



Licentiate Thesis in Business Studies

# Understanding individual investors' preferences and knowledge of sustainable investments

IDA AYU AGUNG FARADYNAWATI

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## Abstract

This thesis aims to contribute to the field of sustainable investment by investigating individual investors' preferences and knowledge level of sustainable investments. To achieve this objective, this thesis examined the impact of investment-related attitudes and demographic characteristics on sustainable investment choices through secondary data analysis and assessed investors' knowledge level regarding sustainable investments through a survey. Both the secondary data and the survey used individual investors in Nordic regions as the sample. The data analysis was performed using logistic regression and ordinary least square regression methods. The results show that risk-averse investors and investors with shorter investment horizons were more likely to choose sustainable investments. In terms of sociodemographic characteristics, sustainable investments were preferred by older, female, and less wealthy clients. Furthermore, after understanding the characteristics of individuals with sustainable investment choices, this thesis measured the knowledge level of sustainable investors and examine the relationship between investors' knowledge level and information-seeking and advice-seeking behavior. The findings suggest that most sustainable investors had high objective financial literacy but scored low in sustainability knowledge and even lower in sustainable finance literacy. Sustainable investors search for information more actively when they have a high perceived knowledge compared to their actual knowledge. In evaluating advice-seeking behavior, it was discovered that sustainable investors who perceive themselves to be more financially literate are more likely to receive advice on sustainable investments from financial advisors. Yet, those who saw themselves as having greater sustainability literacy were less inclined to consult their financial advisors before making sustainable investing decisions. In regards to product literacy, this study found that the key information about the dark green fund, with the highest sustainable disclosure requirements, was not easy to understand compared to the ones with lower requirements.

**Keywords:** sustainable investments, risk-return preference, investment horizon, financial literacy, sustainability literacy, sustainable finance literacy, product literacy, information-seeking behavior, advice-seeking behavior

## Sammanfattning

Denna avhandling syftar till att bidra till tidigare forskning om hållbara investeringar genom att undersöka enskilda investerarens preferenser och kunskap om hållbara investeringar. Avhandlingen redovisar två studier som undersöker effekten av konsumenters investeringsrelaterade attityder och olika demografiska egenskaper samt olika typer av finanskunskap vid val av hållbara investeringar. Data i den första studien beskriver enskilda investerare i Norden. I den andra studie genom en enkät, i båda fall. Dataanalysen utfördes med hjälp av logistisk regression respektive OLS-regression.

Resultaten visar att riskaverta investerare och investerare med kortare investeringshorisonter är mer benägna att välja hållbara investeringar. När det gäller sociodemografiska egenskaper föredrog äldre, kvinnliga och mindre förmögna kunder hållbara investeringar. Dessutom undersöktes sambandet mellan kunskapsnivån hos konsumenter som valt hållbara investeringar och deras informations- och rådgivningssökande beteende. Resultaten antyder att de flesta konsumenter med hållbara investeringar hade en hög objektiv finanskunskap, men låg hållbarhetskunskap och ännu lägre kunskap om hållbara investeringar. Konsumenter som valt hållbara investeringar söker efter information mer aktivt när de har en hög egenupplevd kunskap jämfört med faktisk kunskap, dvs när de överskattar sin förmåga. Vid utvärdering av ett rådgivningssökande beteende upptäcktes att investerare som uppfattar sig själva som mer ekonomiskt kunniga är mer benägna att söka råd om hållbara investeringar från finansiella rådgivare. De som såg sig själva som mer kunniga inom hållbarhet var däremot mindre benägna att rådfråga sina finansiella rådgivare innan de fattade beslut om hållbara investeringar. När det gäller produktkunskap om olika testade hållbara investeringsalternativ, visar resultaten att nyckelinformationen om fonden med högst hållbarhetskrav (den mörkgröna fonden) var svårare att förstå än information om fonder med lägre hållbarhetskrav.

**Nyckelord:** hållbara investeringar, risk-avkastningspreferenser, investeringshorisont, finanskunskap, hållbarhetskunskap, kunskap om hållbar ekonomi, informationssökande beteende, rådsökande beteende

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*Ida Faradynawati*  
Stockholm, May 2023

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## List of papers

### Paper 1

Faradynawati, I.A.A. and Söderberg, I.-L. (2022). Sustainable Investment Preferences among Robo-Advisor Clients. Manuscript published in Sustainability, Multidisciplinary Digital Publishing Institute, Vol. 14 No. 19, p. 12636. doi: 10.3390/su141912636.

### Paper 2

Faradynawati, I.A.A., Söderberg, I.-L., and Persson, A. (XXXX). Sustainable Investments: Double Trouble for Retail Investors. Addressing Vulnerability and Consumer Protection Issues. Manuscript submitted for publication in International Journal of Bank Marketing special issue Consumer Vulnerability in the Banking Context.

## Acronyms

CSR	Corporate Social Responsibility
ESG	Environment, Social, and Governance
EU	European Union
MiFID	Markets in Financial Instruments Directive
OLS	Ordinary Least Squares
SDG	Sustainable Development Goals
SRI	Socially Responsible Investments

# Chapter 1: Introduction

## 1.1 Research background

Mitigation and adaptation to climate change are essential for reducing the effects of the continuous increase in global temperature since the pre-industrial era. Since the Paris Agreement in 2015, United Nations member states have pledged to limit the increase in global temperature to 1.5 degrees Celsius. Throughout the past ten years, there has been an increase in the amount of money going toward projects that are climate neutral. Despite the positive trend in green financing activities, the amount is still well below the goals. To accomplish the climate targets by 2030, the yearly growth rate of climate funding needs to be at least 550% (Climate Policy Initiative, 2021). By 2030, it is projected that there would be a global financing shortfall for climate reduction of \$850 billion per year and climate adaptation of \$180 to \$300 billion annually (IFAD, 2021). As a result, the financial sector's role in directing capital toward more sustainable initiatives is becoming increasingly crucial. Financial authorities in many countries released initiatives to promote the participation of retail investors in sustainable investments. In European Union (EU) for instance, European Commission launched The Commission Delegated Regulation (EU) 2021/1257 of 21 April 2021 (European Commission, 2021) in which all firms subject to the Markets in Financial Instruments Directive (MiFID), including financial firms and advisors, are required to assess their client's sustainability preferences. However, limited access to financial advisory services and financial markets is one of the main obstacles to putting this strategy into practice. A substantial number of eager retail investors are prevented from making sustainable investments by a lack of availability and incomplete information (Gutsche *et al.*, 2023).

To effectively promote investment products that align with Sustainable Development Goals (SDGs), it is crucial to understand the characteristics of individual investors who are engaged in sustainable investments. Profiling parameters such as investment-related preferences and demographic characteristics can provide insights into investors' preferences toward sustainable investments. A previous study by Dorfleitner and Utz (2014) mentioned that the risk, return, and liquidity preferences of individual investors determine their decisions to allocate their investment in a socially-responsible way. In addition, demographic profiles such as gender, age, income, and education were found to be significant factors that influence investors' decisions to invest in sustainable investment (Escrig-Olmedo *et al.*, 2013; McLachlan and Gardner, 2004; Nilsson, 2008). Understanding the characteristics of sustainable investors can help to identify potential barriers that hinder individual investors' participation in sustainable investments. If a particular demographic group is found to have a lower interest in sustainable investments, for instance, understanding the reasons helps to develop the solutions to overcome the barriers. In order to attract this type of investor, financial authorities and industry players can develop more effective targeted interventions such as providing financial

education or designing tailored investment products based on investors' needs. Gaining insight into the characteristics of sustainable investors is also essential to ensuring the accessibility and inclusivity of sustainable investments to a wider range of investors.

Furthermore, after understanding the characteristics of individuals with sustainable investment choices, it is also important to measure the knowledge level of sustainable investors. Sustainable investments can be more complex than traditional investments for individual investors because they need to balance the non-monetary goals such as environmental and social impact alongside the monetary goals. Therefore, when evaluating asset allocation decisions, individual investors are required to possess knowledge of finance and sustainability-related aspects.

Households that possess high financial literacy tend to actively seek financial and economic news, which results in better asset allocations (Lu *et al.*, 2021). Additionally, the level of financial knowledge and education among investors positively influences their portfolio diversification (Abreu and Mendes, 2010). As discovered by (Filippini *et al.*, 2021), knowledge of sustainable finance is a strong determinant of willingness to have sustainable investments. On the other hand, individuals with low financial literacy often struggle to make financial decisions while simultaneously considering non-financial factors, despite being environmentally and socially conscious (Borgers and Pownall, 2014). This deficiency in literacy skills makes these individuals more vulnerable to consumer exploitation (Adkins and Ozanne, 2005) and impedes their ability to make well-informed financial decisions. Anderson and Robinson (2021) mentioned that the informational complexity in green investment became one of the reasons that hinder individuals with low financial literacy, even though they have strong environmental values and beliefs, from choosing environment-friendly investments. Retail investors must possess both fundamental financial knowledge and specialized knowledge of sustainable investment products to make informed judgments due to the complexity of the evaluation criteria for sustainable investment products. Filippini *et al.* (2021) proposed the measurement tools of three areas of literacy that are essential for investors in making sustainable investment decisions, namely financial literacy, sustainability literacy, and sustainable finance literacy. Ensuring that investors are mindful of the business activities they are financing and the impacts on society and the environment requires sufficient knowledge in these three areas.

Even though the objective measurement of individuals' knowledge is considered a good predictor of financial behavior, previous studies have shown that perceived knowledge better explains financial behavior than objective knowledge (Allgood and Walstad, 2016; Bellofatto *et al.*, 2018). When an individual's self-assessed knowledge exceeds their measured knowledge, they are considered overconfident, and this has been associated with suboptimal financial behavior. The positive gap between perceived and objective financial literacy leads to unfavorable financial choices (Barber and Odean, 2001). The inflated perceptions of literacy are a proxy to investigate sustainable investors' vulnerability. In addition, the gap between objective and subjective knowledge prevents investors from seeking financial advice from professionals or experts such as financial advisors (Kramer, 2016).

Thus, this thesis explores the influence of objective and perceived knowledge levels on the information-seeking and advice-seeking behavior the individual investors who are engaged in sustainable investments.

In today's retail investor landscape, self-analysis has become the norm, and investors must possess the ability to process financial product information (Marsden *et al.*, 2011). Understanding financial terms, product features, and risks, as well as following financial information to evaluate investment performance, are essential for investors (Rodrigues *et al.*, 2019). Financial service providers provide key investor information documents that outline the product's features, including risk, return, composition, and associated costs. However, previous finding emphasizes that limited cognitive abilities, such as information perception and processing, prevent individuals from utilizing relevant information to make investment decisions (Oehler *et al.*, 2014). Therefore, in addition to financial literacy, sustainability literacy, and sustainable finance literacy, product literacy is also crucial for individual investors. Product literacy refers to the ability of consumers to understand a product's attributes and to be able to process information about its meaning and use (Worosz and Wilson, 2012). This thesis measures investors' ability to understand the information stated in mutual fund information sheets.

This thesis seeks to address a gap in the sustainable investment research field by investigating the investment-related characteristics, demographic, and sustainable investment knowledge of sustainable investors. Moreover, this thesis also explores the relationship between the knowledge level of investors who are engaged in sustainable investments and their information-seeking and financial advice-seeking behavior. This thesis fills in the gap in the literature by integrating the concept of financial literacy, sustainable literacy, and sustainable finance literacy into individual investors' sustainable investment decisions. In this thesis, sustainable investment product literacy is also introduced to measure investors' ability to understand the sustainability-related information contained in the mutual fund information sheets.

## **1.2 Purposes of the thesis and research questions**

This thesis aims at investigating individual investors' preferences and knowledge of sustainable investments. This is done by examining the impact of investment-related attitudes and demographic characteristics on sustainable investment choices and assessing investors' knowledge level regarding sustainable investments.

To achieve the purpose of this study, two research questions are defined:

**RQ1: What are the characteristics of individual investors who prefer sustainable investment?**

According to the traditional theories of economics and finance (Markowitz, 1952; Sharpe, 1964), investors maximize their utility by allocating their portfolios according to their preferred combination of risk and return over a specific time horizon. Regarding sustainable investments, previous studies by Bauer and Smeets (2015) and Adam and Shauki (2014) mentioned that investors also consider non-financial motives, such as social or environmental motivations, when making sustainable investments. Empirical research conducted by Dorfleitner and Utz (2014) found that investors' decisions to allocate their money to socially responsible investments are determined by their preferences for risk, return, and liquidity. Sociodemographic characteristics such as gender, age, and political affiliation have been revealed to be significant factors that influence socially conscious investment decisions (Hood *et al.*, 2014). This thesis investigated the impact of investment-related characteristics such as risk-return preference and investment horizon, as well as sociodemographic profiles such as age, gender, and income level on investors' choice of sustainable investments. This thesis also measured the level of knowledge of sustainable investment in order to get a better understanding of the characteristics of sustainable investors. The measurement of knowledge includes financial literacy, sustainable literacy, sustainable finance literacy, and product literacy of investors who are engaged in sustainable investments.

## **RQ2: How does individual investors' knowledge of sustainable investment affect their information-seeking and financial advice-seeking behavior?**

Sustainable investment integrates social and environmental considerations alongside pecuniary motives in the decision-making process, which makes it more complex than conventional investments. Therefore, in addition to financial literacy, investors need to have both financial and sustainability knowledge when evaluating sustainable investment choices. Customers find it challenging to select sustainable items due to their low understanding of important sustainability concerns and the effects of their purchasing choices (Connell, 2010; Young *et al.*, 2010). Smith and Paladino (2010) found perceived sustainable knowledge as a significant factor that influences consumers' decisions to purchase sustainable products. Furthermore, specific knowledge regarding sustainable finance was found to be a major determinant of willingness to invest in sustainable investments (Filippini *et al.*, 2021). The lack of knowledge can prevent investors from comprehending complex information related to sustainable investment products. Individuals who are overconfident in their financial literacy have a lower intention to seek financial advice (Kramer, 2016). On the other hand, actively seeking information and getting financial advice helps individuals, especially those who have limited knowledge to make informed investment decisions. Therefore, this thesis examined the relationship between knowledge levels and the way investors seek information and financial advice.

### **1.3 Thesis organization**

This thesis comprises five chapters and is organized as follows. Chapter 2 provides related works on investor preference and knowledge of sustainable investments. The review of previous studies was used to formulate the research hypothesis and the research model. The data collection procedure and the data analysis are described in Chapter 3. Chapter 4 summarizes the empirical findings and contributions from Paper I and Paper II. The conclusion of the two papers and the research limitations are covered in Chapter 5. Chapter 5 also provides theoretical and practical implications as well as suggestions for future research.

### **1.4 Declaration of contributions**

Paper I - Sustainable Investment Preferences among Robo-Advisor Clients

Ida Faradynawati conducted the conceptualization, methodology, formal analysis, investigation, writing—original draft preparation, writing—review and editing, and visualization parts. Ingalill Söderberg contributed to the conceptualization, formal analysis, writing—review, and editing parts.

Paper I was published on October 4, 2022, in *Sustainability*, Multidisciplinary Digital Publishing Institute, Vol. 14 No. 19, p. 12636.

Paper II - Sustainable Investments: Double Trouble for Retail Investors. Addressing Vulnerability and Consumer Protection Issues.

Ida Faradynawati conducted the conceptualization, methodology, formal analysis, investigation, writing—original draft preparation, and visualization parts. Ingalill Söderberg contributed to the conceptualization, formal analysis, and writing—original draft preparation parts. Annina Persson conducted the formal analysis, and writing—original draft preparation parts.

Paper II was submitted on March 15, 2023, for publication in the *International Journal of Bank Marketing* special issue *Consumer Vulnerability in the Banking Context*.

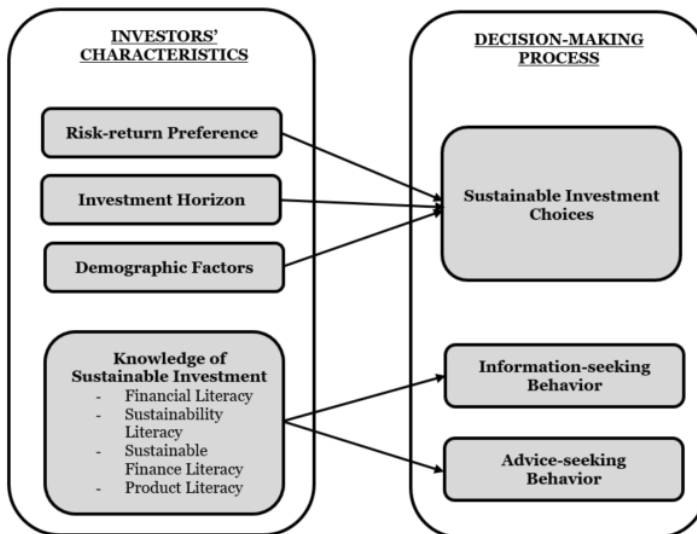
## Chapter 2: Literature review and conceptual framework

This chapter provides a comprehensive overview of the existing literature related to the topic of this thesis. The literature review is conducted by synthesizing and analyzing previous research, theories, and concepts. The review will focus on the key findings, methodologies, and limitations of previous research to highlight the significance and novelty of the present study.

### 2.1 Conceptual framework

Sustainable investing has gained increasing interest in recent years, with higher investors' awareness to the environmental, social, and governance (ESG) aspects alongside financial returns when making investment decisions. This thesis contributes to the evolving research in understanding individual investors when making sustainable investment choices by integrating several important concepts such as investment decision-making and risk, investment horizon, financial literacy, sustainability literacy, and sustainable finance literacy. Figure 1 displays the conceptual framework of this thesis. The concepts of risk-return preference, investment horizon, and demographic characteristics are integrated to explain the sustainable investment preferences of individual investors. Meanwhile, in measuring knowledge of sustainable investment, this thesis uses three concepts namely financial literacy, sustainability literacy, and sustainable finance literacy. These three types of literacy are incorporated to analyze investors' information-seeking behavior and advice-seeking behavior.

**Figure 1 Conceptual Framework**





## 2.2 Investment decision-making and risk

Individuals' preference for risk is a major consideration in making investment decisions. The risk and uncertainty perception is subjective and based on individual perspectives and incorporates psychological and emotional aspects. Psychological and emotional factors can play an informative role in decision-making involving risk and uncertainty (Virlics, 2013). Thus, decision-making under risk and uncertainty has become one of the biggest multidisciplinary research topics among economists and psychologists (Loewenstein *et al.*, 2001). The classical finance theory by Markowitz (1952) defined investment risk as the variability in expected returns. The degree of investment risk is determined by the range of possible outcomes for the returns that are expected. The investment risk is positively associated with the variability in expected returns. Individuals who pursue higher returns are willing to take a higher degree of risk, meanwhile, risk-averse individuals are willing to earn lower returns to compensate for the lower risk.

Sustainable investments combine financial objectives and non-financial objectives such as environmental and social impact. Some investors who consistently invest in socially responsible funds aim at balancing ethical and financial goals. However, studies conducted by Lewis and Mackenzie (2000) and Höchstädter and Scheck (2015) highlighted that ethical investment decisions are highly influenced by financial outcomes. Investors who balance their portfolio mix by investing in ethical funds, lose their interest when the fund is underperformed. In contrast, Webley *et al.* (2001) found that investors who are engaged in ethical investments were committed to pledging their money into the funds even when the financial performance is poor.

Sustainability is associated with environmental and social risks that may occur in the future, and those with lower risk tolerance may invest in sustainable options to minimize uncertainty. Sustainable investments are perceived as less risky than conventional investments by risk-averse investors (Fernandez-Perez *et al.*, 2022). As long as the socially responsible funds align with their social preferences, investors are willing to get lower returns and pay higher management fees (Riedl and Smeets, 2017). In contrast, investors with higher risk tolerance emphasize more on the financial objectives instead of the environmental impact of the investments (Bassen *et al.*, 2019).

## 2.3 Investment horizon

Another factor that has been considered as important as risk-return preference in the investment decision-making process is the investment horizon. Investment horizon refers to the duration an individual plans to invest their money in a particular financial product or portfolio. Investors choose the appropriate investment strategies and products based on their investment horizon (Dierkes *et al.*, 2010). Investors with short investment horizons are more likely to choose investments with

immediate returns like the certificate of deposits or bonds with short-term maturity. Investment horizon is also closely associated with investors' risk preferences. Investors with longer investment horizons may prefer to allocate their money to higher-risk instruments such as equities, while those with shorter investment horizons are more likely to choose less volatile products such as fixed-income instruments.

Concerning sustainable investments, Cox *et al.* (2004) revealed that investors with long-term horizons prefer not to invest their money in companies with low corporate social responsibility (CSR) performance. On the other hand, socially responsible investment (SRI) investors exhibit less sensitivity to the fund's performance and tend to invest for more extended periods than conventional investors (Benson and Humphrey, 2008). The limited supply of investment products that align with their social preferences could be a plausible explanation for this behavior. Increasing awareness of climate change makes investors expect funds with higher environmental impacts to outperform conventional investments in the long run (Anderson and Robinson, 2019). Based on the construal level theory by Trope and Liberman (2010), individual preferences are influenced by spatial, temporal, social, and hypothetical distance. Investors tend to make more risky decisions when the consequences of their actions occur in the distant future. Thus, investors with longer investment horizons may exhibit a stronger inclination towards sustainable investments because they have a shorter temporal distance from the future.

## **2.4 Investors' knowledge**

### **2.4.1 Financial literacy**

Basic understanding and knowledge of finance, or financial literacy, are essential to assist individuals to make informed financial decisions (Altman, 2012). Financially literate investors can better grasp the risks and possible rewards of various investment opportunities. They can use this information to make wise investment choices that are in line with their objectives and risk tolerance. Investors with a good level of financial literacy can also create a thorough financial plan that takes into account their present financial condition, long-term objectives, and possible hazards. This may make it easier for them to accomplish their financial objectives.

Financial literacy has been found to have a significant impact on individuals' financial behavior and outcomes. Several studies have demonstrated that individuals with higher levels of financial literacy are more likely to participate in the stock market (Arrondel *et al.*, 2012; Hsiao and Tsai, 2018), plan better for retirement (Clark *et al.*, 2017; Lusardi and Mitchell, 2007), manage personal cash flow better, and have precautionary savings (Hilgert and Hogarth, 2003). On the other hand, those with low financial literacy often face higher borrowing costs (Moore, 2003), increased over-indebtedness

risk (Gathergood, 2012), and difficulty choosing suitable financial products (Lusardi and Tufano, 2015).

With the increasing demand for sustainable investments, the role of financial knowledge is even more crucial. By choosing sustainable investments, investors consider both financial returns and ESG factors. Individuals who perceived themselves as financially literate show less interest in socially responsible investment (Rossi *et al.*, 2019). Moreover, there is no difference in the behavior of investors with different levels of financial knowledge toward socially responsible investments (Chamorro-Mera and Palacios-González, 2019). Financial literacy is essential in accurately assessing the potential risks and returns of sustainable investments. Investors need to identify investment opportunities that align with their financial goals and risk tolerance when evaluating the potential risks and returns of sustainable investments.

#### 2.4.2 Sustainability literacy

In addition to financial knowledge, individuals who wish to allocate their money to sustainable investors should have the capacity to understand sustainability metrics. Investors' understanding of the ESG performance of investment products assists them to make informed decisions that align with their financial and sustainability objectives. Moreover, investors with high sustainability literacy may encourage the investee companies to enhance their ESG performance and the level of disclosure about their sustainability practices. Previous studies by Lin and Niu (2018) and Sun *et al.* (2019) identified individuals' literacy in sustainability issues positively influences their environmentally-friendly consumption behavior. In sustainable investment settings, individuals' knowledge of environmental and social issues is positively associated with their willingness to invest in sustainable investments (Mehta *et al.*, 2020; Thanki *et al.*, 2022). Investors who are engaged in socially responsible investments tend to obtain more knowledge related to the sustainable aspects of mutual funds instead of the financial aspects (Nilsson *et al.*, 2016). Furthermore, despite the growing interest in sustainable investments, Benson and Humphrey (2008) pointed out that investors' lack of knowledge and information asymmetry between financial institutions and customers hamper investors' participation in the area.

#### 2.4.3 Sustainable finance literacy

Along with the knowledge of finance and sustainability issues, individual investors must be familiar with the knowledge of sustainable finance. Sustainable finance literacy measures individuals' knowledge of sustainable finance products (Filippini *et al.*, 2021). Knowledge of sustainable finance integrates the knowledge of ESG factors that may affect the financial performance of companies they are considering investing in. It also includes the knowledge of sustainability certifications and criteria as well as the regulatory frameworks in sustainable investments. The growing awareness of the need

to address sustainability challenges, such as climate change and social injustice gave rise to the demand for sustainability standards and criteria. The certifications and criteria were developed as consumers expect higher transparency of the sustainable practices conducted by the companies. Investors should also be aware of the regulatory frameworks related to sustainable investments such as disclosure or reporting requirements. Having a fundamental understanding of this knowledge of sustainable finance helps individual investors to make optimal sustainable investment decisions and prevent them from falling into misleading marketing practices.

The first study that introduced the sustainable finance literacy concept was proposed by Filippini *et al.* (2021). Sustainable finance literacy comprises a set of questions to measure individuals' understanding of ESG product definitions and guidelines, the difference between sustainability and ecology, and between impact investing and sustainable investing. The findings revealed that despite being financially literate, many Swiss retail investors scored low on the sustainable finance literacy test. Additionally, sustainable finance literacy was shown to be a predictor of investors' willingness to buy sustainable investment products.

#### 2.4.4 Product literacy

Every investment product, including sustainable investments, comes with a document such as a prospectus or a fund sheet that contains key information for potential investors. The purpose of the documents is to give an overview of the fund's investment objectives, strategies, and risks to be taken as considerations when potential investors evaluate the products. The fund sheet of sustainable investments generally states the information on the ESG profile and rating alongside the financial information of the investment. As an effort to promote sustainable investments and enhance consumer protection in the financial market, the EU launched The European Sustainable Finance Disclosure Regulation (SFDR). The regulation mandates financial market players to categorize their products based on their level of sustainability (EU Regulation 2022/1288, 2022). Under this regulation, all funds should be grouped into three categories based on their sustainability degrees: the dark green fund is the fund that fulfills the highest sustainability disclosure requirement based on article 9, the light green fund has a lower sustainability disclosure standard than the dark green fund, and another category that must integrate sustainability risk into their investment decisions as governed in article 7 of the regulation. Standardized disclosure requirements enable investors when making comparisons among investment choices and help them to make well-informed financial decisions (Oehler *et al.*, 2014). Kopp (2012) defined product literacy as the level of a consumer's ability to find, acquire, assess, utilize, and communicate essential knowledge to make informed decisions about a product. This concept goes beyond basic reading literacy, as it includes the capability to make a comparison between different products, evaluate and integrate new information, as well as use the products.

## **2.5 Information-seeking behavior and advice-seeking behavior**

The level of individuals' knowledge and their information-seeking behavior are closely related. Individuals with a higher level of prior knowledge are more likely to obtain more detailed and complex information than those without prior knowledge (Khosrowjerdi and Iranshahi, 2011). In contrast, low prior knowledge positively influences the ability to process subject-specific information (Surber and Schroeder, 2007). As a result, individuals with low prior knowledge spend less time reading each word. In the finance context, Lee and Cho (2005) found that individuals with a low level of perceived expertise in finance are more likely to utilize information intermediaries. The relationship between prior knowledge and information-seeking behavior is an important consideration in understanding how individuals make decisions.

Seeking financial advice from experts or professionals such as financial advisors is one of the ways for investors to obtain information when evaluating sustainable investment choices. Individuals' decision to seek financial advice depends on how they value the advice. As mentioned by Stigler (1961), individuals seek financial advice when the marginal benefit of the advice exceeds the marginal cost. A more recent study by Kramer (2016) found that individuals who overestimate their financial literacy are more likely to ignore the benefit of getting financial advice. On the other hand, financially literate individuals tend to seek advice from financial advisors and inquire for more information which increases their knowledge level even further (Calcagno and Monticone, 2013).

## Chapter 3: Methods and Data

Chapter 3 describes the methods and procedures used to collect and analyze the data. The first part of this chapter explains the data collection methods used in this thesis such as secondary data collection from and an online survey. In this chapter, the statistical analyses, such as ordinary least squares (OLS) regression and logistic regression, used to test hypotheses and examine the relationship between variables are also explained.

### 3.1 Data collection

This thesis focuses on understanding individual investors' preferences and knowledge of sustainable investments. Therefore, it is important to collect data that can give accurate representations of individual investors who are engaged in sustainable investment. My supervisor and I decided to contact one of the biggest banks in the Nordic region to discuss the possibility to use its consumer database for research purposes. The bank agreed to give permission to use the data from its robo-advisory service which contains investment preferences data and demographic data. All personal data that is identifiable are removed from the database by the bank to maintain the client's confidentiality. The bank designed the robo-advisor program to expand its advisory services to younger investors with limited budgets and limited experience in investing. The robo-advisor clients are required to fill in a short survey that assesses their financial situation, risk tolerance, investment horizon, investment goals, and sustainability preferences. The client's investment profile is used as a basis for the algorithms and computer programs to formulate the best investment recommendations. The database consists of investment profile data from 27,771 clients who reside in Sweden, Norway, and Finland. The sample included in the thesis is all clients who are registered with the robo-advisor between December 2017 and June 2021.

The database retrieved from the bank has certain limitations, it does not provide information about investors' knowledge of sustainable investment and their behavior in searching for information and financial advice before allocating their money to sustainable investment. Thus, an online survey was conducted from January to February 2023 to assess investors' knowledge of sustainable investments. The survey was conducted in Swedish considering that the participants reside in Sweden. In constructing the questionnaire, the study used a battery of questions from previous research to measure financial literacy (Lusardi and de Bassa Scheresberg, 2013), sustainability literacy, and sustainable finance literacy (Filippini *et al.*, 2021). Three short texts from a real mutual fund information sheet were used to test investors' ability to utilize the information to assess the funds' sustainability degree. The questionnaire was distributed through a research panel managed by Kantar SIFO, a Swedish marketing analytics firm. Members of the research panel should own an investment

that is labeled or rated as a sustainable investment to be eligible participants in the survey. Among the 1.774 members that signed up for the survey, only 504 participants fitted the criteria.

The questionnaire comprises four main parts and is started with background questions such as age, gender, income, education, etc. The second part of the survey consists of financial literacy, sustainability literacy, and sustainable literacy questions. The third part provides short texts from the mutual fund information sheet and questions related to the text. Participants' behavior in searching for information and advice about sustainable investments were questioned in the last section of the questionnaire.

### **3.2 Motivations of Method Choice**

The database from the bank consists of quantitative data on the risk-return preferences, investment horizon, demographic profiles, and sustainable investment choices of the investors. To answer the first research question, this thesis used the logistic regression method to analyze the data. Logistic regression was chosen after considering the dependent variable data characteristic, which has categorical outcomes. This regression method can estimate the probability of investors choosing sustainable investment based on the independent variables. Logistic regression was also used to examine the relationship between investors' knowledge and their advice-seeking behavior. This is due to the characteristic of the independent variable data, advice-seeking behavior. The survey asked if the investors seek financial advice before deciding on making sustainable investment decisions. The answer is dichotomous, thus, logistic regression was considered the most appropriate technique to analyze the data. Additionally, this thesis investigates the impact of sustainable investment knowledge on investors' information-seeking behavior. The information-seeking behavior was measured using a Likert scale, a type of ordinal scale, in the survey. Meanwhile, the independent variables are in ratio scales. Thus, this thesis utilized the ordinary least square regression method in investigating the relationship between the independent and dependent variables. The following section provides technical explanations of the two methods chosen in this thesis.

### **3.3 Methods of Data Analysis**

#### **3.2.1 Ordinary Least Squares Regression**

OLS regression is a statistical method that is commonly used in economics, social sciences, and many other fields to estimate the relationship between a dependent variable and independent variable(s). This method estimates of population parameters by searching the line of best fit that minimize the sum of the squared residuals between observed and predicted responses of the dependent variable (Gujarati, 2021). The following equation shows a simple linear regression model.

$$Y_i = \alpha + \beta X_i + \varepsilon_i \quad (1)$$

Where,

$Y_i$  = dependent variable

$X_i$  = independent variable

$\varepsilon_i$  = error between the observed responses and what the model predicts

The OLS technique aims to obtain the value of  $\hat{\alpha}$  and  $\hat{\beta}$  that minimize the sum of  $\varepsilon_i^2$ .

$$\sum_{i=1}^n (Y_i - (\hat{\alpha} + \hat{\beta} X_i))^2 \quad (2)$$

The value of  $\hat{\alpha}$  and  $\hat{\beta}$  are as follows.

$$\hat{\alpha} = \bar{Y} - \hat{\beta} \bar{X} \quad (3)$$

$$\hat{\beta} = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sum(X_i - \bar{X})^2} \quad (4)$$

A linear regression model with  $k$  number of variables is shown in the following equation

$$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \varepsilon_i \quad (5)$$

### 3.2.2 Logistic Regression

The OLS method is commonly used when both the independent and dependent variables are in an interval scale. However, if the independent variable is measured in a nominal or ordinal scale, using OLS regression to make an estimation will violate several classical assumptions of regression. The violation includes the assumption of normal distribution of the residuals or errors and the homoscedasticity assumption. Alternatively, when the outcomes of the dependent variable are categorical, researchers can use a logit or probit model. The similar densities make the data characteristics of the logit and probit models very similar (Brooks, 2008). The two models only differ in their error variance, the error variance in the logit model follows a logistic distribution while in the probit model, it follows a normal distribution.

One type of logistic regression is binary logistic regression, which is usually performed when the dependent variable has a dichotomous value. In this technique, the model estimates the likelihood of an event occurring based on the independent variables and the logistic curve categorizes the event as either a success or a failure (Fleiss *et al.*, 2013). Binary logit regression has several advantages compared to OLS regression. Unlike OLS, the binary logit model does not require the error values to be normally distributed and the error variance of the independent variables is not required to be homoscedastic. Binary regression can do estimation although the dependent and independent



variables do not have a linear relationship. Another advantage of the binary logit model is the independent variables can consist of discrete data.

The logistic regression model with  $k$  number of variables is shown in the following equation.

$$\text{logit}(y) = \ln\left(\frac{p}{1-p}\right) = \alpha + \beta_1 X_1 + \dots + \beta_k X_k \quad (6)$$

Where,

$p$  = probability of the event occurring

$(1-p)$  = probability of the event not occurring

$X$  = independent variable

The magnitude of the relationship between independent and dependent variables in logistic regression is measured in the odds ratio. The odds ratio represents the probability of an event occurring with a one-unit change in the independent variable, and all other variables remain constant. A higher odds ratio shows a higher probability of the event occurring. When the odds ratio is greater than 1, it shows that the independent variable is positively associated with an increased probability of the event occurring, whereas an odds ratio less than 1 indicates a decreased probability of the event occurring. An odds ratio equal to 1 suggests there is no significant relationship between the independent and dependent variables. Odds ratio is formulated as follows:

$$\text{Odds Ratio (Success)} = \frac{p}{(1-p)}$$

(7)

Where,

$p$  = probability of the event occurring

$(1-p)$  = probability of the event not occurring

### 3.4 Ethical Considerations

The anonymity and confidentiality of the samples in the database from the bank were maintained by encrypting personal information such as name, address, phone number, and account number. None of the authors of the first paper have the access to this personal information. Moreover, throughout the online survey, participants are not required to fill in any identifiable information to encourage participants to give honest and accurate answers.

## Chapter 4: Results

This chapter summarizes the results from each of the two articles included in this thesis. This section provides the basis for formulating the implications and suggestions for future research in Chapter 5. The full articles are presented at the end of this thesis.

### 4.1 Results of Paper I

#### **Faradynawati, I.A.A. and Söderberg, I.L. (2022). Sustainable Investment Preferences among Robo-Advisor Clients.**

Paper I sought to determine whether demographic characteristics and attitudes toward investing are connected to robo-advisor clients' sustainable investment decisions. This study provides two main contributions. First, it adds to the body of knowledge on sustainable investment choices of individual investors, particularly in the digital finance settings. In addition, it offers an analysis based on real data, allowing customers to express their investing preferences through actual investment choices. As far as we know, no prior works have examined investors' behavior toward sustainable financial products using real investment data, particularly in the context of digital advice.

The paper offers an empirical investigation into individual investor preferences for sustainable investments using a logistic regression model. Regarding investment-related attitudes, the results show that risk-averse investors. Similar results were shown for both estimation models which consider the country effect and without the country effect. The odds ratios of investors with high and moderate risk tolerance of purchasing sustainable investment fall below 1. This indicates that these groups of investors are less likely to choose sustainable investments compared to risk-averse investors. The findings are in line with the hypothesis which stated that investors with low-risk preferences are more likely to choose sustainable investment products. Moreover, investment horizon was found to be a significant factor in explaining investors' sustainable investment preferences. Investors with shorter investment horizons, ranging from 3 to 6 years horizon, were more likely to choose sustainable investments. The odds ratios of investors with investment horizons ranging from 6 to 10 years and 10 to 15 years were found to be below 1. This shows that investors with medium and long investment horizons have a lower probability to purchase sustainable investments than those with shorter investment horizons.

The sociodemographic profiles such as income level, gender, and age were statistically significant in determining investors' sustainable investment preferences. The income level was negatively associated with the probability of choosing sustainable investments. Investors with lower income

were more likely to choose investments that focus on ESG aspects. The finding in terms of gender supported the research hypothesis that female investors are more likely to be sustainable investors. Meanwhile, investors aged 55 years old and above had the highest likelihood of choosing sustainable investments. The paper also took into account country effects and the results showed that Swedish clients were more interested in sustainable investing than clients from Norway and Finland.

These findings assist financial service providers in formulating better marketing strategies by showing the market segment of sustainable investment products. This study also provides policy implications to financial authorities by describing the category of retail investors that should be the focus of campaigns or education to increase the awareness of sustainable investment.

## **4.2 Results of Paper II**

### **Faradynawati, I.A.A., Söderberg, I.L., and Persson, A. (XXXX). Sustainable Investments: Double Trouble for Retail Investors. Addressing Vulnerability and Consumer Protection Issues.**

The first objective of this study is to investigate the vulnerability of sustainable investors by measuring financial literacy, sustainability literacy, sustainable finance literacy, and product literacy. The second objective is to examine the relationship between financial literacy, sustainability literacy, sustainable finance literacy, and information-seeking and advice-seeking behavior. Logistic regression and linear regression were performed to examine the relationship between literacy and information-seeking and advice-seeking behavior. In understanding product literacy level, this study analyzed participants' comprehension of the key investor information documents of sustainable investment products.

The findings suggest that most sustainable investors had high objective financial literacy but scored low in sustainability knowledge and even lower in sustainable finance literacy. Investors who female, aged 18-29 years old, have lower income, low education level, and has no education in finance scored lower in the financial literacy test. The perceived financial literacy for all demographic groups is low on average. In general, both of the objective and the perceived sustainability literacy scores were low for all demographic groups. Similar findings were also found in the area of sustainable finance literacy, where most participants obtained low objective and perceived scores.

The paper also compared the actual and the perceived knowledge in these three areas of literacy. Most participants were found to have higher perceived knowledge of sustainability compared to their actual knowledge. The presence of overconfidence bias in sustainability was more prevalent compared to the area of financial literacy and sustainable finance literacy.

Sustainable investors search for information more actively when they have a high perceived knowledge compared to their actual knowledge. In evaluating advice-seeking behavior, it was discovered that sustainable investors who perceive themselves to be more financially literate are more likely to receive advice on sustainable investments from financial advisors. Yet, those who saw themselves as having a greater level of sustainability literacy were less inclined to consult their financial advisors before making sustainable investing decisions. In regards to product literacy, this study found that the key information about the dark green fund, with the highest sustainable disclosure requirements, was not easy to understand compared to the ones with lower requirements. Most of the participants also found it difficult to correctly classify the degree of sustainability of the dark green fund based on the key information. However, the majority of participants properly assigned the right degree of sustainability to the light green fund and the unclassified fund.

The originality of this research is threefold. The paper is the first to integrate the concept of financial, sustainability, sustainable finance, and product literacy into a sustainable investment context. Second, the results provide the evaluation of investors' vulnerability based on each type of literacy. Third, it examines the influence of financial literacy, sustainability literacy, and sustainable finance literacy, in shaping investors' information-seeking and advice-seeking behavior.

## Chapter 5: Conclusions and future research

This chapter summarizes the discussion of the findings related to the previous literature, contributions, limitations, and suggestion for future research.

### 5.1 Conclusions

This thesis aims at examining individual investors' preferences and knowledge of sustainable investments through two empirical studies. The thesis presents analyses and draws relevant conclusions to provide contributions to the literature and managerial implications.

Using a database from a Nordic bank, this thesis found that both investment-related attitudes such as risk-return preference and investment horizon are significant in explaining investors' sustainable investment choices. Individual investors with a high degree of risk aversion and short investment horizon have a higher probability to choose sustainable investments. The findings are in line with previous research by Dorfleitner and Utz (2014) and Bassen *et al.* (2019), which suggested that socially responsible investment preferences are significantly influenced by risk, return, and liquidity preferences.

Regarding sociodemographic characteristics, income, gender, and age were found to be significant in determining investors' sustainable investment preferences. Investors who are less wealthy, female, and older are more likely to be engaged in sustainable investments. The results are in contrast to (Gutsche and Zwergel, 2020), which found positive correlations between age and income to the amounts invested in sustainable investments. However, the finding regarding age supports the finding from Wins and Zwergel (2016) and Camilleri (2020) who reported that women are more engaged in social and environmental initiatives. This thesis also tested the country effect and found that investors from Sweden have a higher probability to choose sustainable investments compared to clients from Finland and Norway.

In addition, this thesis investigated the characteristics of sustainable investors by measuring individual investors' knowledge of sustainable investment. The empirical findings indicated that although most participants have a good level of financial literacy, their knowledge of sustainability and sustainable finance knowledge is limited. The results are consistent with Filippini *et al.* (2021), which found that individual investors' understanding of sustainable finance is insufficient despite the growing demand for sustainable investments. A lack of knowledge of sustainable finance may lead individual investors to make suboptimal investment decisions that are not aligned with their sustainable investment objectives. This thesis further examines the relationship between investors' knowledge of sustainable investments and their behavior in seeking information and advice. The results suggest that male investors, investors with higher education backgrounds in finance, and those

with a higher level of overconfidence in sustainability literacy are more active in searching for information. In terms of advice-seeking behavior, perceived sustainability literacy and perceived financial literacy were found to be significant factors to determine investors' advice-seeking behavior. Investors who perceived themselves as financially literate are more likely to get advice from financial advisors. On the contrary, investors who considered themselves to have a good understanding of sustainability have a lower likelihood to search for financial advice before deciding to buy sustainable investment products. Seeking advice from financial advisors is viewed as a favorable financial behavior that reflects individuals' financial well-being (Porto and Xiao, 2016).

This thesis also brought up a novel concept of sustainable investment product literacy. The survey participants perceived that the information regarding the light green fund and the non-sustainable labeled fund was easy to understand. Nevertheless, the information from the dark green fund, the fund with the highest disclosure requirement, was perceived to be more challenging to comprehend. Furthermore, many participants also had difficulty appropriately assigning the degree of sustainability of the dark green fund based on the information sheet. In contrast, most participants were able to correctly categorize the sustainability ratings of the light green fund and the fund with no sustainability label. These findings confirmed earlier research from Beshears *et al.* (2009) which mentioned that insufficient knowledge prevents investors from comprehending complex information.

## **5.2 Contributions**

The findings of this thesis provide several contributions to the literature, policymakers, and industry players.

First, this thesis contributes to the sustainable investment research field by providing new insights into sustainable investment preferences from the individual investor's perspective, which combines the Nordic region and digital finance settings. The thesis, to the best of the author's knowledge, is the first to integrate the concepts of financial literacy, sustainability, sustainable finance, and product literacy into a sustainable investment context. In addition, the empirical findings from this study fill in the knowledge gap regarding investors' knowledge of sustainable investment and their information-seeking and advice-seeking behaviors.

The results of this thesis have important implications for policymakers by providing relevant information about individuals' investment-related attitude and sociodemographic characteristics and their relation to sustainability preferences. The findings identified which type of individual investors have a high and low engagement in sustainable investments. Policymakers should prioritize educational campaigns for individuals who are not engaged in sustainable investment to strengthen the participation of retail investors in sustainable initiatives. Furthermore, this thesis shows which

type of investors have insufficient knowledge of sustainable investment and in which area of knowledge investors are most vulnerable. The insights give a basis for policymakers to formulate consumer protection policies for the most vulnerable ones by raising awareness of the knowledge and risks associated with sustainable investments. Stronger consumer protection accelerates the mobilization of capital from individual investors toward sustainable investments.

From the industry practitioners' perspective, the findings revealed the characteristics of individual investors who are more likely to select sustainable investments which can assist financial service providers to unlock the retail investment potential. The results from the product literacy assessment suggested industry players provide mutual fund sheets that fulfill the disclosure requirements and convey information that is easy to follow by individual investors. Comprehensive and clear information helps investors to make well-informed decisions and increase the likelihood of participating in sustainable investments.

### **5.3 Limitations**

This thesis provides initial insights into consumers' preferences and knowledge of sustainable investments, however, it is also essential to acknowledge the limitations of this thesis. The thesis focused on the sustainable investment preferences and knowledge of Nordic region consumers, which constrains the ability to assess the behavior of investors from different backgrounds. It is worth noting that the Nordic region is recognized as the frontrunner in sustainability initiatives, whereas other countries may be slower to adopt such practices. In addition, most of the adults in the Nordic countries are financially literate. The findings might be different if the research is conducted in countries or regions where the consumer bases have a lower level of literacy and lower level of sustainability awareness, compared to the Nordic region. Secondly, the sample retrieved from the bank consumer database was predominately made up of younger individuals, reflecting the fact that the bank's digital advisory service was created for the younger and digital-savvy generation. This raises the possibility of an analysis bias. Furthermore, in examining sustainable investment preference, this thesis did not include the analysis of other variables such as consumer attitudes towards sustainability and previous investment knowledge due to the lack of available data, which could have provided further insights. The short text from mutual funds sheets was used in the survey to assess sustainable investment product literacy due to the technical limitations of the data collection method. This limits the ability to get deeper information when analyzing investors' understanding of the information related to sustainable investments.

## **5.4 Suggestions for future research**

Considering the aforementioned limitations, there are some potential avenues for further research to gain a more comprehensive understanding of the sustainable preferences and behavior of individual investors. Further studies can extend the scope of the analysis to include a sample from diverse geographical backgrounds with varying degrees of sustainability awareness and in a comparative study. It would be worthwhile to incorporate additional variables such as attitude towards sustainability and prior investment knowledge to obtain a more holistic understanding of investors' sustainable behaviors. Additionally, to gain a deeper understanding of how individuals interpret information concerning sustainable investments, future research can employ comprehensive data collection methods, such as in-depth interviews or experimental studies. It would be interesting to investigate how individual investors utilize the information on sustainable investment from different sources of information such as financial advisors or the Internet in making investment decisions. Moreover, financial advisors are one of the important sources of information for individual investors before deciding to invest in sustainable investments. Future research can be conducted to investigate the role of advisory sessions in bringing up sustainability issues in investments, from the perspective of both consumers and financial advisors. There are substantial opportunities to conduct further research on the factors that drive sustainable investment decisions among individual investors. By expanding the understanding of sustainable investment behavior, it is possible to provide more valuable insights that enable the development of sustainable investment products that align with investors' preferences. It also enables better policy formulations by the authorities to increase the engagement of individual investors in sustainable investments.



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