ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

- ○ 1 cent (1)
- ○ 5 cents (2)
- ○ 10 cents (3)
- ○ 11 cents (4)
- ○ 20 cents (5)
- ○ 100 cents (6)
- ○ 1 dollar (7)
- ○ I do not know (8)

Q11.8 In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

- ○ 16 days (1)
- ○ 24 days (2)
- ○ 25 days (3)
- ○ 32 days (4)
- ○ 26 days (5)
- ○ 22 days (6)
- ○ 47 days (7)
- ○ I do not know (8)

Q11.9 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Numeracy

Start of Block: Investment risk

Q12.1 Please indicate your agreement with the following statements.

	Very unlikely (1)	Unlikely (2)	Somewhat unlikely (3)	Not sure (4)	Somewhat likely (5)	Likely (6)	Very likely (7)
Investing 10% of your annual income in a moderate growth mutual fund. (1)	○	○	○	○	○	○	○
Investing 5% of your annual income in a very speculative stock. (2)	○	○	○	○	○	○	○
Investing 5% of your annual income in a conservative stock. (3)	○	○	○	○	○	○	○
Investing 10% of your annual income in government bonds (treasury bills). (4)	○	○	○	○	○	○	○

Q12.2 When thinking of your financial investments, how willing are you to take risks?

- ○ Not at all willing (1)
- ○ Not willing (2)
- ○ Somewhat not willing (3)
- ○ Neither willing nor unwilling (4)
- ○ Somewhat willing (5)
- ○ Willing (6)
- ○ Very likely willing (7)

Q12.3 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Investment risk

Start of Block: Propensity to plan

Q13.1 Please indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I set financial goals for the next 1-2 years for what I want to achieve with my money. (1)	○	○	○	○	○	○	○
I decide beforehand how my money will be used in the next 1-2 years. (2)	○	○	○	○	○	○	○
I actively consider the steps I need to take to stick to my budget in the next 1-2 years. (3)	○	○	○	○	○	○	○
I consult my budget to see how much money I have left for the next 1-2 years. (4)	○	○	○	○	○	○	○

I like to look to my budget for the next 1-2 years in order to get a better view of my spending in the future. (5)	○	○	○	○	○	○	○
It makes me feel better to have my finances planned out in the next 1-2 years. (6)	○	○	○	○	○	○	○

Q13.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Propensity to plan

Start of Block: Confidence in (financial) information search

Q14.1 Please indicate your agreement with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor diagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I am confident in my ability to recognize a good financial investment. (1)	○	○	○	○	○	○	○
I know what investments to look for to get the most return on my money. (2)	○	○	○	○	○	○	○
I know the right questions to ask when making financial investment decisions. (3)	○	○	○	○	○	○	○
I have the skills required to make sound financial investments. (4)	○	○	○	○	○	○	○
I know the right sources to consult to make wise financial decisions. (5)	○	○	○	○	○	○	○

Q14.2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Confidence in (financial) information search

Start of Block: Financial behavior

Q15.1 Have you set aside emergency or rainy day funds that would cover your expenses for three months, in case of sickness, job loss, economic downturn, or other emergencies?

- Yes (1)
- No (2)

Q15.2 Have you ever tried to figure out how much you need to save for retirement?

- Yes (1)
- No (2)

Q15.3 Have you ever opened a savings account or bought a certificate of deposit (CD)?

- Yes (1)
- No (2)

Page Break

Q15.4 Have you ever bought a savings bond or other bonds?

- ○ Yes (1)
- ○ No (2)

Q15.5 Have you ever invested in mutual funds?

- ○ Yes (1)
- ○ No (2)

Q15.6 Have you ever invested in individual stocks?

- ○ Yes (1)
- ○ No (2)

Page Break

Q15.7 How do you think banks or credit card companies would rate your credit?

	0 1 2 3 4 5 6 7 8 9 10
Very poor (0) to excellent (10) ()	

Q15.8 Over the past two years, how freuqently have you been late paying credit card bills?

- Never (1)
- Once or twice since had credit cards (2)
- Once or twice per year (3)
- More than twice per year (4)

Q15.9
How often have you bounced a check?

- Never (1)
- Once or twice in lifetime (2)
- Once or wice per year (3)
- More than twice per year (4)

Q15.10 Please indicate below the option that best describes your payments on credit cards.

- Always pays off monthly (1)
- Generally pays off monthly (2)
- Occassionally pays off monthly (3)
- Seldom pays off, but tries to pay down (4)
- Generally pays minimum each month (5)

Q15.11 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Financial behavior

Start of Block: Sustainable investments

Q16.1 Have you ever heard of sustainable investments before this survey?

- Yes (1)
- No (2)

Q16.2 What is the current share of sustainable investments in total of all your investments?

- 0% (1)
- More than 0% to 20% (2)
- More than 20% to 40% (3)
- More than 40% to 60% (4)
- More than 60% to 80% (5)
- More than 80% to 100% (6)
- 100% (7)
- Don't know (8)

Q16.3 Do you want to invest in sustainable investments in the future?

- Yes, I want to invest in sustainable investments in the future (1)
- Yes, I want to keep investing in sustainable investments in the future (2)
- No (3)
- Do not know (4)

End of Block: Sustainable investments

Start of Block: Sociodemographics - Introduction

Q17.1 Finally, to better understand the retrieved data and the different relationships across different groups of individuals, we would like to get to know you a little more. Of course, your response remains anonymous, and this data will not be matched with your identity.

Q17.2 Timing
First Click (1)
Last Click (2)
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End of Block: Sociodemographics - Introduction

Start of Block: Sociodemographics

Q18.1 How old are you?

_____

Q18.2 In which country do you currently reside?

▼ Afghanistan (1) ... Zimbabwe (1357)

Q18.3 How would you describe yourself?

- Female (1)
- Male (2)
- Non-binary / third gender (3)
- Other (4)
- Prefer not to say (5)

Q18.4 What is the highest level of school you have completed or the highest degree you have received?

- ○ Primary education school (less than high school) (1)
- ○ Lower secondary education (up to 3/4 years in high school) (2)
- ○ Higher secondary education (high school) (3)
- ○ Post-secondary non-tertiary or short-cycle tertiary education (e.g., some time in college) (4)
- ○ Bachelor's or equivalent (5)
- ○ Master's or equivalent (6)
- ○ Doctoral or equivalent (7)

Q18.5 What was your household income in USD throughout the last 12 months?

- ○ Less than USD 25,000 (1)
- ○ USD 25,000 - 50,000 (2)
- ○ USD 50,001 - 75,000 (3)
- ○ USD 75,001 - 100,000 (4)
- ○ USD 100,001 - 150,000 (5)
- ○ More than USD 150,000 (6)
- ○ Prefer not to say (7)

Q18.6 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Sociodemographics