EMPIRICAL EXAMINATION OF FINANCIAL LITERACY AMONG YOUTHS IN THE DEVELOPING ECONOMY

Yasmeen Ansari [*], Mansour Saleh Albarrak [**], Sara Ali Alokley [***]

* Department of Finance, College of Administrative and Financial Sciences, Saudi Electronic University, Riyadh, Saudi Arabia
** *Corresponding author*, College of Administrative and Financial Sciences, Saudi Electronic University, Riyadh, Saudi Arabia
Contact details: Saudi Electronic University, Prince Mohammed Ibn Salman Ibn Abdulaziz Rd, 6867, Ar Rabi, Riyadh 13316, Saudi Arabia
*** Department of Finance, School of Business, King Faisal University, Al-Hasa, Saudi Arabia

Abstract

This study aimed to investigate the financial literacy level of youth in Saudi Arabia and identify any associations between their financial understanding and demographic characteristics (Seraj et al., 2022). A digital questionnaire was administered to gather data, and 439 responses were deemed appropriate. The regression results revealed that higher levels of financial knowledge among youth are linked to gender, education, and specialization. In contrast, other factors, such as living, marital status, region, and job status, were not significantly related to financial literacy. This study was unique to the Saudi context (Ansari et al., 2023). The study showed the importance of increasing financial knowledge among youth in Saudi Arabia to ensure better financial well-being and avoid future financial distress. It provides policy implications for increasing financial knowledge among youth in Saudi Arabia to promote better financial well-being and avert future financial distress. Recommendations have been made to introduce financial education courses to enhance young individuals' financial literacy and welfare.

Keywords: Financial Education, Financial Knowledge, Financial Literacy, Youths, Saudi Arabia

1. INTRODUCTION

Financial literacy is the skills and knowledge needed to make informed money, investments, and financial planning decisions. In today's complex and fast-paced financial markets, managing finances is a crucial competency that significantly impacts individuals and society (Zahera & Bansal, 2018).

Youth demographics are crucial for promoting financial literacy, given their significant financial decisions during key life stages. Over recent decades, market openness and political reforms have heightened household financial risks. The Organization for Economic Cooperation and Development (OECD) has raised concerns about the financial literacy of young citizens, particularly

teenagers. The PISA 2018 results show that 25% of 15-year-olds struggle with financial literacy (Mo, 2020).

Few studies investigate financial literacy among various socio-economic, geographic, and cultural groups within the youth population in developing economies. Understanding these disparities can better inform tailored educational programs and policies. Additionally, there needs to be more research on how digital financial services and technologies, such as mobile banking and fintech, enhance financial literacy among youths. Moreover, there is inadequate exploration of gender differences in youth financial literacy.

Research aim:

1. Conducting comparative studies across different demographic groups within KSA economies.

2. Implementing and evaluating long-term financial literacy programs and tracking their impact over time.

3. Investigating the role of digital financial tools in improving financial literacy.

4. Exploring behavioral and psychological factors influencing financial decisions among youths.

5. Analyzing the effectiveness of financial education programs and identifying best practices.

6. Studying gender differences and addressing young men's and women's specific financial literacy needs.

7. Assessing the impact of policy and institutional frameworks on financial education.

8. Investigating the long-term economic and social benefits of improved financial literacy.

This study utilized self-administered Arabic surveys and online data collection tools to assess Saudi youths' financial literacy and empowerment from diverse socioeconomic backgrounds. Structured questionnaires tailored to different levels of financial knowledge were employed, and snowball sampling was used to gather responses. Of the many invited respondents, 439 valid responses were received and analyzed to evaluate the financial literacy levels of Saudi youths.

Financial literacy among Saudi Arabian youth is limited but can be improved through formal education and awareness initiatives. Enhancing financial literacy involves public awareness campaigns via media, social media, and community events, access to financial counseling and workshops, and educational resources from financial institutions. Despite existing challenges, progress can be made by integrating financial education in schools, raising awareness of financial services, and cultivating a financial planning culture to enable informed decision-making.

Furthermore, Lusardi et al.'s (2010) study also showed alarming results, concluding, "We found that financial literacy was severely lacking among youths; only 27% knew about inflation and risk diversification and could do simple interest rate calculations" (p. 374). These worrying statistics are not new, as the study by Chen and Volpe (1998, p. 107) shows a similar pattern where only 53% of the answers in the survey were correct. However, the increasing complexity and volatility of financial markets and the decreasing financial literacy are becoming global phenomena.

Several studies have investigated Saudi Arabia, such as Ansari et al. (2023) and Seraj et al. (2022), focusing on investors and investment decisions. Furthermore, Alshebami and Aldhyani (2022) studied the relationship between social influence, financial literacy, and saving behavior among Saudi youth. Their findings suggest parental and peer influences are pivotal, despite the study's limited scale. Recently, Saudi Arabia has experienced substantial economic and developmental growth. Vision 2030 and its associated initiatives have notably shifted the Saudi economy. The "*National Transformation Program*", especially objective 26, seeks to increase women's labor market participation (Government of Saudi Arabia, n.d.).

The Saudi Public Investment Fund plans to create 500,000 jobs by 2021, with 53% of Saudi nationals under 24 (Zawya, 2022). To address the critical need for financial literacy, the kingdom is advancing financial planning via the Financial Sector Development Program to equip the youth for leadership roles. Despite these efforts, the current level of financial literacy among Saudi youths remains under-researched. This study explores the financial literacy levels among Saudi youth, examining demographic influences and its effects on financial decisions and behaviors. It covers the concept of financial literacy, reviews related literature, explains the methodology for data collection and analysis, and offers suggestions to enhance financial literacy education for Saudi youth.

This paper is structured as follows. Section 2 reviews relevant literature. Section 3 analyzes the methodology for empirical research on financial literacy. Section 4 presents the findings. Section 5 provides the discussion and Section 6 shows a conclusion.

2. LITERATURE REVIEW

Financial literacy refers to tools that enable individuals to make effective financial decisions (Siegfried & Wuttke, 2021; Benjamin et al., 2020; Brown & Graf, 2013).

A lack of financial literacy suggests youths may not be effectively saving for their future financial goals, such as retirement, emergency fund, or investments (Lusardi & Mitchell, 2014; Mitchell & Lusardi, 2015). Many youths' in European and Asian countries may also face high debt levels, mainly due to education loans, credit card debt, and consumer loans (Reyna & Wilhelms, 2017; Strömbäck et al., 2017). Lack of financial literacy can prevent youths from comprehending debt implications, including interest rates, repayment terms, and effects on financial well-being, potentially resulting in financial stress and poor debt management (van Dalen & Henkens, 2020; Watts et al., 2018).

Compared to their counterparts elsewhere, the working young in urban India demonstrate greater financial behavior, a better attitude towards money, and inferior financial knowledge (Agarwalla et al., 2015). Both men and women require financial education to enhance literacy, but specialized interventions are necessary to alter their financial attitudes and behaviors (Zahera & Bansal, 2019). Gender disparities in financial service usage among individuals can be attributed to income, education

levels, household, and employment status variations, explaining why women use formal financial services less frequently (Aterido et al., 2013).

Therefore, focusing educational initiatives and interventions on financial literacy is crucial (Siegfried & Wuttke, 2021). Factors influencing financial literacy include personality traits, socioeconomic conditions, and the inability to delay gratification, individually or collectively (Badillo-Urquiola et al., 2021; Espinosa & Rudenstine, 2020). The 2007–2008 National Longitudinal Survey of Youth was analyzed to assess young people's readiness for financial decision-making. Using this extensive dataset, the author explored the correlations between respondents' socio-demographics, family and peer influences, and financial literacy (Lusardi & Mitchell, 2011; Lusardi et al., 2010). Determine the level of financial literacy among young people globally based on existing studies. This study focuses on how socioeconomic and demographic factors such as age, gender, marital status, and income influence financial literacy levels among young people (Garg & Singh, 2018; Ghosh et al., 2020; Harun et al., 2021).

Brüggen et al. (2017) and Bucher-Koenen et al. (2017) discussed financial awareness and knowledge. An individual's life influences literacy and wealth, which is positively correlated with the model examining the relationship between financial literacy, wealth, and savings (Huston, 2010). Financial literacy is often employed to advocate for financial education and to account for variations in financial outcomes (Mishra, Bansal, & Maurya, 2023). Understanding the educational benefits and obstacles to wise final decision-making requires defining and accurately assessing financial literacy (Rudeloff et al., 2019; Santini et al., 2019). In prior studies, have examined the relationship between financial literacy and financial education to financial behaviors (Klapper & Lusardi, 2020; Lee et al., 2021).

Hsu (2016), Kaiser and Menkhoff (2017), and Longobardi et al. (2018) described that financial literacy interventions had smaller impacts on low-income groups and only partially explained the variance in financial behavior. Financial education, like other forms of education, diminishes over time (Mishra, Bansal, Maurya, Kar, et al., 2023). Even substantial instruction comprising numerous hours showed minimal impact on behavior 20 months or more after the initial intervention (Maurya et al., 2023).

In Saudi Arabia, like in many countries, youth financial literacy is a major concern, yet education on budgeting, saving, investing, and debt management is absent from school and college curricula. Consequently, many young individuals need more effective financial management skills. A Saudi Central Bank (2022) study shows only 12% of Saudi youth have basic financial literacy. This gap can lead to financial stress, debt, and poor credit scores. Cultural factors also contribute, as dependence on family for financial support and decision-making, especially among youth living with parents until marriage, may impede financial independence and confidence.

Moreover, the cultural norm of avoiding discussions about money matters openly and limited exposure to financial services and products may also contribute to a lack of financial literacy (Sredojević & Ziakou, 2020; Woodward et al., 2022; Yip et al., 2022). Despite being a high-income nation, Saudi Arabia exhibits a relatively low savings rate, particularly among its youth. The Saudi Central Bank (2023) reports a recent decline in personal savings rates. Young people worldwide may lack awareness of financial products and services, such as savings accounts, investments, insurance, and retirement plans. This lack of understanding can lead to poor decision-making and missed opportunities to build wealth and secure their financial future (Cameron et al., 2014; Fernandes et al., 2014). Integrating financial education into academic curricula can provide youths with crucial financial literacy skills, such as budgeting, savings, investing, debt management, and financial planning (Garg & Singh, 2018; Greimel-Fuhrmann & Silgoner, 2018; Happ & Förster, 2019; Hastings & Mitchell, 2020).

The above discussion leads to the development of the following hypotheses:

H1: Gender has a significant influence on financial literacy.

H2: Living has a significant influence on financial literacy.

H3: Education has a significant effect on financial literacy.

H4: Specialization has a significant influence on financial literacy.

*H5: Job status significantly influences financial literacy.*

3. RESEARCH METHODS

This section outlines the step-by-step process of conducting an empirical study to assess the impact of financial literacy on the youth (Figure 1).

3.1. Descriptive statistics

Descriptive statistics, including the mean, median, standard deviation, and percentiles, were used to summarize and analyze the data. The mean provides the average financial literacy score for the youth, while the median is the midpoint of the scores (Malik et al., 2024). Standard deviation and percentiles provide valuable metrics for assessing score variability and relative performance in youth financial literacy. The choice of research methodology depends on the study's aims and constraints, with several commonly used approaches available (Lusardi & Mitchell, 2011).

Figure 1. Pictorial overview of the proposed methodology
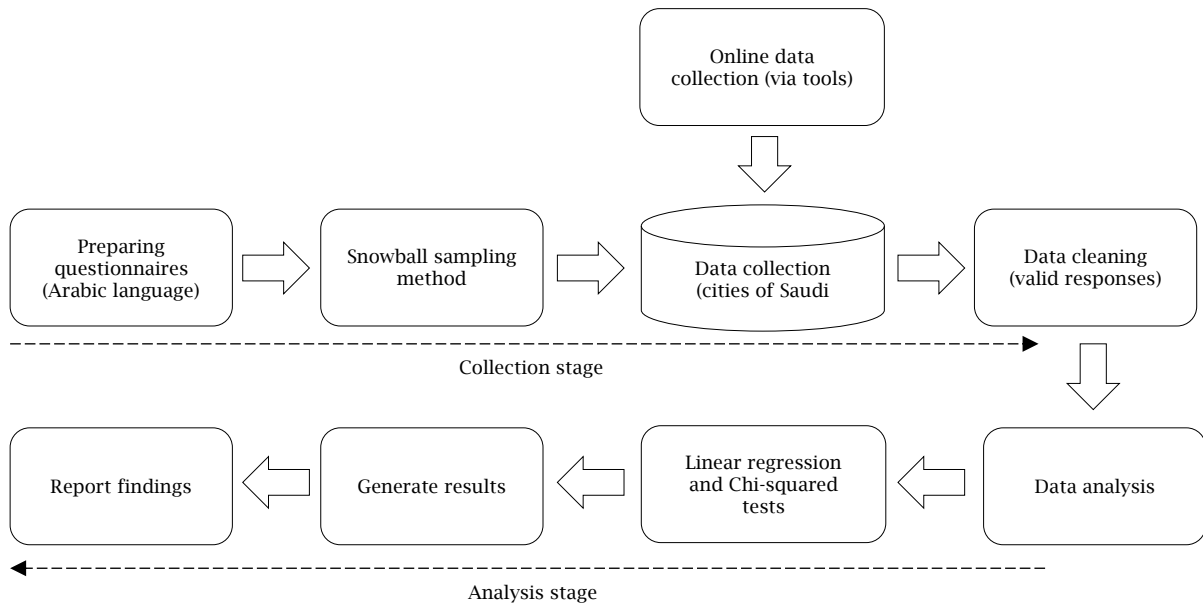
Source: Authors' elaboration.

3.2. Survey search

This study employed surveys with tailored questionnaires to investigate financial empowerment and literacy among Saudi youth from diverse socioeconomic backgrounds. Self-administered Arabic surveys and online tools were used to collect data, resulting in 439 valid responses that were analyzed to evaluate the financial literacy levels of Saudi youth.

Surveys and questionnaires targeting a broad youth demographic can collect financial literacy, behaviors, and attitudes data. To assess the effectiveness of financial literacy programs, use experimental or quasi-experimental designs. Integrating quantitative methods like surveys with qualitative approaches such as interviews and focus groups offers in-depth insights. Employing mobile apps and online platforms for data collection capitalizes on extensive digital device usage. These strategies allow for collecting detailed information on youth financial literacy in developing nations. Choosing or blending methods according to research goals and context can produce strong results.

3.3. Chi2-tests and linear regression models

This study assessed financial literacy among Saudi Arabian youth using Chi2-tests and linear regression models. The Chi2-test examined contingency tables in large populations to determine the independent impact of two categorical variables on the results (Gupta et al., 2024). This test assesses whether differences between categorical variables arise from chance or an underlying relationship.

$$x_c{}^2 = \frac{\sum(O_i - E_i)^2}{E_i} \qquad (1)$$

In Eq. (1), *c* denotes the degrees of freedom, *O* denotes the observed values, and *E* denotes the expected values. In this study, Chi2-tests were used to determine whether the distribution of the answers differed between the youth. These Chi2-test findings provide a mathematical lens through which researchers, policymakers, and trainers can identify and resolve the gaps in financial literacy.

Linear regression models are commonly used to forecast youth financial literacy by examining relationships and estimating data. This method employs linear predictor functions to estimate model coefficients, tackling diverse financial issues. It seeks to minimize prediction errors through modeling the relationship between independent and dependent variables. This analysis evaluates the relationship's strength and identifies factors potentially impacting the model's accuracy (Verma & Bansal, 2023). The dependent variable, the *percentage of respondents correctly answering financial literacy questions*, formed the regression models' baseline.

In this study, we designed six different linear regression models, the equations of which are given in Eq. (2–6):

$$Y = C + \beta Gender \qquad (2)$$

$$Y = C + \beta_1 Gender + \beta_2 Living \qquad (3)$$

$$Y = C + \beta_1 Gender + \beta_2 Living + \beta_3 Education \qquad (4)$$

$$Y = C + \beta_1 Gender + \beta_2 Living + \beta_3 Education + \beta_4 Specialization \qquad (5)$$

$$Y = C + \beta_1 Gender + \beta_2 Living + \beta_3 Education + \beta_4 Specialization + \beta_5 Job\ status \qquad (6)$$

In Eq. (2–6), *Y* denotes a dependent variable; $\beta_1 - \beta_6$ are the coefficients of the model; *C* is the constant term; and *gender*, *living*, *education*, *specialization*, and *job status* are the independent variables. Equation (2) is referred to as Model 1, Eq. (3) is Model 2, Eq. (4) is Model 3, Eq. (5) is Model 4, and Eq. (6) is Model 5. The dataset contained
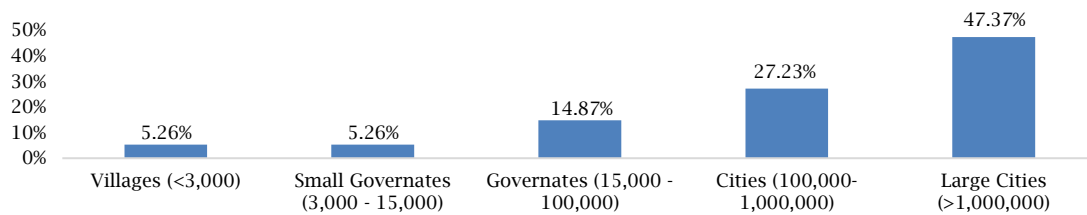
439 samples that corresponded to the survey participants. To analyze the regression results, error values, model coefficients, t-statistics, significance, and R^2 that is, R-squared are repised. More precisely, in a regression model, R-squared is the coefficient of determination and a statistical measure that denotes the percentage of a dependent variable's variation associated with the independent variable (that is, *gender*, *living*, *education*, *specialization*, and *job status*). Mathematically, it is computed using Eq. (7).

$$R^2 = 1 - \frac{RSS}{TSS} \qquad (7)$$

In Eq. (7), *RSS* denotes the sum of the squares of the residuals, and *TSS* is the total sum of squares. Additionally, the t-statistic was employed in a t-test to support or reject the null hypothesis. It is also defined as the ratio of a parameter's anticipated value to its hypothesized estimate divided by its standard error. Mathematically, this is computed using Eq. (8).

$$t_B = \frac{B - B_0}{SE(B)} \qquad (8)$$

In Eq. (8), *B* denotes the estimator of the parameter, B_0 is a known constant (non-random), and $SE(B)$ is the standard error of the estimator. The ideal t-statistic has a statistically significant value, indicating that disparity between the two samples is unlikely to arise by coincidence.

3.4. Data analysis

Data analysis incorporated 439 valid responses, following recent entrepreneurial research standards. Linear regression analyzed the data, utilizing a structural model to examine the relationships between independent and dependent variables. This model can simultaneously examine multiple gender and dummy financial literacy models. Participants' living locations varied, with 47.37% in large cities (Figure 2). The study found 64.92% were female and 35.08% male (Table 1). Most participants were single (93.85%), with a small percentage married, widowed, divorced, or undisclosed. Participants were from various Saudi Arabian regions, mainly Riyadh Province (35.31%) and Eastern Province (23.46%) (Figure 3). Most held bachelor's degrees (52.62%) (Figure 4).

Figure 2. Distribution of locations/area in data collection (percentages)

Source: Authors' calculation.

Table 1. Demographic characteristics of participants (age 18–24)

Variable	N = 439	Percentage, %
Gender		
Male	154	35.08
Female	285	64.92
Marital status		
Single	412	93.85
Married	15	3.42
Widowed	0	0.00
Divorced	3	0.68
I do not wish to answer	9	2.05

Source: Authors' calculation.

Table 2 presents participant details, including *employment status*, *employer*, and *specialization*. Most participants were students (79.95%), followed by employed individuals (11.39%) and other occupations (8.66%). Government employees accounted for 17.31%, and about 40.77% worked in diverse specializations.

Figure 3. Distribution of participants region by region in Saudi Arabia

- Riyadh - 35.31%
- Easter - 23.46%
- Makkah - 21.87%
- Asir - 4.33%
- Medina - 2.96%
- Tabuk - 2.73%
- Qassim - 2.51%
- Jizan - 1.59%
- Hail - 1.37%
- Al Jouf - 1.14%
- Northern - 0.91%
- Najran - 0.91%
- Al Baha - 0.91%
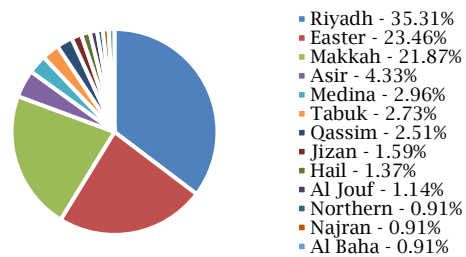
Figure 4. Distribution of academic qualifications of participants in the survey

- High School or Lower
- Diploma
- Bachelor's Degree
- Master's Degree
- Ph.D.

0.23%
38.27%
52.62%
8.43%
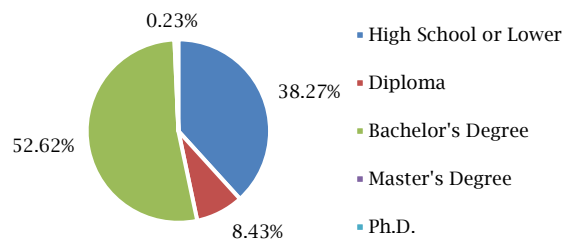
Table 2. Employment details of participants in data collection

Variables	N = 439	Percentage, %
Employment status		
Student	351	79.95
Employee	50	11.39
Retired	0	0.00
Others	38	8.66
Employer		
Governmental	76	17.31
Military	11	2.51
Private sector	61	13.90
The charitable and non-profit sector	2	0.46
Do not apply	273	62.19
Others	16	3.64
Specialization		
Administrative	129	29.38
Engineering	28	6.38
Medical	51	11.62
Humanitarian	52	11.85
Others	179	40.77

Source: Authors' calculation.

Tables 3 and 4 summarize participants' responses to scenario questions. In the first scenario, involving five-year savings growth at a 2% interest rate, 60.59% chose "more than 102 riyals", while 23.46% selected "I don't know" (Table 3).

The second scenario addressed purchasing power with a 1% interest rate and 2% inflation rate, with 28.47% opting for "less" and 15.72% for "more" (Table 4).

Table 3. Replies against scenario question No. 1

Responses	N = 439	Percentage, %
More than 102 riyals*	266	60.59
Exactly 102	29	6.61
Less than 102 riyals	34	7.74
I don't know	103	23.46
I refuse to answer	7	1.59

*Note: Scenario question: "Suppose you have 100 riyals in a savings account and the annual interest rate is 2%; if we let the money grow for five years, then the amount is in the account". * indicates the correct answer.*
Source: Authors' calculation.

Table 4. Replies against scenario question No. 2

Responses	N = 439	Percentage, %
More	69	15.72
Less*	125	28.47
Equal	84	19.13
I don't know	161	36.67

*Note: Scenario question: "Suppose the interest rate on your savings account is 1% per annum, and the inflation rate is 2% per annum. One year later, you will be able to make a purchase. Products with the amount available in this account". * indicates the correct answer.*
Source: Authors' calculation.

A survey presented a true/false statement about stock investments, with 44.87% of respondents selecting "true" and 20.73% selecting "false" (Table 5). The survey assessed financial literacy among adults in Saudi Arabia, encompassing 439 participants, as detailed in Tables 1–5.

Table 5. Replies against true/false question

Responses	N = 439	Percentage, %
False*	91	20.73
True	197	44.87
I don't know	151	34.40

*Note: True/false question: "How true is the following statement: Buying one company's stock usually provides a safer return than a stock mutual fund"?. * indicates the correct answer.*
Source: Authors' calculation.

4. RESULTS

In this section, a detailed analysis of financial literacy among youth is discussed, along with the results acquired after data collection.

4.1. Financial literacy among youth

This study utilized Chi2-tests and linear regression models to examine financial literacy among Saudi Arabian youth. Table 6 shows that most female participants answered the interest rate question correctly. The proportions of males and females with knowledge of interest rates were approximately 41.4% and 58.6%, respectively, and within gender, 25.1% and 35.5%. Financial literacy regarding interest rates was 60.6%, indicating substantial financial awareness among Saudi youth. Female respondents were likelier to answer correctly and admit when they did not know the answer. Chi2-test results showed significant gender differences in responses to the interest rate question, indicating the need for targeted financial education to ensure equitable financial knowledge across genders in Saudi Arabia.

The study found 4.3% of male respondents claimed knowledge of a financial literacy question, while 19.1% of female respondents were more likely to answer "I don't know". The Chi2-test results (17.653) highlighted a notable gender gap in financial literacy, underscoring the necessity for tailored financial education programs and policies.

Table 6. Statistics for *interest rate* question with *gender* as a variable

Responses	Male	Female	Total sample
More than 102 riyals*	110	156	266
% within interest rate	41.4%	58.6%	100.0%
% within gender	25.1%	35.5%	60.6%
Exactly 102 riyals	9	20	29
% within interest rate	31.0%	69.0%	100.0%
% within gender	2.1%	4.6%	6.6%
less than 102 riyals	13	21	34
% within interest rate	38.2%	61.8%	100.0%
% within gender	3.0%	4.8%	7.7%
I don't know	19	84	103
% within interest rate	18.4%	81.6%	100.0%
% within gender	4.3%	19.1%	23.5%
I refuse to answer	3	4	7
% within interest rate	42.9%	57.1%	100.0%
% within gender	0.7%	0.9%	1.6%
Chi2-tests	**Value**	**df**	**Sig.**
Pearson Chi2	17.653[a]	4	0.001

*Note: Chi2-tests were used to determine whether the distribution of answers differed between men and women. * indicates the correct answer. a — We used it for calculating significance of two categorical variables. If p-value is less than 0.05 it means there is a significant association between two variables.*
Source: Authors' calculation.

Table 7. Statistics for *inflation* question with *gender* as a control variable

Responses	Male	Female	Total sample
More	24	45	69
% within inflation	34.8%	65.2%	100.0%
% within gender	5.5%	10.3%	15.8%
Less*	56	69	125
% within inflation	44.8%	55.2%	100.0%
% within gender	12.8%	15.7%	28.5%
Equal	28	56	84
% within inflation	33.3%	66.7%	100.0%
% within gender	6.4%	12.8%	19.1%
I don't know	46	115	161
% within inflation	28.6%	71.4%	100.0%
% within gender	10.5%	26.2%	36.7%
Chi2-tests	**Value**	**df**	**Sig.**
Pearson Chi2	8.296[a]	3	0.006

*Note: Chi2-tests were used to determine whether the distribution of responses differed between men and women. * indicates the correct answer. a — We used it for calculating significance of two categorical variables. If p-value is less than 0.05 it means there is a significant association between two variables.*
Source: Authors' calculation.

Table 7 highlights the gender disparities in financial literacy and inflation knowledge in Saudi Arabia. Female financial literacy is 15.7%, compared to 12.8% for men. About 28.5% of respondents correctly answered inflation-related questions, with women at 15.7% and men at 12.8%. Men are more likely to claim they know the answer, whereas women more often respond with "I don't know" (10.5% vs. 26.2%). A Chi2-test confirms significant gender differences in responses to interest rate questions, underscoring a gap in financial literacy. Consequently, targeted financial education programs are essential to promote gender equity in financial knowledge in Saudi Arabia.

A survey on inflation knowledge among 439 participants revealed a significant gender difference (Chi2-test: 8.296%), with women (55.2%) outperforming men (44.8%). The results underscore a gender disparity in comprehending inflation, guiding tailored financial literacy initiatives.

Table 8. Statistics for *risk diversification* question with *gender* as a control variable

Responses	Male	Female	Total sample
False*	23	68	91
% within risk diversification	25.3%	74.7%	100.0%
% within gender	14.9%	23.9%	20.7%
True	85	112	197
% within risk diversification	43.1%	56.9%	100.0%
% within gender	55.2%	39.3%	44.9%
I do not know	46	105	151
% within risk diversification	30.5%	69.5%	100.0%
% within gender	29.9%	36.8%	34.4%
Chi2-tests	**Value**	**df**	**Sig.**
Pearson Chi2	10.884	2	0.000

*Note: Chi2-tests were used to determine whether the distribution of responses differed between men and women. * indicates the correct answer.*
Source: Authors' calculation.

Table 8 outlines the financial literacy of the Saudi Arabian population, emphasizing gender disparities and risk diversification. A "true/false" question on stock investments showed that merely 20.7% of respondents grasped risk diversification.

Males outperformed females' incorrect responses, with 23.9% of women and 14.9% of men answering correctly. Females (36.8%) were more likely to say "I do not know" than males (29.9%). Regarding "within risk diversification" by gender, female and male respondents differ by approximately 69.5% and 30.5%, respectively. Table 8's Chi2-test results show a value of 10.884% with 2 degrees of freedom, highlighting significant gender differences in risk diversification responses with a sample size of 439. Women more frequently chose the correct response on risk diversification. This gender disparity requires further investigation into sociocultural influences, education levels, and differing risk assessments between genders.

Table 9 shows the results of three financial literacy questions, revealing gender differences in Saudi Arabia. With only 12.3% of the population financially literate, men outperformed women in understanding interest rates, inflation, and risk diversification. Specifically, 8.4% of women and 19.5% of men answered all questions correctly, highlighting a significant gender gap. Women provided incorrect answers 91.6% of the time, while men did so 80.5% of the time. The Chi2-test (11.336%) confirmed a significant gender disparity in financial literacy among the 439 participants.

Table 9. Combined statistics for all three correct questions

Responses	Male	Female	Total sample
Incorrect	124	261	385
% within all three correct	32.2%	67.8%	100.0%
% within gender	80.5%	91.6%	87.7%
Correct	30	24	54
% within all three correct	55.6%	44.4%	100.0%
% within gender	19.5%	8.4%	12.3%
Total	154	285	439
% within all three correct	35.1%	64.9%	100.0%
Chi2-tests	**Value**	**df**	**Sig.**
Pearson Chi2	11.336	2	0.001

Note: Chi2-tests were used to determine whether the distribution of answers differed between men and women.
Source: Authors' calculation.

Table 10 showcases financial literacy regarding interest rates and inflation in Saudi Arabia, revealing substantial comprehension among Saudis. Financial literacy rates are at 14.6%, with women surpassing men; 22.7% of men and 10.2% of women correctly answered all three questions. Nonetheless, a higher percentage of women (89.8%) than men (77.3%) provided incorrect answers. Chi2-test findings (12.537%) indicate a notable gender disparity in responses, especially in understanding risk measures.

Table 10. Statistics for *interest* and *inflation* question

Responses	Male	Female	Total sample
No	119	255	374
% within two correct	31.8%	68.2%	100.0%
% within gender	77.3%	89.8%	85.4%
Yes	35	29	64
% within two correct	54.7%	45.3%	100.0%
% within gender	22.7%	10.2%	14.6%
Total	154	284	438
% within two correct	35.2%	64.8%	100.0%
Chi2-tests	**Value**	**df**	**Sig.**
Pearson Chi2	12.537[a]	2	0.001

Note: Chi2-tests are used to determine whether the distribution of the answers between men and women differs. a — We used it for calculating significance of two categorical variables. If p-value is less than 0.05 it means there is a significant association between two variables.
Source: Authors' calculation.

Table 11. Summary statistics for one *I don't know* question

Responses	Male	Female	Total sample
No	135	201	336
% within one I don't know	40.2%	59.8%	100.0%
% within gender	87.7%	70.5%	76.5%
Yes	19	84	103
% within one I don't know	18.4%	81.6%	100.0%
% within gender	12.3%	29.5%	23.5%
Total	154	285	439
% within one I don't know	35.1%	64.9%	100.0%
Chi2-tests	**Value**	**df**	**Sig.**
Pearson Chi2	16.348[a]	1	0.000

Note: Chi2-tests were used to determine whether the distribution of answers differed between men and women.
a — We used it for calculating significance of two categorical variables. If p-value is less than 0.05 it means there is a significant association between two variables.
Source: Authors' calculation.

Table 11 illustrates gender disparities in Saudi Arabia's "I don't know" responses to a financial literacy question. Financial literacy is prevalent among Saudis (23.5%), but women are more likely than men to select "I don't know" (29.5% vs. 12.3%). Women also provided more "no" answers (81.6%) than men (18.4%). The Chi2-test indicated a significant gender difference in responses. Addressing this gap can bolster women's financial independence and resilience, fostering a more inclusive socioeconomic landscape.

Table 12 also summarizes the results of the three "I don't know" answers to the questions and the distinctions between men and women in Saudi Arabia.

The study found that 93.8% of the respondents in Saudi Arabia had a high level of financial literacy, as they answered "no" to all three questions. A substantial proportion of Saudi citizens understand the complications of financial literacy. Only 6.2% responded "I don't know" to all questions, with women being more likely to answer this way than men. Similar to the prior case, women have opted more than men for a question "I don't know." For example, 7.0% of women chose this, but 4.5% of males opted for "I don't know". Women gave the most "no" answer to this question (64.3%), whereas men gave only 35.7%.

The Chi2-test results (14.158) indicated a significant gender difference in the "I don't know" response, highlighting the necessity to understand the nuances behind this answer and how men and women differently handle uncertainties or display knowledge gaps in financial literacy.

Table 13 details incorrect responses and gender differences in Saudi Arabia. Financial literacy was high, with incorrect answers below 25.1%. Males selected incorrect answers less frequently than females, at 18.8% and 28.4%, respectively. Males had more "no" responses (81.2%) compared to females (71.6%). A Chi2-test score of 4.896 indicates statistical significance, suggesting the need for measures to enhance financial knowledge equity between genders.

Table 12. Summary statistics for three *I don't know* question

Responses	Male	Female	Total sample
No	147	265	412
% within three, I don't know	35.7%	64.3%	100.0%
% within gender	95.5%	93.0%	93.8
Yes	7	20	27
% within three, I don't know	25.9%	74.1%	100.0%
% within gender	4.5%	7.0%	6.2%
Total	154	285	439
% within three, I don't know	35.1%	64.9%	100.0%
Chi2-tests	*Value*	*df*	*Sig.*
Pearson Chi2	14.158[a]	1	0.000

Note: Chi2-tests were used to determine whether the distribution of answers differed between men and women. a — We used it for calculating significance of two categorical variables. If p-value is less than 0.05 it means there is a significant association between two variables.
Source: Authors' calculation.

Table 13. Summary statistics for *all incorrect* question

Responses	Male	Female	Total sample
No	125	204	329
% within none correct	38.0%	62.0%	100.0%
% within gender	81.2%	71.6%	74.9%
Yes	29	81	110
% within none correct	26.4%	73.6%	100.0%
% within gender	18.8%	28.4%	25.1%
Total	154	285	439
% within none correct	35.1%	64.9%	100.0%
Chi2-tests	*Value*	*df*	*Sig.*
Pearson Chi2	4.896	1	0.027

Note: Chi2-tests were used to determine whether the distribution of answers differed between men and women.
Source: Authors' calculation.

4.2. Linear regression model findings

This section analyzes gender differences in financial literacy using Chi2-tests on scenario-based question responses. However, these inequalities persist when the demographic and economic traits of males and females differ. To answer this, regression models are designed and defined in Eq. (2–6), the results of which are given in Table 14. The previously stated theoretical models serve as the driving forces behind the variables used in the regressions. The dependent dummy variable in Table 14 was set to one for respondents correctly answering all three financial literacy questions. These regressions serve as additional descriptive statistics to determine if gender differences in financial awareness stem mainly from disparities or income between men and women. To measure the gender effect, we added controls to the blocks of variables. More precisely, in Table 14, the first column shows the variable names involved in the different models, starting from 1–5.

Table 14. Results of linear probability model: Dependent variables *all correct*

Variable	B	Std. error	Beta	t	Sig.	N	R²
Model 1							
(Constant)	-0.137	0.078		-1.757	0.080	439	0.161
Gender	0.111	0.032	0.161	3.403	0.001		
Model 2							
(Constant)	-0.151	0.098		-1.546	0.123	439	0.164
Gender	0.109	0.033	0.158	3.316	0.001		
Living	0.007	0.013	0.025	0.518	0.605		
Model 3							
(Constant)	-0.232	0.115		-2.025	0.043	439	0.168
Gender	0.117	0.033	0.170	3.591	0.000		
Living	0.001	0.015	0.003	0.052	0.958		
Education	0.051	0.016	0.149	3.163	0.002		
Model 4							
(Constant)	-0.094	0.125		-0.750	0.453	439	0.224
Gender	0.110	0.032	0.159	3.377	0.001		
Living	-0.002	0.014	-0.008	-0.147	0.883		
Education	0.038	0.017	0.113	2.329	0.020		
Specialization	-0.025	0.009	-0.132	-2.690	0.007		
Model 5							
(Constant)	-0.114	0.128		-0.891	0.374	439	0.259
Gender	0.107	0.033	0.155	3.271	0.001		
Living	-0.001	0.015	-0.002	-0.044	0.965		
Education	0.038	0.017	0.111	2.284	0.023		
Specialization	-0.026	0.009	-0.133	-2.710	0.007		
Job status	0.014	0.018	0.038	0.802	0.423		

Note: This table shows the results of numerous linear regressions performed on diverse datasets. The dependent variable was the proportion of respondents correctly answering the three financial literacy questions. The percentage of respondents who correctly answered the three questions regarding financial literacy was the baseline for all regression models.
Source: Authors' calculation.

The '*B*' column denotes the coefficients of the independent variables, which estimate the change in the probability of the dependent variable equaling one for a one-unit increase in the corresponding independent variable, ceteris paribus.

Similarly, *t* denotes the t-statistic, Sig. denotes significance, *N* is the total number of samples, and R^2 is the R-squared value of the model in Table 14. It is observed from Table 14 that the lowest R^2 is attained with Model 1, in which there is only one independent variable, *gender*, while the highest R^2 is attained with Model 5, in which all dependent variables are involved, including *gender*, *living*, *education*, *specialization*, and *job status*.

Similarly, nearly all models yielded the lowest error values when analyzing errors. To address the gender gap in financial literacy, a new dummy variable and a set of controls were included for each regression model from Models 1 to 5. Saudi Arabia exhibited the largest gender gap. Findings demonstrated a strong correlation between *gender* and *all three correct* responses, with a coefficient value of 0.111. Males were more likely than females to answer all questions correctly, potentially due to differences in educational opportunities, societal expectations, and cultural biases. Higher education levels correlate with better performance, supporting the idea that education enhances cognitive abilities and knowledge acquisition. Table 15 indicates a significant positive correlation between *education* and *financial literacy*, with perfect financial knowledge making *living* insignificant. Model 5 implies that *specialization* decreases the likelihood of correctly answering all questions, potentially due to its narrow focus limiting necessary knowledge and skills. Nevertheless, education level is relevant for all three accurate responses. Additionally, full financial literacy renders work status insignificant.

Regression analysis (Table 15) shows a positive relationship between *gender* and *financial literacy*, supporting *H1*. This indicates a significant correlation between *gender* and *financial literacy*. However, *living* and *job status* were not significantly related to *financial literacy*, rejecting hypotheses *H2* and *H5*. The *education*, which is significantly correlated with financial knowledge, supports *H3*, indicating that higher education levels enhance financial knowledge. Youth *specialization* also directly correlates with financial knowledge, supporting *H4*, suggesting *specialization* influences *financial literacy*.

Table 15. Relationship between demographic factors and financial literacy

Null hypothesis	Relationship	Test result-null hypothesis
H1	*Gender → Financial literacy*	Supported
H2	*Living → Financial literacy*	Not supported
H3	*Education → Financial literacy*	Supported
H4	*Specialization → Financial literacy*	Supported
H5	*Job status → Financial literacy*	Not supported

Source: Authors' calculation.

5. DISCUSSION

The survey gathered data from 439 young Saudi Arabian respondents. Of these, 35.08% were male, and 64.92% were female. Over 29% were enrolled in business administration courses, 11% in humanitarian courses, and 40% in other disciplines. Approximately 52.62% of the students were enrolled

in undergraduate courses. Over 35% were from the Riyadh region, and 23% from the Eastern province. Additionally, 17% were government employees, and 14% worked in the private sector. According to the findings of the symmetrical analysis, demographic variables (*gender, education,* and *specialization*) were significantly related to financial literacy inclination. A few demographic variables, such as *living,* and *job status,* are not strongly linked to youths' emergence of financial literacy (Ali et al., 2019). Financial literacy profoundly affects Saudi youth's financial decisions, and customized education programs targeting specific challenges can enhance their knowledge and behavior. Although financially aware, Saudi youth need programs emphasizing fundamental concepts, empowerment, and skill-building, taking into account cultural and societal influences on marginalized groups. Policymakers, financial institutions, and nonprofits must advocate for financial literacy in Saudi Arabia and comparable settings.

This study evaluated the financial literacy of youths in a developing economy, confirming progress, gaps, and improvement areas, consistent with previous findings. Research by Lusardi and Mitchell (2011) revealed that while basic financial literacy is relatively high, deeper financial knowledge among youths in developing economies necessitates enhancement, emphasizing the requirement for targeted educational interventions covering basic and advanced financial topics. Socioeconomic status significantly influences financial literacy. To develop inclusive and effective financial education programs, policymakers and educators must address these disparities (Grohmann et al., 2018). Chen and Volpe (2002), and Lusardi and Tufano (2009) found that men often score higher than women in financial literacy tests, highlighting the need for gender-focused financial education to enhance financial inclusion and equity. Digital tools and access to information are shown to boost financial literacy (Beck & Demirgüç-Kunt, 2008; Allen et al., 2016), while financial education is linked to improved literacy and behaviors over time (Lusardi et al., 2017). Hence, embedding financial education in formal schooling is key to developing financial literacy in youth.

6. CONCLUSION

Although limited, financial literacy among Saudi Arabian youth can improve through education and awareness initiatives. Key measures include media campaigns, community events, financial counseling, workshops, and resources from financial institutions. Despite progress, challenges remain. Enhancing financial education in schools, raising awareness of financial services, and promoting financial planning can help youth make informed financial decisions. Youth financial illiteracy in developing economies, shaped by education, socioeconomic status, and gender, undermines personal financial management and economic stability. Effective solutions involve targeted educational programs, policy measures, and enhanced financial resources and information access. Financial literacy is essential for informed decision-making, economic empowerment, and regional economic development. This study provides empirical evidence on youth financial literacy, filling literature gaps, notably in developing economies. Educational bodies can use these results to craft curricula for financial literacy shortfalls. Further studies should investigate interventions to narrow socio-economic disparities, especially those enhancing gender equality and young women's economic empowerment. The findings may prompt pilot initiatives and experimental studies in financial education, fostering broader research. This influential paper bridges research gaps, facilitating additional investigation. The findings establish a foundation for enhancing financial education policies, comprehending inequalities, employing digital tools, and refining theories. Ultimately, this will improve financial literacy among youths in developing economies and nurture financially empowered generations. The study provides insights into youth financial literacy in a developing economy, but its limitations, such as small sample size, cross-sectional data, and limited financial concepts and contextual factors, should be considered. Future research should address these limitations to enhance the findings' applicability and nuance.

REFERENCES

Agarwalla, S. K., Barua, S. K., Jacob, J., & Varma, J. R. (2015). Financial literacy among working young in urban India. *World Development, 67*, 101–109. https://doi.org/10.1016/j.worlddev.2014.10.004

Ali, I., Ali, M., & Badghish, S. (2019). Symmetric and asymmetric modeling of entrepreneurial ecosystem in developing entrepreneurial intentions among female university students in Saudi Arabia. *International Journal of Gender and Entrepreneurship, 11*(4), 435–458. https://doi.org/10.1108/IJGE-02-2019-0039

Allen, F., Demirguc-Kunt, A., Klapper, L., & Peria, M. S. M. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation, 27*, 1–30. https://doi.org/10.1016/j.jfi.2015.12.003

Alshebami, A. S., & Aldhyani, T. H. H. (2022). The interplay of social influence, financial literacy, and saving behaviour among Saudi youth and the moderating effect of self-control. *Sustainability, 14*(14), Article 8780. https://doi.org/10.3390/su14148780

Ansari, Y., Albarrak, M. S., Sherfudeen, N., & Aman, A. (2023). Examining the relationship between financial literacy and demographic factors and the overconfidence of Saudi investors. *Finance Research Letters, 52*, Article 103582. https://doi.org/10.1016/j.frl.2022.103582

Aterido, R., Beck, T., & Iacovone, L. (2013). Access to finance in Sub-Saharan Africa: Is there a gender gap? *World Development, 47*, 102–120. https://doi.org/10.1016/j.worlddev.2013.02.013

Badillo-Urquiola, K., Shea, Z., Agha, Z., Lediaeva, I., & Wisniewski, P. (2021). Conducting risky research with teens: Co-designing for the ethical treatment and protection of adolescents. *Proceedings of the ACM on Human-Computer Interaction, 4*(CSCW3), Article 231. https://doi.org/10.1145/3432930

Beck, T., & Demirgüç-Kunt, A. (2008). Access to finance: An unfinished agenda. *The World Bank Economic Review, 22*(3), 383–396. https://doi.org/10.1093/wber/lhn021

Benjamin, D. J., Laibson, D., Mischel, W., Peake, P. K., Shoda, Y., Wellsjo, A. S., & Wilson, N. L. (2020). Predicting mid-life capital formation with pre-school delay of gratification and life-course measures of self-regulation. *Journal of Economic Behavior & Organization, 179*, 743–756. https://doi.org/10.1016/j.jebo.2019.08.016

Brown, M., & Graf, R. (2013). Financial literacy and retirement planning in Switzerland. *Numeracy, 6*(2), Article 6. https://doi.org/10.5038/1936-4660.6.2.6

Brüggen, E. C., Hogreve, J., Holmlund, M., Kabadayi, S., & Löfgren, M. (2017). Financial well-being: A conceptualization and research agenda. *Journal of Business Research, 79*, 228–237. https://doi.org/10.1016/j.jbusres.2017.03.013

Bucher-Koenen, T., Lusardi, A., Alessie, R., & van Rooij, M. (2017). How financially literate are women? An overview and new insights. *The Journal of Consumer Affairs, 51*(2), 255–283. https://doi.org/10.1111/joca.12121

Cameron, M. P., Calderwood, R., Cox, A., Lim, S., & Yamaoka, M. (2014). Factors associated with financial literacy among high school students in New Zealand. *International Review of Economics Education, 16*, 12–21. https://doi.org/10.1016/j.iree.2014.07.006

Chen, H., & Volpe, R. P. (1998). An analysis of personal financial literacy among college students. *Financial Services Review, 7*(2), 107–128. https://doi.org/10.1016/S1057-0810(99)80006-7

Chen, H., & Volpe, R. P. (2002). Gender differences in personal financial literacy among college students. *Financial Services Review, 11*(3), 289–307. http://surl.li/ojukjo

Espinosa, A., & Rudenstine, S. (2020). The contribution of financial well-being, social support, and trait emotional intelligence on psychological distress. *British Journal of Clinical Psychology, 59*(2), 224–240. https://doi.org/10.1111/bjc.12242

Fernandes, D., Lynch, J. G., Jr., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science, 60*(8), 1861–1883. https://doi.org/10.1287/mnsc.2013.1849

Garg, N., & Singh, S. (2018). Financial literacy among youth. *International Journal of Social Economics, 45*(1), 173–186. https://doi.org/10.1108/IJSE-11-2016-0303

Ghosh, A. K., Hughes, C. E., & Wisniewski, P. J. (2020). Circle of trust: A new approach to mobile online safety for families. In *CHI '20: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1–14). Association for Computing Machinery. https://doi.org/10.1145/3313831.3376747

Government of Saudi Arabia. (n.d.). *Vision 2030: National transformation program.* https://www.vision2030.gov.sa/en/explore/programs/national-transformation-program

Greimel-Fuhrmann, B., & Silgoner, M. (2018). Analyzing the gender gap in financial literacy. *International Journal for Infonomics, 11*(3), 1779–1787. https://doi.org/10.20533/iji.1742.4712.2018.0180

Grohmann, A., Klühs, T., & Menkhoff, L. (2018). Does financial literacy improve financial inclusion? Cross country evidence. *World Development, 111*, 84–96. https://doi.org/10.1016/j.worlddev.2018.06.020

Gupta, S., Bansal, R., Bankoti, N., Kar, S. K., Mishra, S. K., Kaur, P., & Harichandan, S. (2024). Factors affecting consumer's intention to use electric vehicles: Mediating role of awareness and knowledge. *Journal of Advanced Transportation, 2024*(1), Article 5922430. https://doi.org/10.1155/2024/5922430

Happ, R., & Förster, M. (2019). The relationship between migration background and knowledge and understanding of personal finance of young adults in Germany. *International Review of Economics Education, 30*, Article 100141. https://doi.org/10.1016/j.iree.2018.06.003

Harun, H., Graham, P., Kamase, H. P., & Mir, M. (2021). A critical analysis of the impacts of financial literacy and NPM on Village Funds Initiative in Indonesia. *International Journal of Public Administration, 44*(4), 336–345. https://doi.org/10.1080/01900692.2020.1722165

Hastings, J., & Mitchell, O. S. (2020). How financial literacy and impatience shape retirement wealth and investment behaviors. *Journal of Pension Economics & Finance, 19*(1), 1–20. https://doi.org/10.1017/S1474747218000227

Hsu, J. W. (2016). Aging and strategic learning: The impact of spousal incentives on financial literacy. *Journal of Human Resources, 51*(4), 1036–1067. https://doi.org/10.3368/jhr.51.4.1014-6712R

Huston, S. J. (2010). Measuring financial literacy. *The Journal of Consumer Affairs, 44*(2), 296–316. https://doi.org/10.1111/j.1745-6606.2010.01170.x

Kaiser, T., & Menkhoff, L. (2017). Does financial education impact financial literacy and financial behavior, and if so, when? *The World Bank Economic Review, 31*(3), 611–630. https://doi.org/10.1093/wber/lhx018

Klapper, L., & Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. *Financial Management, 49*(3), 589–614. https://doi.org/10.1111/fima.12283

Lee, K. J., Roldan, W., Zhu, T. Q., Kaur Saluja, H., Na, S., Chin, B., Zeng, Y., Lee, J. H., & Yip, J. (2021). The show must go on: A conceptual model of conducting synchronous participatory design with children online. In *CHI '21: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Article 345). Association for Computing Machinery. https://doi.org/10.1145/3411764.3445715

Longobardi, S., Pagliuca, M. M., & Regoli, A. (2018). Can problem-solving attitudes explain the gender gap in financial literacy? Evidence from Italian students' data. *Quality & Quantity, 52*, 1677–1705. https://doi.org/10.1007/s11135-017-0545-0

Lusardi, A., & Mitchell, O. S. (2011). Financial literacy around the world: An overview. *Journal of Pension Economics & Finance, 10*(4), 497–508. https://doi.org/10.1017/S1474747211000448

Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature, 52*(1), 5–44. https://doi.org/10.1257/jel.52.1.5

Lusardi, A., & Tufano, P. (2009). Teach workers about the perils of debt. *Harvard Business Review, 87*(11). https://hbr.org/2009/11/teach-workers-about-the-perils-of-debt

Lusardi, A., Michaud, P.-C., & Mitchell, O. S. (2017). Optimal financial knowledge and wealth inequality. *Journal of Political Economy, 125*(2), 431–477. https://doi.org/10.1086/690950

Lusardi, A., Mitchell, O. S., & Curto, V. (2010). Financial literacy among the young. *The Journal of Consumer Affairs, 44*(2), 358–380. https://doi.org/10.1111/j.1745-6606.2010.01173.x

Malik, G., Singh, D., & Bansal, R. (2024). Exploring the complex dynamics: Examining the influence of deviant personas in online gambling. *Journal of Gambling Studies, 40*, 1271–1294. https://doi.org/10.1007/s10899-024-10301-x

Maurya, P. K., Bansal, R., Ansari, Y., & Mishra, A. K. (2023). Behavioural determinants of health insurance buying intention of missing middle consumers: A study during COVID-19 pandemic. *European Economic Letters, 13*(5), 1082–1098. https://doi.org/10.52783/eel.v13i5.874

Mishra, A. K., Bansal, R., & Maurya, P. K. (2023). Investing for a better tomorrow: Values-driven antecedents of investment in socially responsible equity funds by Indian retail investors. *Journal of Cleaner Production, 420*, Article 138441. https://doi.org/10.1016/j.jclepro.2023.138441

Mishra, A. K., Bansal, R., Maurya, P. K., Kar, S. K., & Bakshi, P. K. (2023). Predicting the antecedents of consumers' intention toward purchase of mutual funds: A hybrid PLS-SEM-neural network approach. *International Journal of Consumer Studies, 47*(2), 563–587. https://doi.org/10.1111/ijcs.12850

Mitchell, O. S., & Lusardi, A. (2015). Financial literacy and economic outcomes: Evidence and policy implications. *The Journal of Retirement, 3*(1), 107–114. https://doi.org/10.3905/jor.2015.3.1.107

Mo, J. (2020). *PISA 2018 results: Are students smart about money* (PISA in Focus, No. 106)? OECD. https://doi.org/10.1787/d540d9e9-en

Reyna, V. F., & Wilhelms, E. A. (2017). The gist of delay of gratification: Understanding and predicting problem behaviors. *Journal of Behavioral Decision Making, 30*(2), 610–625. https://doi.org/10.1002/bdm.1977

Rudeloff, M., Brahm, T., & Pumptow, M. (2019). Does gender matter for the use of learning opportunities? Potential explanation for the gender gap in financial literacy. *Citizenship, Social and Economics Education, 18*(3), 128–142. https://doi.org/10.1177/2047173419892208

Santini, F. D. O., Ladeira, W. J., Mette, F. M. B., & Ponchio, M. C. (2019). The antecedents and consequences of financial literacy: A meta-analysis. *International Journal of Bank Marketing, 37*(6), 1462–1479. https://doi.org/10.1108/IJBM-10-2018-0281

Saudi Central Bank. (2022). *Financial stability report 2022.* Saudi Arabian Monetary Authority (SAMA). https://www.sama.gov.sa/en-US/EconomicReports/Financial%20Stability%20Report/Financial_Stability _Report_2022_EN.pdf

Saudi Central Bank. (2023). *Financial stability report 2023.* Saudi Arabian Monetary Authority (SAMA). https://www.sama.gov.sa/en-US/EconomicReports/Financial%20Stability%20Report/Financial%20Stability %20Report%202023.pdf

Seraj, A. H. A., Alzain, E., & Alshebami, A. S. (2022). The roles of financial literacy and overconfidence in investment decisions in Saudi Arabia. *Frontiers in Psychology, 13*, Article 1005075. https://doi.org/10.3389 /fpsyg.2022.1005075

Siegfried, C., & Wuttke, E. (2021). What influences the financial literacy of young adults? A combined analysis of socio-demographic characteristics and delay of gratification. *Frontiers in Psychology, 12*, Article 663254. https://doi.org/10.3389/fpsyg.2021.663254

Sredojević, S., & Ziakou, S. (2020). Resilient digital financial education for Youth — European money quiz project. In *FINIZ 2020 — People in the Focus of Process Automation* (pp. 131–136). Singidunum University. https://doi.org/10.15308/finiz-2020-131-136

Strömbäck, C., Lind, T., Skagerlund, K., Västfjäll, D., & Tinghög, G. (2017). Does self-control predict financial behavior and financial well-being? *Journal of Behavioral and Experimental Finance, 14*, 30–38. https://doi.org/10.1016/j.jbef.2017.04.002

Van Dalen, H. P., & Henkens, K. (2020). The COVID-19 pandemic: Lessons for financially fragile and aging societies. *Work, Aging and Retirement, 6*(4), 229–232. https://doi.org/10.1093/workar/waaa011

Verma, R. K., & Bansal, R. (2023). Stock market reaction on green-bond issue: Evidence from Indian green-bond issuers. *Vision, 27*(2), 264–272. https://doi.org/10.1177/09722629211022523

Watts, T. W., Duncan, G. J., & Quan, H. (2018). Revisiting the marshmallow test: A conceptual replication investigating links between early delay of gratification and later outcomes. *Psychological Science, 29*(7), 1159–1177. https://doi.org/10.1177/0956797618761661

Woodward, J., Alemu, F., López Adames, N. E., Anthony, L., Yip, J. C., & Ruiz, J. (2022). "It would be cool to get stampeded by dinosaurs": Analyzing children's conceptual model of AR headsets through co-design. In *CHI '22: Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (Article 152). Association for Computing Machinery. https://doi.org/10.1145/3491102.3501979

Yip, J., Roldan, W., Gonzalez, C., Pina, L. R., Ruiz, M., & Vanegas, P. (2022). Youth invisible work: The sociocultural and collaborative processes of online search and brokering between adolescents and English-language learning families. *Information and Learning Sciences, 123*(7–8), 330–350. https://doi.org/10.1108/ILS-01- 2022-0004

Zahera, S. A., & Bansal, R. (2018). Do investors exhibit behavioral biases in investment decision making? A systematic review. *Qualitative Research in Financial Markets, 10*(2), 210–251. https://doi.org/10.1108 /QRFM-04-2017-0028

Zahera, S. A., & Bansal, R. (2019). A study of prominence for disposition effect: A systematic review. *Qualitative Research in Financial Markets, 11*(1), 2–21. https://doi.org/10.1108/QRFM-07-2018-0081

Zawya. (2022, October 27). *PIF launches local content growth program to grow competition and innovation in the private sector* [Press release]. https://www.zawya.com/en/press-release/government-news/pif-launches-local-content-growth-program-to-grow-competition-and-innovation-in-the-private-sector-vf7eur3o