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The Moderating Role of Managers' Emotional Intelligence in Explaining the Relationship between Research and Development Costs and Corporate Social and Environmental Responsibility

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ABSTRACT
Corporate social responsibility approaches are becoming increasingly widespread since environmental performance is a significant aspect of developing a firm socioemotional wealth, such as legitimacy, trustworthiness, and image. This study investigates the moderating role of managers' emotional intelligence on the relationship between research and development costs and the social and environmental responsibility of manufacturing companies in the Tehran Stock Exchange. This research is applied and correlational. One hundred thirty-two companies were selected as sample companies that were active in the Tehran Stock Exchange during 2010-2020. The data is collected from the actual financial statements of the companies through the Kodal website, and it is compiled using Excel software. The method of testing the hypotheses is moderator regression (hierarchical), and Eviuse 12 software is used to test the hypotheses. The findings reveal that research and development costs have a meaningful relationship with the social and environmental responsibility of manufacturing companies, and the emotional intelligence of managers has a moderating role in the relationship between research and development costs and the social and environmental responsibility of manufacturing companies. The results can help all stakeholders evaluate the level of attention of companies to research and development costs and corporate social and environmental responsibility.

KEYWORDS
Emotional Intelligence, Research and Development Costs, Corporate Social and Environmental Responsibility.

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نشریه علمی

آموزش محیط‌زیست و توسعه پایدار

«مقاله پژوهشی»

نقش تعدیل‌گری هوش هیجانی مدیران در تبیین ارتباط هزینه‌های تحقیق و توسعه با مسئولیت اجتماعی و زیست‌محیطی شرکت‌ها

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چکیده

نگرش‌های مسئولیت اجتماعی شرکتی به‌طور فزاینده‌ای در حال گسترش هستند، به‌طوری‌که عملکرد زیست‌محیطی همچنان فاکتور مهمی از توسعه اجتماعی – عاطفی شرکت از قبیل مشروعیت، اعتمادسازی و تصویرسازی است. هدف پژوهش بررسی نقش تعدیل‌گری هوش هیجانی مدیران بر رابطه بین هزینه‌های تحقیق و توسعه با مسئولیت اجتماعی و زیست‌محیطی شرکت‌های تولیدی در بورس اوراق بهادار تهران می‌باشد. روش پژوهش از نظر هدف، کاربردی و از نوع همبستگی است. در این راستا ۱۳۲ شرکت به‌عنوان شرکت‌های عضو نمونه انتخاب گردید که در طی سال‌های ۱۳۹۹-۱۳۸۹ در بورس اوراق بهادار تهران فعالیت داشته‌اند. داده‌های پژوهش از صورت‌های مالی واقعی شرکت‌ها از طریق سایت کدال جمع‌آوری و با استفاده از نرم‌افزار اکسل گردآوری شد. روش آزمون فرضیه‌ها رگرسیون تعدیلگر (سلسله مراتبی) با استفاده از نرم‌افزار ایویوز ۱۲ می‌باشد. یافته‌ها نشان داد هزینه‌های تحقیق و توسعه ارتباط معناداری با مسئولیت اجتماعی و زیست‌محیطی شرکت‌های تولیدی دارد و هوش هیجانی مدیران نقش تعدیل‌کننده‌ای بر ارتباط هزینه‌های تحقیق و توسعه با مسئولیت اجتماعی و زیست‌محیطی شرکت‌های تولیدی دارد. نتایج این پژوهش به تمام ذی‌نفعان کمک می‌کند تا میزان توجه شرکت‌ها به هزینه‌های تحقیق و توسعه و مسئولیت اجتماعی و زیست‌محیطی شرکت‌ها را مورد ارزیابی قرار دهند.

واژه‌های کلیدی

هوش هیجانی، هزینه‌های تحقیق و توسعه، مسئولیت اجتماعی و زیست‌محیطی شرکت‌ها.

استناد به این مقاله:

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Introduction

Several social and environmental problems were intensified along with economic growth, including environmental degradation, resource depletion, product quality, social injustice, continued poverty, and employee dissatisfaction. The economy continues to grow, but the environment and social justice on which the economy depends do not develop. Although economic indicators, such as investment and trade, show positive values, the fundamental indicators of environmental conditions and social justice are becoming more negative daily (Jafari Taraji, 2015). Today, companies, as the most prominent economic units whose activities have extensive environmental, social, and economic effects, are asked to disclose the various effects of their activities on the environment, social welfare, and economic issues (Kolk & Pinkse, 2010). Companies are sustainable when considering social and environmental priorities in their economic activities (Grejo & Lunkes, 2022). The overall structure of organizations is constantly affected by society and environmental changes, so the adverse environmental effects caused by humans and consumer awareness have demanded a socially responsible attitude and changes in companies' operations (Espindoal & Ribeiro, 2020). Corporate social and environmental responsibility is a concrete form of the company's efforts to create a harmonious relationship with society and the surrounding environment of the business, where the company's success parameters are related to prioritizing ethical principles, that is, achieving the best results without harming other social groups. Social and environmental responsibility means that the responsibility of companies includes social, environmental, and financial responsibilities because financial conditions cannot guarantee the company's value for sustainable growth. The underlying thinking of social and environmental responsibility is the core of business ethics. Business ethics mean that companies do not only have economic and legal obligations but also have obligations to other stakeholders that their scope precedes the above obligations (Kurniawait et al., 2022).

One of the variables affecting the social and environmental responsibility of companies is research and development costs (Sadeghpoor et al., 2022; Huang et al., 2021; Alam & Eslam, 2021; Ford et al., 2014; Yang et al., 2012). Ford et al. (2014) and Yang et al. (2012) showed that with the increase of environmental regulations, innovative research and development have increased significantly. The existence of an independent and separate unit or department under the title of research and development is fundamental in any organization. Research and development costs are widely used as technical support for companies to improve production processes and reduce costs (Park & Nicolau, 2019). Huang et al. (2021) showed that environmental regulations affect R&D investment. Alam and Islam (2021) have stated in their research that research and development activities reduce environmental costs in companies. Recent research shows that investment in research and development affects corporate social and environmental responsibility. Environmental regulations can reduce the high costs of environmental investment by stimulating companies to innovate and invest in research and development. Research and development play a vital role in companies' innovation and represent a critical criterion for increasing the knowledge reserve in companies, which causes the growth of companies (Fan & Wang, 2019). UNESCO considers research and development as a dynamic and continuous process of basic, applied, and development research that the scientific results of each stage are collected as a stock of knowledge over time, and these stocks are essential and valuable inputs that are the source of new ideas and innovations in every stage (Rahimi Rad et al., 2017). Research and development costs have two leading roles in reducing environmental costs: first, the purchase of new equipment and machinery reduces waste and consumables, and second, the use of new technology leads to a reduction in energy consumption in product production (Alam & Islam, 2021).

Managers' emotional intelligence is considered as a moderator in this study. Emotional intelligence has been used in many experimental studies and theories. Emotional intelligence, as a cognitive ability, affects a person's decision-making. Cognitive biases,

such as loss aversion, optimism, and overconfidence, make a manager irrational. The managers' emotional intelligence has a meaningful relationship with research and development, and it affects the managers' social responsibility. The behaviors of senior managers regarding research and development costs affect corporate social responsibility performance (Yew et al., 2006). Emotional intelligence expresses a person's ability to manage his/her own emotions and others' emotions, which allows managers to know the strengths and weaknesses of the business. It helps managers to make wise decisions, invest in appropriate projects, and make innovative decisions that improve manager-employee and manager-customer relationships (Firori & Antonakis, 2011). Therefore, emotional intelligence has a positive effect on corporate social responsibility. However, emotional intelligence, as a positive emotion, should guide managers to make wise decisions to expand the scope of business activity, minimize business issues, and achieve social performance in the manager-employee relationship (Ezzi et al., 2020). Carley (1997) concluded that diversity of activities enables managers to acquire cognitive skills such as emotional intelligence. Bar-On (2002) assumes that emotional intelligence is crucial in meeting environmental needs. Positive and negative emotions affect the social performance of the company, and these emotions affect the individual's behavior.

Focusing the activities of the Securities & Exchange Organizations of Iran (SEO) in line with public expectations and fulfilling social and environmental responsibility in practice has increased profitability in the long term. It has beneficial effects for organizations, such as reducing the percentage of complaints, reducing operational risks, and increasing reputation and economic credibility. Undoubtedly, the fact that currently, all the stakeholders of the Securities & Exchange Organizations do not feel highly satisfied with the performance of the organizations must be related mainly to the lack of clear and transparent strategies and indicators in the social and environmental responsibility of these organizations. Therefore, the first issue that is important and necessary for an organization to implement its social responsibility is to define the limits and framework of social and environmental responsibility so that it can take steps in its implementation. Since research has shown that research and development costs are crucial in achieving organizational goals, it is crucial to know the amount of research and development costs in the listed companies. On the other hand, as stated, one of the critical roles of every manager at the head of the organization is to increase emotional intelligence to help achieve the goals and advance the company. Therefore, the main research question is whether managers' emotional intelligence has a moderating role in explaining the relationship between research and development costs and the social and environmental responsibility of companies in the Tehran Securities Exchange.

According to what was said above, the research hypotheses and model are designed as follows:

First hypothesis: There is a meaningful relationship between research and development costs and social and environmental responsibility.

Second hypothesis: Managers' emotional intelligence moderates the relationship between research and development costs and companies' social and environmental responsibility.

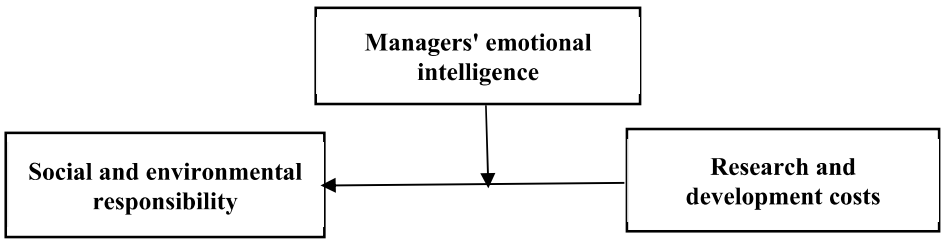

Figure 1. The Conceptual Model of the Research

Research Methodology

The method of this research is descriptive-correlation and the financial statements of the companies admitted to the Tehran Securities Exchange are used to process the research hypotheses. The research data was collected from the Kodal site and compiled using Excel software. The hypothesis testing method is multivariate regression and is done using Eviuse version 12. The statistical population of the research includes companies that are listed on the Tehran Securities Exchange (www.codal.ir) from 2010 to 2020. Some factors are considered, including the availability of financial information to extract the required data, the acceptance before 2010, the type of activity of the production company, and therefore the absence in the financial industry, investment, insurance, stock trading in all periods of the research. In this regard, one hundred thirty-two companies are selected. The research variables and their measurement methods are as follows:

Corporate social and environmental responsibility

Content analysis has been used to evaluate corporate social and environmental responsibility. Four areas of social activities have been identified, including the organization's interaction with society, helping to develop human resources, helping to develop natural resources and the environment, and improving product quality (Gray, 2002). The emphasis is on the organization's interaction with society and with developing natural and environmental resources. A checklist of social and environmental information items to be disclosed in the annual reports of Iranian companies was prepared, considering the research done on social and environmental responsibility. This list includes financial and non-financial items. The criteria for identifying and measuring social and environmental responsibility are described in Table 1. The overall value of corporate social and environmental responsibility is obtained from the sum of the partial value. If the desired index exists, the number is considered one, and if the desired index does not exist, the number is considered zero.

Table 1. List of Corporate Social and Environmental Responsibility

List of social responsibility cases	List of environmental items
1. Supporting public health 2. Supporting sports activities 3. Recreational, cultural and religious support 4. Supporting education 5. Charitable donations 6. Legal actions, lawsuits 7. Scholarship program 8. Cash donation program 9. Conferences, seminars and conferences	10. Pollution control 11. Preventing environmental damage 12. Recycling by preventing waste 13. Preservation of natural resources 14. Environmental policy 15. Award in the field of environment 16. .Development of green space and landscaping 17 .Environmental protection training for employees 18. Energy conservation and saving

Source (Kilic & Uyar, 2014. Sepasi & Esmaili, 2013)

Research and development costs

Investing in research and development costs is a measure that shows the company's degree of compliance with innovative activities and the level of risk-taking of managers (Ginesti et al., 2021). In this research, the ratio of research and development costs to total sales has been used (Ezzi et al., 2020; Konno & Itoh, 2018).

Managers' Emotional Intelligence

Sheering's standard emotional intelligence questionnaire was used to measure emotional intelligence. This questionnaire has thirty-three questions based on the 5-option Likert scale.

Control variables

Company size: The natural logarithm of total assets at the end of the period is used to measure company size.

Financial leverage: It is used to divide the liabilities over the total assets of the company at the end of the financial period.

Sales growth: Sales growth is obtained by calculating the difference between the current

year's sales and the previous year's sales divided by the previous year's sales.

Company performance: It is calculated by dividing the company's net profit by the shareholders' equity.

Research models: Model 1 was used to test the first hypothesis, and Model 2 was used to test the second hypothesis.

Model 1:

$$CSER_{i=t} = \beta_0 + \beta_1 R\&D_{i=t} + \beta_2 SIZE_{i=t} + \beta_3 LEV_{i=t} + \beta_4 GRW_{i=t} + \beta_5 ROE_{i=t} + \in$$

Model 2:

$$CSER_{i=t} = \beta_0 + \beta_1 R\&D_{i=t} + \beta_2 EI_{i=t} + \beta_3 R\&D_{i=t} * EI_{i=t} + \beta_4 SIZE_{i=t} + \beta_5 LEV_{i=t} + \beta_6 GRW_{i=t} + \beta_7 ROE_{i=t} + \in$$

Research Findings

The statistical analysis of the data has been done in two parts: descriptive and inferential. Table 2 shows the descriptive statistics of the research variables. The Kolmogorov-Smirnov test was used to check the normality of the variables. Since the significance level of Kolmogorov Smirnov's Z statistic for all variables is greater than 0.05, these variables have a normal distribution.

Table 2. Descriptive Statistics and Checking the Normality of Research Variables

Variable	Symbol	Minim	Maximum	Mean	Standard deviation	Z-Statistic	Sig
Social and environmental responsibility	CSER	0	0.852	0.278	0.173	0.126	0.357
Research and development costs	R&D	0	0.179	0.045	0.007	0.025	0.352
Emotional intelligence	EI	58.231	68.457	64.50	15.230	0.984	0.463
Company size	SIZE	21.752	29.569	25.748	1.352	0.117	0.574
Financial leverage	LEV	0.145	0.982	0.591	0.178	1.853	0.290
Sales growth	GRW	-0.025	1.437	0.243	0.073	0.245	0.283
Company performance	ROE	-0.528	4.793	0.425	0.598	0.936	0.168

Stability tests of research variables:

The stability of the variables is based on the Levin, Lin & Chu Test and the Augmented Dickey-Fuller Test. The results of the reliability check of the variables are shown in Table 3. All the research variables are stable according to the information in the table.

Table 3. Stability Test of Research Variables

Variable	Levin, Lin& Chu Tese	ADF Test
	Test statistics Sig	Test statistics Sig
Social and environmental responsibility	-9.7893 (0.000)	49.5784 (0.001)
Research and development costs	-7.4561 (0.000)	18.6923 (0.000)
Emotional intelligence	-28.9514 (0.000)	88.6834 (0.000)
Company size	-12.7842 (0.000)	188.4563 (0.000)
Financial leverage	-14.7492 (0.000)	150.4672 (0.000)
Sales growth	-6.6328 (0.000)	14.9573 (0.000)
Company performance	-10.7951 (0.000)	12.8437 (0.000)

Test results of research models:

The variance heterogeneity test was performed before estimating the model, and its results are shown in Table 4. One of the assumptions considered in regression is the independence of errors (the difference between the actual values and the values predicted by the regression equation), which is used to check the independence of errors using Durbin-Watson's test. The Durbin-Watson statistic is between 0 and 4, and if there is no serial correlation between the residuals, the value of this statistic should be closer to 2. The results of the Durbin-Watson test are shown in Table 4. Limer's F test has been used to determine the appropriate model for estimating the combined data. The results of the Limer F test have confirmed the null hypothesis that the width from the origin is the same in all periods. The Hausman test has been used to choose between the fixed effects and random effects. If the significance level of the Hausman test is less than 0.05, the fixed effects model is accepted. The results of Limer's F and the Hausman test are shown in Table 4.

Table 4. The Results of the Breusch-Pagan-Godfrey Homogeneity of Variance Test, the Durbin-Watson Test, the Limer F Test, and the Hausman Test.

	Model	Statistics	Sig	Conclusion
Breusch-Pagan-Godfrey Test	1	4.675	0.001	There is Heteroscedasticity
	2	7.683	0.000	There is Heteroscedasticity
Durbin-Watson Test	1	2.0654	-	There is no Autocorrelation
	2	2.0852	-	There is no Autocorrelation
Limer F Test & Hausman Test	1	18.347	0.0000	Panel date
		7.045	0.0183	Fixed Effects Model
	2	10.598	0.0000	Panel date Fixed Effects Model

Table 5. Statistical Results of the First Research Hypothesis Test

Variable	Coefficients	Standard deviation	T-Statistics	Sig	Conclusion
-	-0.554	0.197	-2.628	0.007	-
Research and development costs	0.375	0.127	1.992	0.013	Positive
Company size	0.046	0.085	5.185	0.004	Positive
Financial leverage	-0.467	0.037	-4.465	0.001	Negative and Significant
Sales growth	0.154	0.178	12.896	0.086	Positive and Significant
Company performance	0.067	0.452	1.021	0.018	Positive
R^2			0.451		
Adjusted R^2			0.361		
F-Statistics			8.329		
sig			(0.000)		

The results of estimating the first research model are described in Table 5.

The probability value of the F statistic is smaller than 0.05, confirming the significance of the whole model with 95% confidence examining the significance of the whole model, according to Table 5. The coefficient of determination and the adjusted coefficient of determination of the model are 0.451 and 0.361, which indicate that about 45% of the dependent variable of the social and environmental responsibility of the company is explained by the independent and control variables of the model. The t-statistic of research and development costs is 1.992, according to Table 5. Its significance level is 0.013, which can be concluded that the significance level of this variable is less than 5% error (95% confidence level). Therefore, it can be concluded that research and development costs have a statistically significant relationship with corporate social and environmental responsibility. The control variables of company size have a meaningful relationship

with corporate social and environmental responsibility. The variables of sales growth and financial performance have no significant relationship with corporate social and environmental responsibility. However, the financial leverage variable has a negative and significant relationship with corporate social and environmental responsibility.

Table 6. Statistical Results of the Second Hypothesis Test of the Research

Steps of the model	Variable	Adjusted R^2	ΔR^2	Δf	β
Model 1	Features of the model	0.388	0.400	33.98	
	Research and development costs				0.426
	Emotional intelligence				0.569
	Company size				0.346
	Financial leverage				-0.589
	Sales growth				0.104
	Company performance				0.043
Model 2		0.385	0.003	0.44	
	Research and development costs				0.244
	Emotional intelligence				0.312
	Research and development costs* Emotional intelligence				0.431
	Company size				0.145
	Financial leverage				-0.318
	Sales growth				0.009
	Company performance				0.004

According to the results of Table 6, in the first stage, the variable of research and development costs has been entered into the model. The modified coefficient of determination (R2) explains 38% of the variance in the variable of social and environmental responsibility, and ΔR2 is 40%, which shows the increase in the ability to explain the variance after the addition of the moderator variable. The standardized beta coefficient is significant at the level of 0.01 both for the variable of emotional intelligence (β = 0.569) and for the variable of research and development costs (β = 0.426). To test the hypothesis, as mentioned earlier, the interaction effect of research and development costs emotional intelligence was added to the model, and this variable is also significant at the 0.01 level (β = 0.431). This hypothesis is confirmed. The control variables of company size have a positive and significant relationship with corporate social and environmental responsibility, and the variables of sales growth and financial performance have no significant relationship with corporate social and environmental responsibility. However, the financial leverage variable has a negative and significant relationship with corporate social and environmental responsibility.

Conclusion

This study examined the role of managers' emotional intelligence as a moderating variable in explaining the relationship between research and development costs and the company's social and environmental responsibility. Research and development costs have a significant relationship with the social and environmental responsibility of companies, according to the first hypothesis. The results of this hypothesis are consistent with the research of Eazi et al. (2020), Alam et al. (2019), Ford et al. (2014), and Yang et al. It is not consistent with the research result of Sadeghpour et al. (1400). The results of Sadeghpour et al.'s research (1401) showed that there is no relationship between environmental performance and profit per share. Nevertheless, there is a positive and significant relationship between environmental performance and profit per share in the new years, and development costs have a moderating effect on the relationship between environmental performance and earnings per share in the

current year and the next year. It can be stated that one of the most important requirements for companies to survive in the era of globalization and to achieve a high market share and competitive advantage, and especially to move towards a competitive economy, is to pay attention to social and environmental responsibility in businesses, especially in developing countries, that requires the creation of the necessary platforms, including raising awareness, examining the necessary stimuli, and removing obstacles and challenges. In most countries, the movement towards sustainable development is accepted as an accepted principle, and the technical, organizational, and human resources meet the environmental goals of a company. However, there is not much legal requirement at the national and international level to examine the social and environmental responsibility of companies. Shareholders are not indifferent to the disclosure of social and environmental responsibility and use it as an information source. Therefore, when information about the cost of research and development and social and environmental responsibility is provided to the shareholders, it causes the stock returns to increase. Companies that are more socially responsible act more fairly not only in the process of wealth creation but also in the distribution of wealth. Moreover, the disclosure of this information prevents the managers from implementing profit management methods to maintain and raise the stock price in the short term and reduce the intrinsic value of the shareholders' shares. Increasing the level of social and environmental responsibility as well as disclosing it by improving the social and technical image of the company cause the dissemination of information affecting the market and gaining investors' trust in research and development projects. Therefore, it increases the value and yield of companies' shares. On the other hand, in a non-transparent reporting environment, such as the lack of clear social responsibility reporting, investors are not able to identify the company's loss-making projects because there is no clear information to make optimal decisions. Therefore, it is not possible to separate profitable and unprofitable research and development projects. This lack of ability leads to the continuation of unprofitable projects. As a result, the asymmetry in stock returns is accumulated in the company over time, and with the release of this information, the stock value undergoes abnormal fluctuations. The willingness of business units to commit to social and environmental responsibility in all aspects has a significant effect on performance and, accordingly, on stock prices and returns. The tendency towards social responsibility encourages the for-profit unit to try to improve the environment, use less energy, and avoid wasting management time. The results of the second hypothesis showed that managers' emotional intelligence has a moderating role in the relationship between research and development costs and the social and environmental responsibility of companies. The results of this hypothesis are consistent with the research of Eazi et al. (2020), Fury and Antotax (2011), Aslam et al. (2021), Yu, Mira, and Ji (2006), and Rud et al. Eazi et al. (2020) showed that managerial emotional intelligence has a moderating role between research and development variables and social responsibility performance. In explaining the results of this hypothesis, it can be stated that emotional intelligence helps people to become more aware of interpersonal methods, identify and manage the impact of emotions on thinking and behavior, develop the ability to recognize social movements in the workplace, and understand how to manage and improve relationships. Perhaps the best thing about emotional intelligence is that it is a flexible skill that people can improve with practice. Many authors have written about the potential abilities of emotional intelligence and its effects on the normal and daily life of human beings. In addition, it has led people to believe that emotional intelligence can increase the level of health, well-being, general comfort, wealth, social responsibility, success, love, and happiness in a person. Nevertheless, it is necessary to carry out accurate and scientific evaluations to determine their correctness and incorrectness according to the emerging issues related to emotional intelligence. If the employees have high intelligence and use their talents and skills in the service of the organization, they play an important role in increasing the social and environmental responsibility of their company. People's positive feelings and attitudes toward the organization, their jobs, and the culture that

governs the organization can solve many problems in organizations. The research results show that environmental laws and regulations increase the social and environmental responsibility of companies. The social and environmental responsibility of companies and the disclosures related to those conditions become necessary for the continuation of the companies' activities. It is suggested to have strict monitoring and support measures, such as investment in the environment, on behalf of the company and society, so that ultimately, by increasing the competitive advantages, the company's profitability will also increase. The results of this research can help politicians in planning regulatory programs, incentive programs, recommendations, and persuasion in social and environmental responsibility. Encouraging companies to be socially and environmentally responsible, increases their credibility in a highly competitive environment, and increases their share in the market. It is suggested that the Environmental Protection Organization and other institutions establish rules by interacting with the Tehran Stock Exchange so that all companies can participate in social and environmental activities. Considering the expansion of the discussion of social and environmental responsibility and the importance of the discussion of stock returns, there are still various issues that can be investigated for future research. For example, considering the confirmation of the moderating effect of emotional intelligence on the relationship between research and development costs and social and environmental responsibility, it is suggested that the effect of different dimensions of emotional intelligence on research and development costs, on social and environmental responsibility, and stock returns be measured for various industries, to get a clearer view of this concept.

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