

The Role of Financial Institutions in Shaping Green Finance Decisions: The Impact of Digital Tools and Pro-Environmental Communication*

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Abstract

The objective of this study is to analyze the impact of digital financial tools utilized by banks and fintech companies on consumers' inclination to make environmentally friendly financial decisions. A survey was conducted among 318 students from AGH University of Krakow in Poland (n=160) and University of Western Macedonia in Greece (n=158), using a 5-point Likert scale. Results indicate a cautious attitude toward eco-friendly initiatives. About 33% of respondents would likely consider eco-products promoted online, with Greek students showing significantly higher responsiveness than Polish students. Mobile apps providing eco-advisory tips received moderate openness (43% likely/very likely), again higher in the Greek sample. Daily banking suggestions for eco-friendly alternatives elicited slightly above-neutral engagement (about 45%), while perceptions of fintechs versus traditional banks remained neutral across countries. Around 48% of participants perceive digital tools as useful for supporting eco-conscious decisions. Correlation analyses reveal that greater environmental awareness is strongly associated with responsiveness to digital advisory, daily eco-suggestions, and eco-marketing, though it may also prompt a more critical view of fintech innovativeness in green finance. Overall, the findings highlight the potential of digital platforms to encourage eco-conscious financial behaviors, while suggesting that tailored strategies may be needed to enhance engagement across different contexts.

Keywords: digital finance, green finance, banking, financial decisions

Introduction

In recent years, as environmental global problems intensify, raising awareness among society, whether among ordinary citizens or companies, and encouraging public engagement are priorities that affect both society and the economy. A key parameter is alternative energy, in particular forms characterized as green energy and, more generally, as part of a sustainable economy. An important issue in the development of green energy is its financing, either through banking and non-banking institutions or through public financing. In this context, there is a double pillar, on the one hand, financial institutions can play an important role in shaping decisions on green financing, with policies such as directing lending towards green investments, on the other hand, the digital tools at the disposal of banks can facilitate the promotion of green sensitivity and ultimately the promotion of investments not only by companies but also by consumers for the use of green consumer products and investments such as electric means of transportation, green energy upgrading of homes. In the era of the advancing digitalization of the financial services sector, banking applications have ceased to function merely as passive wallets, becoming active advisors in the daily lives of consumers. The dynamic growth of the fintech sector has introduced a new momentum into the client-institution relationship, where personalization and "nudge marketing" play a pivotal role. The objective of this study is to analyze the impact of digital financial tools utilized by banks and fintech companies on consumers' inclination to make environmentally friendly financial decisions.

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Literature Review

Financial institutions are motivated to adopt green finance by a confluence of factors:

- customer demand: growing consumer preference for sustainable products and services,
- regulatory compliance: mandates for environmental, social and governance disclosures, climate risk reporting, and green lending quotas,
- financial incentives: access to green bonds, sustainability-linked loans, and preferential regulatory treatment,
- market forces: competitive differentiation, reputational benefits, and risk mitigation (Akomea-Frimpong et al., 2022; Sohail et al., 2024; Karmacharya et al., 2025).

These drivers are reinforced by the increasing materiality of environmental risks and the alignment of green finance with long-term value creation. They indicate a fundamental shift in the operational paradigm of financial institutions. Green finance has ceased to be considered solely a matter of corporate social responsibility and has become a critical element of credit and investment risk management. Financial institutions recognize that financing high-emission sectors exposes them to losses resulting from regulatory changes and technological advances. In this context, green portfolios serve as a hedge against the loss of asset value (so-called stranded assets). The growing popularity of instruments such as sustainability-linked bonds demonstrates that the market is shifting from simply excluding "dirty" sectors toward actively supporting clients' energy transitions. In an era of increasing digitalization, the financial sector faces a dual challenge: how to effectively implement technological innovations while simultaneously achieving ambitious sustainable development goals. This article examines how financial institutions use digital tools to shape pro-environmental attitudes among their customers. A key research question remains whether modern banking applications are merely a technical convenience or a real incentive for users to choose green financial products.

The academic discourse surrounding these issues is multifaceted. Part of the literature refers to the behavior towards sustainable development that can be financed. Nurkhin et al. (2025), based on a survey of university students, conclude that environmental education significantly determines environmental knowledge and attitudes. Attamin et al. (2023), also investigating behavior among a sample of students, found that participants reported a high level of comprehension regarding sustainability, while their attitude toward the subject was unequivocally marked as highly affected. Suyanto et al. (2021) also analysed a sample of students. Based on the results, the best step to preserve the environment is to evaluate students' behavior, attitudes, and actions in relation to the basic principles of sustainable living. Da Silva Gomes et al. (2020) examined the factors influencing individuals' attitudes towards sustainable development using a sample and found that knowledge about sustainability influences students' attitudes in the dimensions of environmental, economic, social, and education in a positive and significant way. Results indicate that students with left-wing political conceptions tend to hold more positive attitudes.

Complementing the focus on individual attitudes, other studies have examined the role of banks or other financial institutions in financing sustainable, green development. Batchu and Settibathini (2025) analysed how sustainable practices are reshaping financial technology, influencing innovation, regulatory frameworks, and consumer behavior. The paper provides a comprehensive exploration of the future trajectory of sustainable finance within the broader context of financial technology. Vikas et al. (2022), examined the role of banks and other financial institutions in enhancing green digital finance. The authors note that financial product intermediation through technology platforms can, to some extent, help bridge this gap and create an enabling ecosystem. They examined in this context how banks and financial institutions can do this by linking finance, technology, and sustainability. This will promote green finance intermediation, enhance financial inclusion, and mobilize green capital. Other studies have focused on the adoption of fintech in green finance. Iddrisu et al. (2025) provide an in-depth exploration of fintech innovations aimed at promoting sustainability within banking institutions. They also examine the regulatory and ethical considerations that accompany these innovations, concluding on the potential benefits and challenges of integrating fintech into sustainable banking practices. Serdarušić et al. (2024) examined the dynamic interplay among green finance, Fintech adoption, digital awareness, and digital transformation in their study of Croatian banks. The study shows that green finance has a significant impact on fintech adoption and digital awareness. Additionally, digital awareness significantly influenced fintech adoption. However, the direct effect of digital transformation on fintech adoption was not significant. To examine the risk to banks related to green loans, a study by Di Tommaso et al. (2025) was used. In a study examining 47 international banks, the authors assessed the short-term impact of green loans on banks' CDS spreads and the factors that affect those spreads. They found a "green effect" in issuing a green loan. The banks benefit in terms of reputation. The pattern is confirmed across all regions, with specific factors affecting cumulative abnormal returns (CAR). The authors concluded that green bonds' characteristics and country-specific features significantly influence CARs, although

the effects vary across regions. A review of the digital economy and sustainable development is provided by Fu et al. (2023). This study comprehensively reviews the relationship between green finance and sustainable development, with a focus on combating climate change and achieving carbon neutrality.

Research Method

The aim of this study is to examine the effect of digital financial tools used by banks and fintech companies on consumers' propensity to make environmentally sustainable financial decisions.

The following research questions were formulated:

1. Does the pro-ecological communication of financial institutions increase users' inclination to choose green financial products?
2. Does advice on sustainable spending or eco-investing in mobile apps increase the likelihood of users following such recommendations?
3. Do suggestions of green alternatives in banking apps increase users' attention to pro-ecological consumption options?
4. Do digital financial tools make it easier for users to engage in environmentally friendly actions?
5. Do users perceive fintech companies as more innovative and credible in promoting green finance than traditional banks?

Survey research was conducted on a total of 318 students, including 160 from AGH University of Krakow in Poland and 158 from University of Western Macedonia in Greece. Responses were measured using a 5-point Likert scale (1 - very unlikely/strongly disagree, ..., 5 - very likely/strongly agree). The t-test and Spearman's rank correlation were used in the analysis.

Research Results

The following section provides a comprehensive breakdown of the survey results, examining each variable individually to highlight both general trends and national specificities.

Impact of online communication on eco-friendly initiatives

The analysis begins with the influence of pro-ecological social media presence on consumer choices. Data from the total sample shows a cautious approach toward green banking (cf. Fig.1): 33.3% of respondents declare they would be "likely" or "very likely" to consider a specific institution for eco-products based on its online communicated initiatives, while the similar group (33%) remains neutral. As shown in Table 1, the total sample mean is 2.9874. However, a country-level comparison reveals that the Greek sample ($M=3.1329$) is significantly more responsive to such marketing than the Polish sample ($M=2.8553$), with a p-value of 0.02171 indicating a statistically significant difference in consumer sensitivity to green branding.

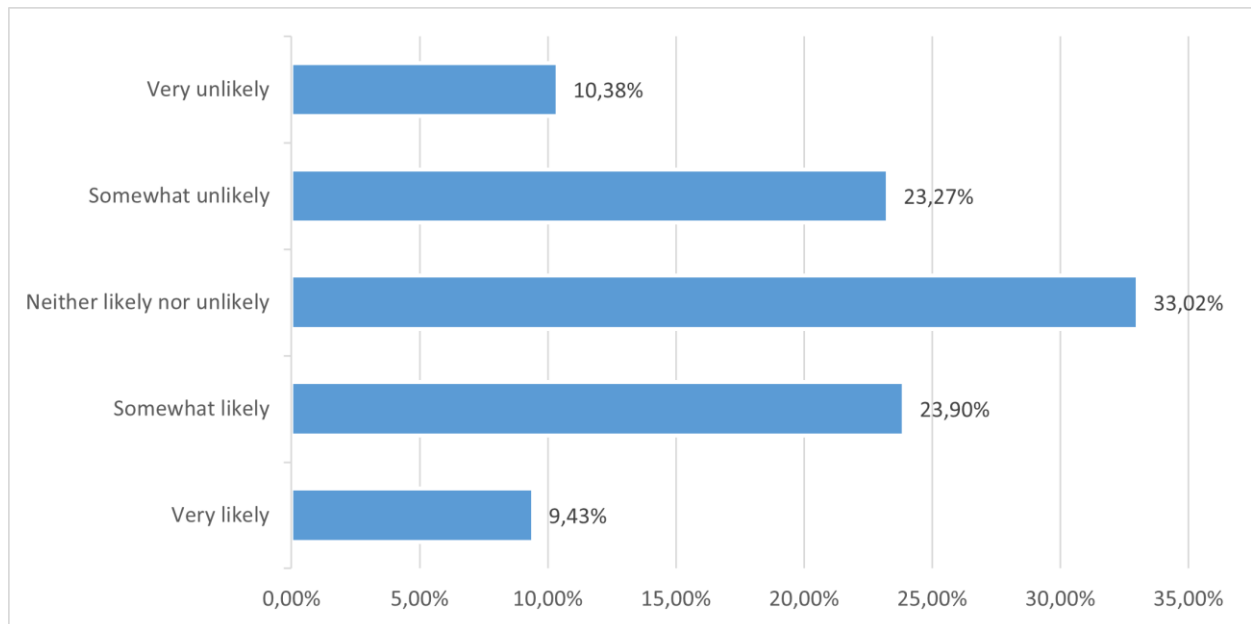


Fig. 1. Answers to the question: ‘A bank or fintech company (e.g. Revolut, Viva Wallet) posts online about its eco-friendly initiatives. How likely are these actions to make you consider that specific institution for eco-products?’ (n=318)

Table 1: Answers to the question: ‘A bank or fintech company (e.g. Revolut, Viva Wallet) posts online about its eco-friendly initiatives. How likely are these actions to make you consider that specific institution for eco-products?’

Sample	Mean	Standard deviation	t-test	
			t	p-value
Total sample (n=318)	2.9874	1.1243	-	-
Greek sample (n=158)	3.1329	1.0379	2.30705	0.02171
Polish sample (n=160)	2.8553	1.1807		

Digital eco-advisory

When examining the role of mobile apps in providing tips for sustainable spending, the data reveals a noticeable level of openness, with 43.1% of all participants expressing a readiness to follow eco-investing advice (combined "likely" and "very likely") (cf. Fig. 2). The extreme negative ("very unlikely") is selected by only 11.3% of the total sample. According to Table 2, this is one of the most polarized areas between the two nations; the Greek respondents (M=3.2848) show a much stronger inclination toward digital guidance than their Polish counterparts (M=2.9188). This difference is highly significant ($p=0.003961$), suggesting that digital advisory platforms may find a more receptive audience in the Greek market.

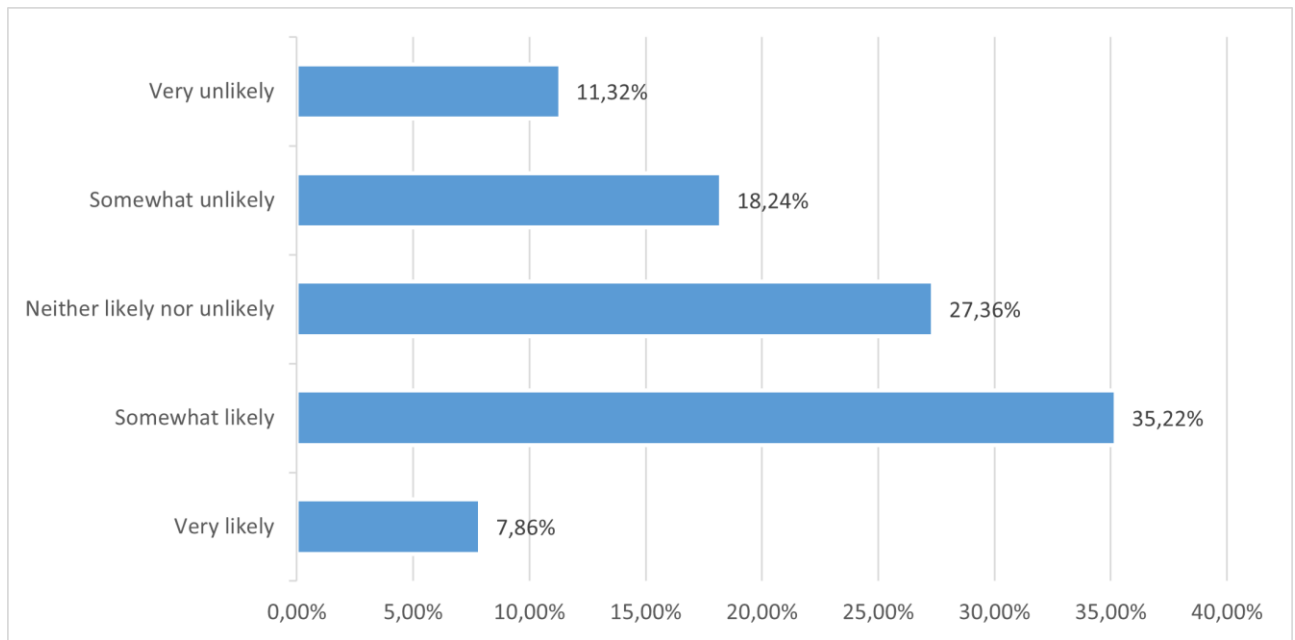


Fig. 2. Answers to the question: ‘A mobile app gives tips on environmentally sustainable spending or eco-investing. How likely are you to follow this advice?’ (n=318)

Table 2: Answers to the question: ‘A mobile app gives tips on environmentally sustainable spending or eco-investing. How likely are you to follow this advice?’

Sample	Mean	Standard deviation	t-test	
			t	p-value
Total sample (n=318)	3.1006	1.1366	-	-
Greek sample (n=158)	3.2848	1.0439	2.90293	0.003961
Polish sample (n=160)	2.9188	1.1936		

Eco-suggestions during daily payments

The integration of eco-friendly substitutes into daily banking routines receives a rather moderate response. Aggregated data shows that approximately 45% of users indicate some willingness to notice or consider these suggestions during their daily transactions (cf. Fig. 3). Table 3 reports a total mean of 3.1289, suggesting a slightly above-neutral attitude. While the Greek mean ($M = 3.2595$) is higher than the Polish mean ($M = 3.0000$), the t-test yields a p-value of 0.05279. This indicates a marginal trend toward higher responsiveness among Greek participants; however, the difference does not reach conventional levels of statistical significance, suggesting broadly similar attitudes across the two groups.

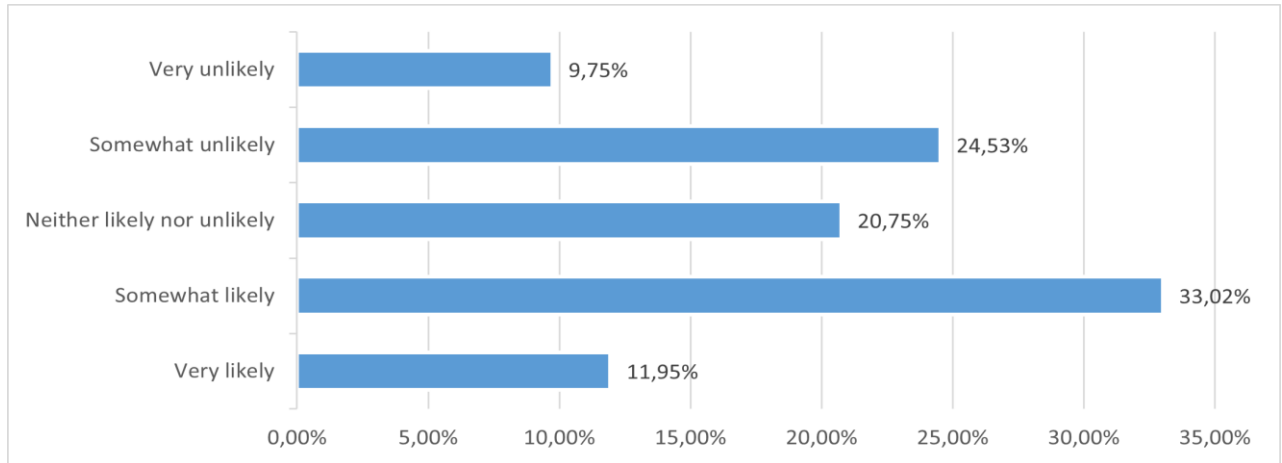


Fig. 3. Answers to the question: ‘You use a banking app for daily payments. Sometimes, it suggests more environmentally friendly options (e.g., eco-friendly substitutes). How likely are you to notice or consider these suggestions?’ (n=318)

Table 3: Answers to the question: ‘You use a banking app for daily payments. Sometimes, it suggests more environmentally friendly options (e.g., eco-friendly substitutes). How likely are you to notice or consider these suggestions?’

Sample	Mean	Standard deviation	t-test	
			t	p-value
Total sample (n=318)	3.1289	1.1945	-	-
Greek sample (n=158)	3.2595	1.1034	1.94403	0.05279
Polish sample (n=160)	3.0000	1.2649		

Fintech vs. traditional banks

The statement regarding whether fintechs are more innovative and reliable in green finance than traditional banks also yields neutral results. The total sample mean of suggests a "wait-and-see" approach from consumers. Procentual data indicates that while some agree with fintech superiority (31.7%), the largest large group remains undecided (cf. Fig.4). Interestingly, Table 4 reveals an almost identical sentiment across both countries (M=3.0822 for Greece and M=3.1000 for Poland). The p-value of 0.8702 confirms there is no significant difference, suggesting that the perceived brand image of fintechs versus banks in the context of "greenness" is consistent regardless of national origin.

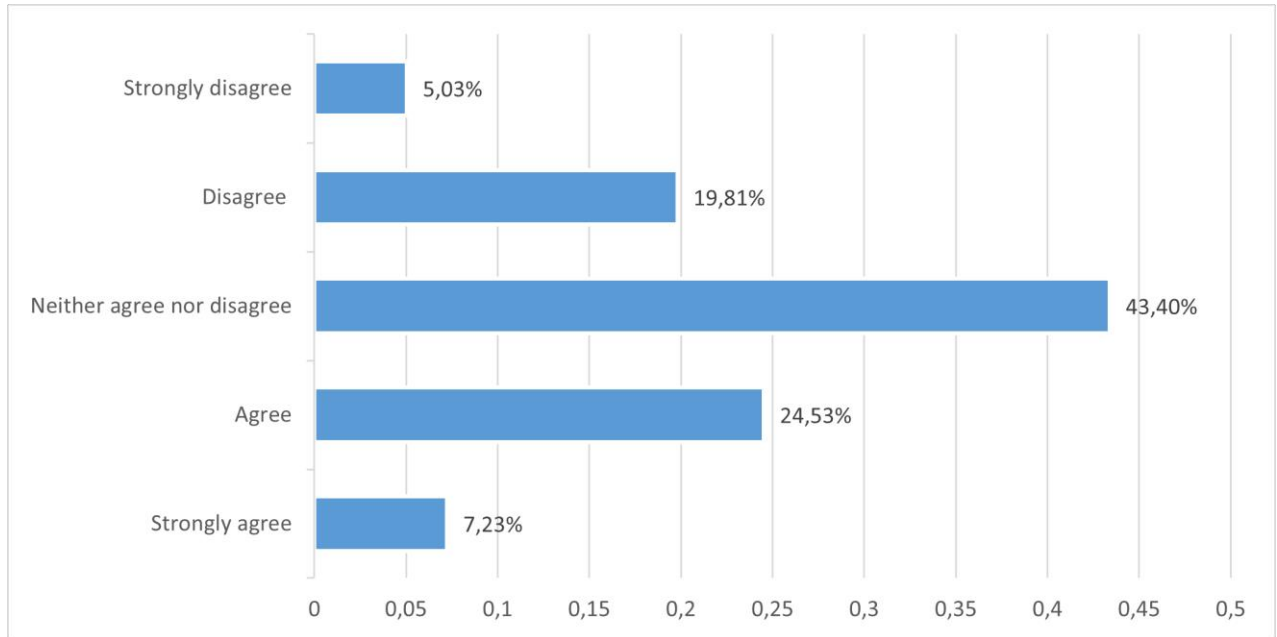


Fig. 4. Answers to the statement ‘Fintech companies are more innovative and reliable in promoting green finance than traditional banks’ (n=318)

Table 4: Answers to the statement ‘Fintech companies are more innovative and reliable in promoting green finance than traditional banks’

Sample	Mean	Standard deviation	t-test	
			t	p-value
Total sample (n=318)	3.0912	0.9621	-	-
Greek sample (n=158)	3.0822	1.0309	0.163568	0.8702
Polish sample (n=160)	3.1000	0.8889		

Utility Of Digital Tools

One of the more notable findings relates to the perceived usefulness of digital tools in supporting eco-friendly behaviors. Around 48.1% of respondents agree or strongly agree that digital tools help them act in a more environmentally conscious way. This is reflected in the highest mean score in the study ($M = 3.3113$), indicating a slightly above-neutral tendency. Table 5 shows that while the Greek sample ($M = 3.4304$) reports a higher mean than the Polish sample ($M = 3.1938$), the difference is marginally non-significant ($p = 0.0532$). Overall, the results suggest a general perception that digital tools may facilitate more environmentally friendly behaviors, although the effect is moderate.

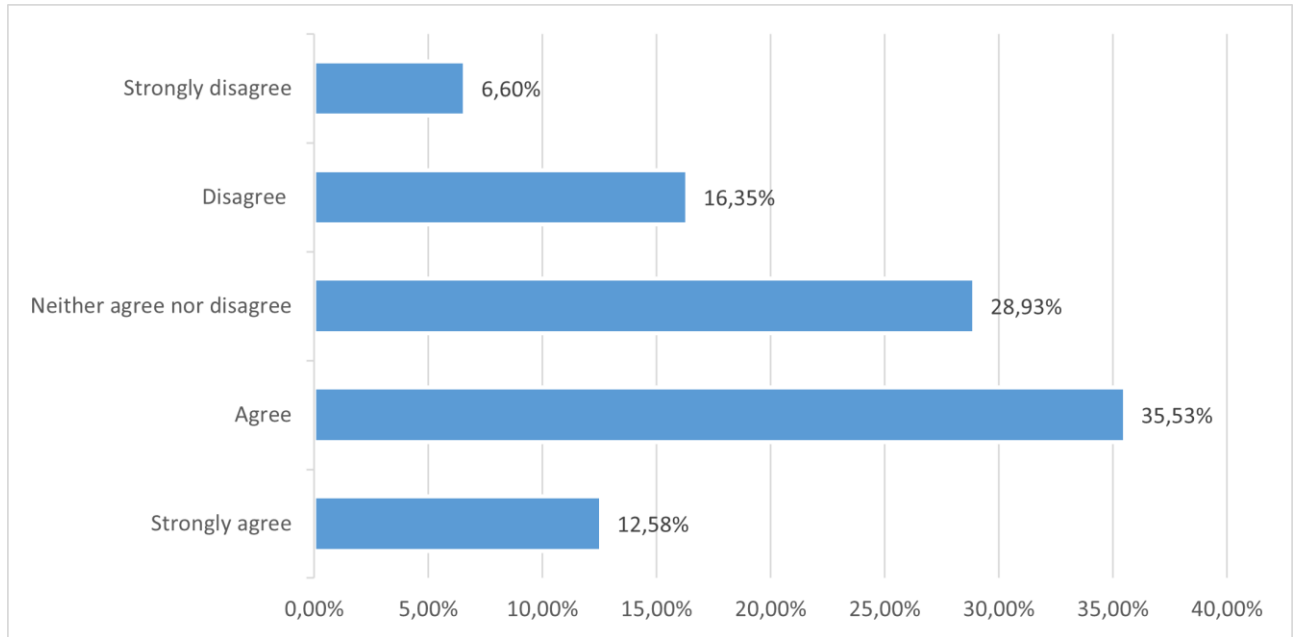


Fig. 5. Answers to the statement ‘Digital financial tools make it easier for me to act in an eco-friendly way’ (n=318)

Table 5: Answers to the statement ‘Digital financial tools make it easier for me to act in an eco-friendly way’

Sample	Mean	Standard deviation	t-test	
			t	p-value
Total sample (n=318)	3.3113	1.0905	-	-
Greek sample (n=158)	3.4304	1.0576	1.94062	0.0532
Polish sample (n=160)	3.1938	1.1096		

Environmental Awareness

Finally, regarding the fundamental understanding of how financial choices affect the environment, 43.7% of respondents declare a high level of awareness (combining "likely" and "very likely"). As shown in Table 6, both the Greek (M=3.2025) and Polish (M=3.1500) samples display nearly identical levels of self-reported awareness (p=0.6922). This indicates that the educational baseline is similar in both countries, even if the subsequent willingness to act on that knowledge (as seen in the impact of online posts of eco-friendly initiatives and digital eco-advisory) varies significantly.

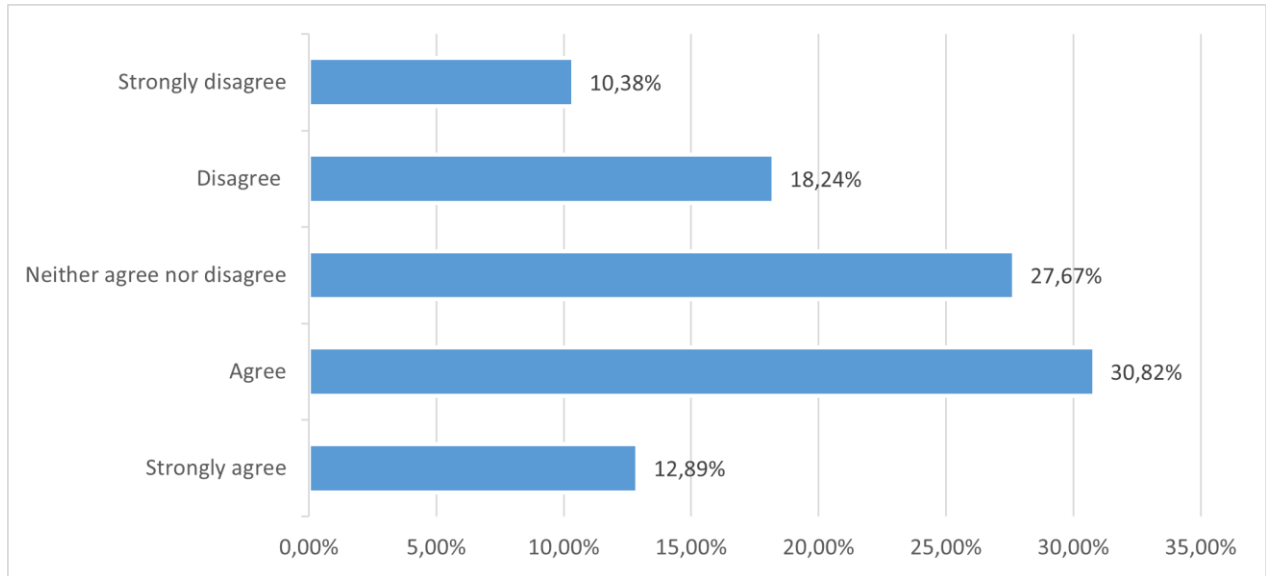


Fig. 6. Answers to the statement 'I understand how my financial choices affect the environment' (n=318)

Table 6: Answers to the statement 'I understand how my financial choices affect the environment'

Sample	Mean	Standard deviation	t-test	
			t	p-value
Total sample (n=318)	3.1761	1.1791	-	-
Greek sample (n=158)	3.2025	1.1516	0.39618	0.6922
Polish sample (n=160)	3.1500	1.2052		

Table 7 presents Spearman's rank correlation coefficients, which allow for the assessment of the strength and direction of the relationship between the declared level of understanding of the environmental consequences of own financial decisions and attitudes toward green finance.

Table 7: Spearman's rank correlation coefficients for the awareness of impact of financial decisions on the environment

Variable	Correlation coefficient (ρ)	Significance (p-value)
Digital eco-advisory (ADV)	0.617	<0.001
Utility of digital tools (DIGIT)	0.576	<0.001
Impact of online communication on eco-friendly initiatives (COM)	0.551	<0.001
Eco-suggestions during daily payments (PAY)	0.544	<0.001
Fintech vs. traditional banks (FINT)	-0.502	<0.001

All obtained results are statistically significant ($p < 0.001$), which, with a sample size of $n = 318$, allows for drawing reliable research conclusions. Individuals who declare a higher level of understanding regarding how their financial choices affect the environment show a significantly greater tendency to follow pro-ecological advice in mobile applications (ADV, $\rho = 0.617$). This strongest positive correlation in the set suggests that ecological awareness is a key condition for the effectiveness of digital advisory in the field of eco-investing. Similarly, respondents with high awareness more frequently notice and consider environmentally friendly alternatives during daily payments (PAY, $\rho = 0.544$), indicating an active consumer attitude at the point of sale. The results also show that a better understanding of financial-environmental mechanisms goes hand in hand with a positive perception of eco-marketing by banks and fintechs (COM, $\rho = 0.551$), increasing the likelihood of choosing a specific institution. Importantly, subjects with greater knowledge more clearly agree with the thesis that digital tools make it easier for them to act in an 'eco-friendly' way (DIGIT, $\rho = 0.576$), confirming the role of

technology as an activator of green behavior. The only negative correlation was recorded in the case of perceiving the innovativeness of fintechs relative to banks (FINT, $\rho = -0.502$). This suggests that individuals with a better understanding of the impact of finance on the environment may take a more critical or skeptical approach toward the advantage of fintechs over traditional banking in the area of green finance. In summary, the strength of the relationships (moderate to strong) proves that financial education in the field of ecology is strongly linked to the willingness to use modern, green financial services.

Conclusions

The study provided comprehensive insights into how digital financial tools influence the environmental decisions of young consumers. Addressing the primary research questions, the results suggest that while there is a visible opening towards green banking, the shift is steady rather than radical. For instance, the fact that only 33.3% of respondents consider eco-friendly initiatives when choosing an institution indicates that for the majority of the student population, traditional factors like costs, security, or ease of use still outweigh ecological communication. The average scores across the study, typically hovering around 3.0–3.1, reflect a state of "moderate readiness" or even hesitation, rather than a definitive behavioral change.

Regarding the influence of digital advisory, the study found that while 43.1% of students are open to receiving sustainable spending tips, their actual commitment to following them is not yet universal. The data indicates that digital tools are perceived more as helpful facilitators rather than primary drivers of change. Interestingly, while technology makes it easier to act pro-environmentally, there is a clear distinction between possessing the tools and consistently using them to alter financial habits. The research also highlighted that the perceived gap between fintechs and traditional banks in the green finance sector is smaller than expected, with no significant preference for either in terms of their reliability and innovation.

A notable finding was the geographical variance, where the Greek sample showed a more reactive stance towards direct ecological prompts compared to the more reserved Polish sample. This suggests that cultural and economic contexts play a vital role in how digital "green nudges" are received across different European regions. Furthermore, while 43.7% of students declare they understand their environmental impact, this awareness does not always translate into a preference for green financial products. This "value-action gap" remains a significant challenge; many students remain in the "neutral" category, suggesting they are waiting for more tangible benefits or clearer communication. Overall, the transition to green finance among students requires more than just digital availability; it demands a deeper integration of ethical values and personal benefits into the user experience to move the "undecided" majority toward active participation.

The following recommendations can be formulated for the banking sector and fintech companies:

1. Personalization of green features: Financial institutions should move away from generic eco-marketing and instead focus on personalized "green nudges" that show the direct impact of individual spending on the environment.
2. Gamification for engagement: To move the average response beyond the current moderate level, fintechs should implement gamification elements (e.g., sustainability streaks or rewards) to make eco-investing more attractive to students.
3. Cross-border adaptation: financial companies operating in both Polish and Greek markets must adjust the intensity of their green communication, recognizing that Greek consumers are significantly more responsive to direct app-based advice and social media initiatives.
4. Bridging the awareness gap: Since less than half of students (43.7%) fully understand their environmental impact through financial choices, banks should implement interactive educational modules within their apps to increase this baseline.
5. Integration, not isolation: Eco-features should not be separate tabs but integrated into the core user experience of daily payments to ensure they are noticed during the natural flow of transactions.
6. Building long-term loyalty: As students are still forming financial habits, institutions that position themselves as genuine partners in sustainability today—rather than just selling products—are more likely to secure long-term loyalty.
7. Enhancing digital trust: Banks must prioritize data privacy and reliability alongside green features, as the study shows that "green innovation" alone is not enough to secure a competitive advantage over traditional, trusted competitors.
8. Targeting the neutral group: Marketing strategies should focus on the large "neutral" segment of the population (approx. 33%) by emphasizing that green choices do not have to come at the expense of financial efficiency or convenience.

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