The Sustainable Investment Gap in Europe: Implications for Digital Finance

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Abstract

This study explores the Sustainable Investment Gap (SIG) in 13 European countries, defined as the gap between awareness of ESG-labeled financial products and actual ownership by individual investors. Drawing on data from the 2023 OECD/INFE, the analysis integrates indicators of digital financial literacy (DFL), online financial activity, and the size of the gap. A preliminary exploratory typology of five country profiles was developed, and contextual digital interventions were proposed. The results indicate that higher levels of DFL co-occur with a smaller investment gap and greater online engagement, but digital readiness alone is not enough to close the gap. The proposed typology provides a framework for designing digital tools to support sustainable investment decisions. In further stages of the study, it is planned to test selected interventions in Poland using experimental methods in a simulated FinTech environment.

Keywords: ESG, sustainable finance, digital financial literacy, financial products.

1. Introduction

In recent years, regulatory and societal pressure across Europe to incorporate sustainability criteria into investment strategies has intensified. EU regulations (Sustainable Finance Disclosure Regulation, SFDR) and the EU Taxonomy have established a unified framework for classifying and reporting financial products aligned with Environmental, Social, and Governance (ESG) standards [5]. Examples of such products include investment funds classified as art. 8 and 9 SFDR (co called light or dark green funds), ESG-themed ETFs, and sustainable funds operating under UCITS or AIF regulations. While these measures have improved the supply-side organization of sustainable finance and increased public visibility of ESG topics, actual adoption of ESG-labelled investment products by retail investors remains low [7]. Data from 13 European countries, based on the OECD/INFE 2023 survey, show a consistent gap between awareness of ESG financial products (awareness) and their declared ownership (holding). For example, in Germany, 64.7% of respondents reported awareness of such products, yet only 14.9% hold them in their portfolios [7]. This discrepancy is referred to as the **Sustainable Investment Gap** (**SIG**). It conceptually reflects the broader attitude–behavior gap known in behavioral and decision science [1], whereby positive intentions or values do not reliably translate into corresponding actions. This phenomenon is observable across countries and is summarized in Table 1.

Table 1. Awareness, Holding, and SIG in Percentage Points for Selected European Countries.

Country	DE	LT	GR	LU	LV	HU	HR	SE	FR	CY	NL	PL	AL
Awareness (%)	64.7	53.3	35.8	29.5	17.9	15.6	15.5	15.1	14.3	13.3	11.1	10.1	6.8
Holding (%)	14.9	2.3	0.8	6.8	0.3	0.8	0.0	2.0	3.8	1.3	0.6	0.7	0.2
SIG (pp.)	49.8	50.9	35.0	22.7	17.6	14.8	15.5	13.1	10.5	12.0	10.5	9.4	6.6

Digital financial literacy (DFL), which is understood as the set of skills, knowledge, attitudes, and behaviors necessary for the safe and effective use of digital financial services [2], [6–7], is increasingly recognized as a key factor influencing individual financial

decisions. However, the link between DFL and ESG investment behavior remains underexplored. While higher DFL has been associated with broader digital engagement, its role in reducing the ESG investment gap has not been systematically examined. The objective of this exploratory study is to identify national-level patterns of the SIG and to propose a preliminary typology of ESG adoption profiles across European countries. Based on this typology, context-sensitive digital intervention strategies are outlined to support more effective translation of ESG awareness into investment behavior. The study is guided by the two research questions. **RQ1:** What combinations of DFL and online activity in managing financial products co-occur with SIG levels across European countries? **RQ2:** What types of context-sensitive digital interventions could be proposed to support the conversion of ESG awareness into investment behavior? The results aim to inform the development of digital financial tools that address barriers to sustainable investing and support individual users in adopting ESG-aligned behaviors. These proposals contribute to the discussion on the development of information systems in digital finance.

2. Data and Methods

The study draws on the raw data from the OECD/INFE 2023 International Survey of Adult Financial Literacy [7]. Out of the 39 countries covered by the survey, 13 were selected for analysis based on the simultaneous availability of the following indicators: ESG financial product awareness (awareness), declared ownership of ESG-labelled products (holding), digital financial literacy (DFL), and the share of adults managing financial products online (online_activity). Countries lacking data in any of these categories were excluded from the analysis. The Sustainable Investment Gap (SIG) was calculated as the difference between awareness and holding:

$$\text{SIG} = \text{Awareness (\%)} - \text{Holding (\%)} \quad (1)$$

To facilitate cross-country comparisons, the normalized version of the SIG was constructed as the ratio of the absolute SIG to the awareness level:

$$\text{Sustainable Investment Gap normalized (SIG\_norm.)} = (\text{Awareness} - \text{Holding}) / \text{Awareness} \quad (2)$$

This normalized indicator ranges from 0 (full conversion) to 1 (full gap). Although not formally defined in the OECD documentation, it serves as a useful analytical proxy for capturing the awareness–behavior mismatch at the national level. Subsequently, bivariate associations between SIG_norm, DFL levels (on a 0–100 scale) [7] and online_activity were examined. Pearson correlation coefficients were calculated to explore the strength and direction of these relationships. A preliminary exploratory typology of countries was then constructed based on the above three variables. Given the small number of countries included (N = 13), the analyses are exploratory in nature and should not be interpreted as establishing causal relationships.

3. Results and Discussion

Most countries are characterized by a high gap level (the SIG_norm exceeds 0.9 in 9 of the 13 countries studied). The results presented in Table 2 confirm the widespread nature of the discrepancy between awareness and declared ownership of ESG financial products.

Table 2. SIG_norm, DFL and online_activity for Selected European Countries.

Country	FR	LU	DE	SE	CY	PL	NL	HU	LT	AL	GR	LV	HR
SIG_norm	0.733	0.769	0.77	0.868	0.905	0.931	0.947	0.951	0.956	0.972	0.978	0.983	1
DFL	62	59	64	52	44	50	56	48	45	39	54	46	49
online_activity	56.3	76.4	62.8	43.5	29	56.9	77.8	29.7	51.4	14.4	15.3	35.8	24.3

In France (0.733), Luxembourg (0.769), and Germany (0.770), the SIG_norm is relatively low and coincides with the highest DFL (62, 59, and 64, respectively). In the remaining countries, although the DFL is also moderately high (e.g. the Netherlands: 56,

Sweden: 52), the SIG_norm remains very high. This suggests that even a high level of DFL does not necessarily translate into the conversion of pro-ESG intentions into investment behaviour. Additionally, the relationship between normalized SIG and online financial activity was visualized in Figure 1.

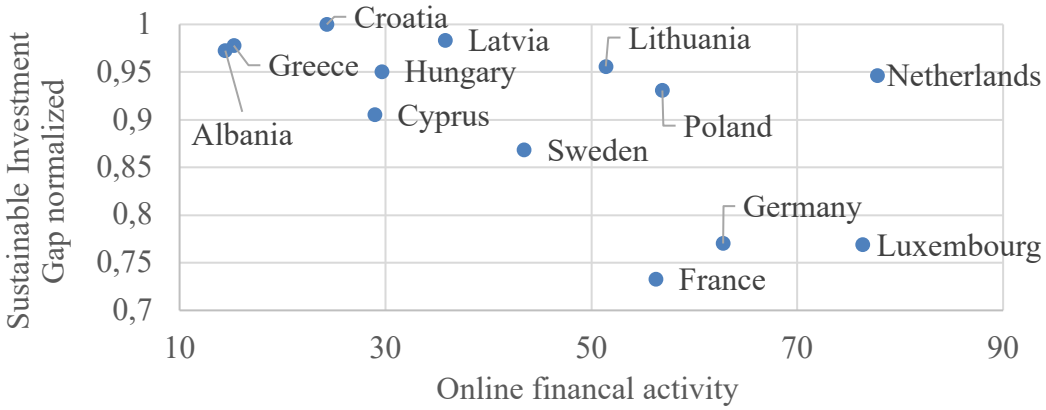

Fig. 1. SIG_norm vs. online_activity (% of adults) (source: own elaboration based on [7]).

The figure illustrates that high levels of digital engagement do not automatically result in a low investment gap. For instance, in the Netherlands, more than 77% of respondents report managing financial products online, yet the SIG_norm remains above 0.94. In contrast, Germany and Luxembourg demonstrate both high online_activity (62.8% and 76.4%, respectively) and lower SIG_norm values. This suggests that, beyond digital infrastructure, other enabling factors - such as the availability of ESG investment products (e.g., ESG exchange-traded funds (ETFs), ESG UCITS funds, ESG alternative investment funds (AIF)), trust in ESG labels, intuitive user interfaces, and the quality of financial education - may influence effective conversion from awareness to action. These findings reinforce that high DFL [2] and frequent use of digital platforms are necessary but insufficient conditions for behavioral change. In many cases, the barriers appear more behavioral than technological: cognitive overload [9], limited trust in ESG certification, and insufficient transparency of product offerings are frequently cited in the literature as contributing factors. The behavioral nature of the investment gap is also highlighted in the literature, particularly in relation to the lack of knowledge and experience [3].

To deepen the analysis, Pearson correlation coefficients were calculated between SIG_norm, DFL, and online_activity, based on aggregate-level indicators across 13 countries (Table 3.). It should be noted, therefore, that the results reflect country-level linkages and not individual-level behavior. Given the limited sample size, the results should be considered exploratory and do not support causal inference.

Table 3. Pearson correlation coefficients between SIG_norm, DFL, and online_activity.

	SIG_norm	**DFL**	**online_activity**
SIG_norm	1	–0.78	–0.61
DFL	–0.78	1	+0.67
online_activity	–0.61	+0.67	1

There is a strong negative correlation between SIG_norm and DFL (r = -0.78), suggesting that higher levels of DFL are associated with a smaller gap between ESG awareness and actual investment behavior. A moderate negative correlation is also observed between SIG_norm and online_activity (r = -0.61), implying that greater use of digital financial channels is generally linked with a smaller investment gap, although the association is weaker than for DFL. Additionally, the positive correlation between DFL and online_activity (r = +0.67) indicates that more advanced DFL are associated with more frequent online financial activity.

To systematize the findings, a typology of country profiles was developed based on three indicators: SIG_norm., DFL, and online_activity. The results are shown in Table 4.

Table 4. Exploratory country profiles based on the Sustainable Investment Gap and digital competencies – indicative recommendations for digital interventions**.**

Profile	SIG _norm	DFL	Online _activity	Recommended digital interventions	Feasibility and expected impact
1. Effective Conversion Cluster	Low (< 0.80)	High (≥ 59)	High (≥ 55%)	Optimization of existing tools (improving performance and flow), benchmarking (using best practices), UX testing (identifying usability issues), scaling effective features, and exploring personalization and AI-supported tools where suitable.	Interventions can be implemented without major structural changes. High user competencies support effective use and scaling of tools.
2. High Readiness - Low Adoption Gap	Medium (0.80-0.94)	High (≥ 59)	Medium-High (≥ 45%)	Digital nudging (interface cues guiding user decisions), real-time feedback (instant user response mechanisms), ESG content personalization (adapting to user values), and default options (pre-selected choices most users tend to follow).	The digital environment supports behavioral interventions that simplify investment decisions and help close the awareness-action gap.
3. Behavioral Resistance Group	Medium (0.80-0.94)	Medium (45–58)	Medium-Low (< 55%)	Simplified user interfaces (reducing decision complexity), cognitive noise reduction (removing distractions and conflicting cues), and trust-building in ESG labels (increasing user confidence in product classification).	Implementation requires design adjustments and messaging that builds trust. This increases the likelihood of action despite moderate digital competencies.
4. Digital Literacy Constraint	High (>0.94)	Low-Medium (< 59)	Medium-Low (< 55%)	Simplified onboarding (intuitive first-use experience), progressive scenario design (gradual introduction of features), and in-app financial education (learning modules embedded in digital platforms).	Tools must be tailored to limited digital skills, laying the groundwork for future investment engagement.
5. Structural Access Gap	High (> 0.94)	Low (< 45)	Low (< 30%)	System-level interventions such as digital infrastructure investment (broadening access), offer transparency (clear, understandable ESG offerings), standardization of ESG criteria, and institutional support for digital investing.	Institutional support and structural investments are required. These interventions are essential to create the conditions for any participation in the ESG market.

Each of the identified profiles reflects a distinct set of barriers and opportunities for digital interventions supporting ESG adoption. Countries were assigned to profiles based on majority-fit, with SIG_norm prioritized in borderline cases due to the exploratory nature of the typology. ESG product holding was not used as a criterion for assignment but is presented illustratively to reflect actual adoption levels. Low holding values justify digital interventions even in digitally competent countries. The first profile includes countries such as Germany, Luxembourg, and France, which combine high DFL and strong online_activity with a low SIG_norm. ESG product holding varies: Germany shows a higher holding (14.9%) than France or Luxembourg (<7%), suggesting adoption also depends on product availability and communication. Recommended interventions include optimizing digital tools, benchmarking, UX testing, scaling effective features, and, where suitable, introducing personalization and transparent and responsible AI-based options. The second profile includes countries with high DFL, strong online_activity and medium SIG_norm. This combination points to behavioral rather than structural barriers [3], such as lack of trust in ESG labels [5], cognitive overload (when users face too much or too complex information), or status quo bias (a tendency to prefer existing options despite better alternatives) [9]. While no country in the dataset fully matches this configuration, the Netherlands comes closest. Recommended interventions include digital nudging, personalization, default options [4], [8-9], real-time feedback, and simplified choice architecture (i.e. designing decision environments to reduce complexity and support user action). The third profile refers to countries with medium SIG_norm and DFL, but only moderate online_activity, as exemplified by Sweden. ESG product holdings remain limited. Recommended interventions include simplified user interfaces, reduction of cognitive noise, and trust-building in ESG content and labels. Digital nudging theory [9] implies that design can influence decisions even among digitally skilled users, requiring interface-focused solutions. The fourth profile includes countries with high SIG_norm, low to medium DFL, and online_activity (e.g., Greece, Hungary, Latvia, Lithuania). ESG product holdings remain minimal. Recommended strategies focus on easing initial digital entry through simplified onboarding, progressive scenario design, and in-app financial education. Poland, with slightly higher online activity and DFL, may be considered a borderline case. **The fifth** and most demanding profile consists of countries with high

SIG_norm, very low DFL, and limited online_activity. ESG product holding is extremely low (e.g., Albania). These require system-level interventions [3], such as digital infrastructure development, improved access to ESG tools, clearer communication of ESG labels [5], and institutional support to promote digital investment channels. While the typology is exploratory and not based on formal modelling, it offers a practical framework for aligning interventions with national competencies and reducing the SIG.

4. Conclusion and Future Research

The study confirms the existence of a significant ESG investment gap in sustainable finance in the European countries surveyed. The gap reflects the discrepancy between awareness of ESG-labeled products and their actual ownership by individual investors. Even in countries with relatively high levels of DFL and online_activity, the magnitude of the gap remains large. The analysis showed that higher levels of DFL co-occur with lower values of SIG_norm and more frequent use of digital financial channels. These relationships are correlational at the aggregate level and, due to the exploratory nature of the analysis and limited sample size, should be interpreted with caution. Based on data from 13 countries, a preliminary typology of five country profiles was developed. It is based on combinations of SIG_norm, DFL and online_activity. For each profile, preliminary recommendations for digital interventions were proposed, considering their feasibility and expected impact. Behavioral factors were also identified that may hinder the effectiveness of translating ESG awareness into investment behavior, even with a developed digital infrastructure. The next study plans to empirically verify the effectiveness of the selected solutions using the example of Poland. The goal will be to investigate whether and how subtle behavioral triggers (e.g., default settings, social signals, feedback messages) used in fintech applications can support pro-ESG decision-making. Respondents will be engaged in realistic decision-making scenarios based on the functionalities of actual digital tools. In addition, technological indicators (perceived usefulness, ease of use) will be analyzed, as well as generational differences, level of trust in technology, the decision fatigue phenomenon, and the availability of ESG products. The results, when subjected to statistical analysis, will help determine the extent to which choice architecture and appropriate interface design can support sustainable investment decisions and influence the reduction of ESG. This will facilitate the design of digital tools that realistically influence investor behavior.

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