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Effectiveness of the Green Tax Sustainability Consequences Based on Themes of Pluralistic Decision: A Case Study of National Iranian Petrochemical Industries

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Highlights

- The identification of green tax sustainability consequences in national Iranian petrochemical industries;
- The identification of pluralistic decision themes in national Iranian petrochemical industries;
- The determination of the most influential green tax sustainability consequences based on pluralistic decision themes by the Vickor process;

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Abstract

Among all kinds of government resources, taxes, as a permanent and predictable source, have always been the focus of government officials. Economists are always trying to introduce new tax bases that create the slightest inefficiency in the economic system, among which the “green taxes” applied on a cost basis have such a feature. This type of tax will be able to increase the quality of the environment successfully, but whether it can replace other taxes is a double-benefit hypothesis that must be considered separately. This research aims to determine the effectiveness of the consequences of green tax sustainability based on themes of pluralistic decisions in petrochemical firms. This research is a mixed methodology, and the meta-synthesis, Delphi, and Rough theory have used it. The target population was the qualitative, similar research and academic experts in accounting. However, the target population in the quantitative part was 22 managers of petrochemical firms, which is acceptable from the statistical population due to the requirement of rough theory analysis. In this study, based on the meta-synthesis analysis of the selected research, six pluralistic decision propositions and four consequential components of green tax sustainability were determined, which entered the Ruff collection analysis phase due to the confirmation of theoretical adequacy based on Delphi analysis. The results in this section identify the most influential pluralistic decision-making proposition, the three propositions of social responsibility in decision-making; it was the reduction of conflict of interest in decision-making and the legitimacy of decision-making affecting green tax sustainability and reducing emissions as the most effective component of green tax sustainability consequence.

Keywords: Green Tax Sustainability Consequence, Philosophical Themes of Pluralistic Decision-making, Rough Set

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1. Introduction

Since the goal of any economic system in any society is to achieve maximum social welfare, in this way, the efficient and effective use of resources over time (present and future), sustainable development, and protection of the environment are of particular importance (Daresh et al., 2020). Achieving a green economy requires practical efforts to clean up the environment; optimizing resource allocation and creating green structures require financial incentives. Due to the inadequate distribution of revenues and the low tax revenues of governments, the green tax, considered tax efficient, helps the government generate revenue through the transition from the status quo to the green economy and can replace other tax bases.

On the one hand, this reduces the disruptive effect of other taxes. On the other hand, it is a new way of allocating resources optimally to increase social welfare in the long run, which prevents the release of excessively optimal social pollutants. Green tax is imposed on economic units based on cost, and those units will try to reduce costs and thus reduce environmental pollution to maintain production efficiency. In other words, this type of tax can encourage firms to use innovative methods of production and transportation to reduce the tax burden. On the other hand, this tax generates income for various purposes, part of which can be spent on improving the environment and part on reducing labor taxes to increase employment or correct the adverse effects of income, called the double dividend.

Receiving this type of tax from factories and those who cause environmental pollution, in addition to preserving the environment for the future (Sotoudeh Niakrani et al., 2020), can be used to create social benefits based on the themes of pluralistic decision-making. In other words, based on pluralistic decision-making, a multifaceted set of benefits is created with equal values to meet a common goal, such as environmental protection and pollution reduction. In other words, pluralistic decision-making in the face of conflicting interests such as environmental pollution, with emphasis on different preferences and expectations but essential as a social concern, seeks to help increase the effectiveness in building social satisfaction and trust by creating a basis for common interests (Ishaque, 2020). Companies pursue the benefits of a green tax through pluralistic decision-making. This level of decision-making is the pursuit of social pluralistic values that, as a social need, such as reducing environmental pollution, can help increase the trust and confidence of shareholders and investors (Sotoudeh Niakrani et al., 2020). On the other hand, pluralistic decision-making is a metaphor for collectivist values that companies adopt to create coherent insights among stakeholders toward decision-makers (Mousavi Azam, 2016) and build trust and confidence, which at the agency level can reduce the conflict of interest between shareholders and managers (Kinader, 2018).

Researchers such as Xin et al. (2019), Rodriguez et al. (2019), Heu and Zhang (2018), and Karydas and Zhang (2018) believe that receiving green taxes can not only help preserve the environment but also enhance sustainable development by interacting between the economy and the environment. The existing research gap is that the present literature fails to reflect the impact of environmental tax on the pluralistic decision from a matrix point of view. In fact, the abovementioned research sheds light on the effects of an environmental tax on just one or two laterals of green development. In previous models, such as the endogenous growth model of Oueslati (2014), the energy–environment–economy dynamic stochastic general equilibrium model by Niu et al. (2018), the deterministic optimization model of Wang et al. (2018), and the random coefficient logit model of Bonnet et al. (2018), environmental tax is usually taken as an explanatory variable, together with other independent variables in some cases, to explain its impacts on economic growth, pollution intensity, or resource intensity.

However, these methods could not analyze the complex interactions between all variables and influencing factors. As a result, the role of consequences of green tax sustainability under themes of

pluralistic decision has not been studied based on matrix analysis in an integrated view of the economy, environment, and resources. Therefore, to fill this gap, content screening first identifies the dimensions of each research variable and then prioritizes it based on the interpretive ranking process of company managers' knowledge level. Policymakers and analysts upgrade the company's strategic functions in a competitive market.

In fact, sustainable development in the tax system, even the sustainability of green taxation as a reciprocal assurance process, can strengthen social trust based on the levels of congestion decisions. In other words, pluralistic decision-making, which describes pursuing a significant level of pluralistic social values, sees the consequences of a green tax for the future. Because of the increase in green taxes, companies are trying to develop their social responsibilities to reduce emissions by strengthening the production infrastructure and to enrich social security and trust by disclosing voluntary information in the form of financial statements through insight into pluralistic decision-making. Therefore, this study seeks to evaluate the paradigm of green tax consequences in the presence of pluralistic decision-making themes in petrochemical firms. Therefore, based on the presented topics raised in this research, the questions are the following:

1. What are the consequential components of a green tax?
2. What are pluralistic decision-making propositions?
3. What is the most influential dimension of the green tax consequence based on the existence of petrochemical firms' pluralistic decision-making?

The rest of the paper proceeds as follows. The next section deals with a literature review and prior research. The third section is the methodology employed in the study, and the penultimate section covers results and discussion. The paper ends with a conclusion and implications.

2. Literature review

In addition to the task of financing the government, taxes are essential in other respects as well. Taxes are one of the government's economic tools to intervene in the market when necessary and a means of financing the government to achieve other goals of human societies because governments with any political structure have three main goals: economic stability, equitable distribution of income, and optimal allocation of resources. The instability of tax revenue has been a significant concern for policymakers in both developed and developing countries, as it can translate into a higher instability of public expenditure (Gnangnon, 2022). In turn, factors of economic growth play an essential role in determining the breadth of a country's tax base and hence its public revenue performance, including tax revenue performance (also referred to as tax revenue share, measured by the share of tax revenue in the gross domestic product (GDP)). At the same time, governments in both advanced and developing countries need to mobilize higher public revenue to finance their development needs (Kamasa et al., 2022). Taxes, on the one hand, affect the distributional conditions of society due to their impact. On the other hand, with the transfer of resources from one market to another, they have allocative effects (Sadeghi et al., 2018). Therefore, economic experts are always looking for sustainable tax development to enhance the effectiveness of development-oriented functions. Functions that create dynamism in competition through strategies used to disclose tax realities at the level of markets, such as the capital market (Hogsden, 2018). Sustainable taxation is considered a strategic function at the level of the capital market, which can help increase economic dynamism if the level of interactive approaches with the government is improved. In fact, tax sustainability is a strategy in which pre-tax profits change little (Dyregang et al., 2014) and focuses on maintaining the results of tax avoidance over time. Tax stability means stability in profit after tax and the ability to predict future cash compensation that creates value for the company in the long run (Vaez et al., 2018). Minimizing the effective tax rate also leads to costs

such as tax penalties and additional financing costs for the company, reducing future liquidity, ambiguity in future tax payments, and increasing tax risk (Hatches and Rigo, 2015).

2.1. Green tax

In addition to the task of financing the government, taxes are essential in other respects as well. Taxes are one of the economic tools of the government to intervene in the market when necessary and a means of financing the government to achieve other goals of human societies because governments with any political structure have three main goals: economic stability, equitable distribution of income, and optimal allocation of resources. Economists believe that taxes affect the distributional conditions of society due to their impact. On the other hand, with the transfer of resources from one market to another, they have allocative effects. Hence, they always seek to identify the bases of taxation that impose the least inefficiency on society. The environmental tax is a practical tool for creating a public balance between society and the environment, which helps compensate for environmental damage by putting pressure on polluting companies and organizations (Khodamipour et al., 2022). In recent years, many researchers have analyzed obstacles or solutions to better implementing the environmental tax, and each of these studies has provided a limited number of barriers or solutions. For example, Aubert and Chiroleu-Assouline (2019) address the obstacles to reducing consumers' purchasing power and society's opposition and consider environmental tax reform to address these barriers (Lu et al., 2019). Rajapakse et al. (2022) presented the problem of how to allocate responsibility and reduce consumer purchasing power as obstacles to environmental tax.

Among the types of taxes, the only tax base with such a feature is environmental taxes. This tax base applied to all kinds of environmental pollution not only does not impair efficiency but also increases the social benefit due to the reduction of costs due to pollution. This type of tax is called green tax (Emami Meybodi et al., 2018). Green tax is based on cost, so it is prevalent and brings good income to the government; thus, it can replace other tax bases. On the one hand, this reduces the disruptive effect of other taxes; on the other hand, it has many benefits for society due to the reduction of pollution. De Miguel et al. (2015) categorized green tax into the following types in one of the most critical research frameworks on green taxation.

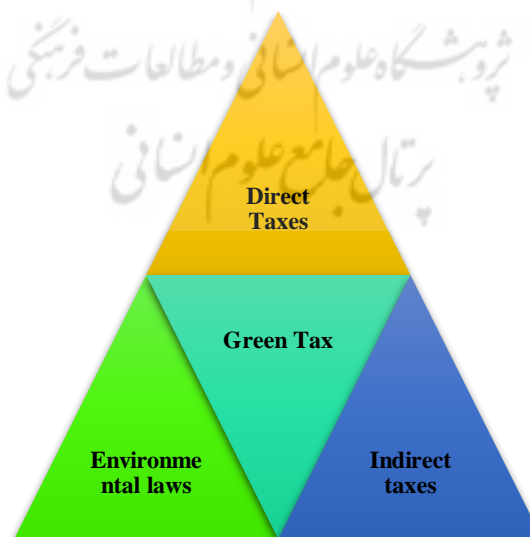


Figure 1

Green tax sustainable development strategies.

According to this framework regarding direct taxes as the first way to develop green tax sustainability, it should be stated that by imposing direct taxes, polluting companies are trying to reduce their environmental costs by reducing their production line infrastructure to reduce their environmental tax costs.

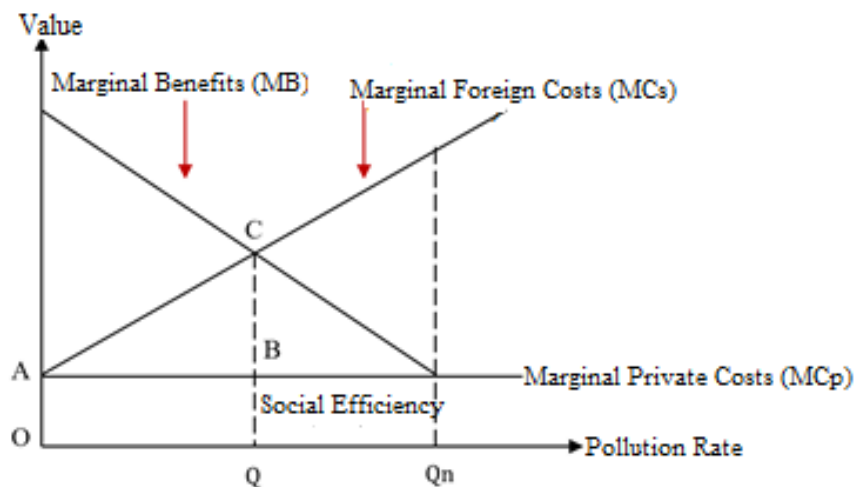


Figure 2

The practical process of direct taxes on value and pollution

The OA level is the corporate tax level, excluding pollution tax. Hence, without pollution tax, the primary result of a competitive market is the equilibrium value of Qn production for the producer. The contaminant will try to operate at the Qn level, where the benefits are maximized. In other words, the producer does not pay taxes for pollution. The optimal conditions for direct tax are realized when the sum of the final costs (internal and external) equals the sum of the final benefit (point Q), the optimal social limit.

$$\text{Marginal benefits (MB)} = \text{Marginal Foreign Costs (MC}_s\text{)} + \text{Marginal Private Costs (MC}_p\text{)}$$

The marginal foreign cost curve (MC_s) shows the final social cost of environmental pollution-related environmental degradation. In this way, by imposing a tax equal to CB for each unit of pollution, the desired social level of pollution is determined by OQ. This tax increases efficiency by equating social costs with social benefits. This type of tax is levied at a fixed rate on each unit of emission of pollutants or environmental degradation. On the other hand, indirect taxes on green tax sustainability are another way to impose a tax on production inputs or consumer goods whose use is related to environmental damage (Eslamlouian and Ostadzadeh, 2015). Its advantage is the transfer of the consumption and cost tax base. Due to attention to consumption by reducing production and storage conditions and improving technology, this type of tax causes more control of pollutants at a higher cost than direct tax. Indirect taxes are more popular than previous types despite their lower efficiency. They impose higher costs on society than direct taxes, forcing industrial plants to make reforms in all dimensions to reduce pollution emissions at the lowest possible cost. This type of tax, like direct taxes, relies on a pricing system instead of controlling and mandating policies (Daugbjerg and Svendsen, 2010). Finally, environmental laws and regulations are the third solution in the sustainable development of green tax. Government regulation is another way of dealing with the external costs of environmental pollution. This form of environmental policy recognizes and declares an acceptable standard of environmental pollutants and condemns violators of these criteria to stop the activity. Usually, due to the decline in welfare, which occurs due to the cessation of production of economic goods and services, this method is less considered by economists except in the case of very costly social pollutants (Heidari et al., 2015). These provisions appear in the corporate income tax system as tax incentives for investment in energy storage and

pollution reduction equipment, incremental depreciation methods, tax breaks for using recycled products, and tax incentives for afforestation. These rules and regulations can have the same effects as indirect environmental taxes. For example, incentive policies for investing in pollution reduction equipment are similar to indirect environmental taxes because they may also address only one dimension of pollution reduction. As a result, the goal of reducing pollution at the lowest cost may not be achieved and may lead to social and economic inefficiency. Tax expenditures may encourage each plant to reduce emissions, but subsidies to tax expenditures weaken the incentive for polluting factories to leave or, in general, may increase pollution emissions (Janova et al., 2019). Thus, environmental regulations that take the form of tax expenditures can represent another source of inefficiency that does not exist in indirect environmental taxes.

2.2. Pluralistic decision-making

Although power and conflict have been considered in theories of the organization, but rarely based on this theory, decision-making approaches in systems with common interests with stakeholders, such as representation, have been focused on. Pluralistic decision-making has not been given coherent conceptual interpretations because it has hidden dimensions of utilitarian decision-making (Halbesleben et al., 2007). Pluralistic decision-making is based on the three key elements of “interest”, “conflict”, and “power”. It states that if the decision-maker expands his power to reduce conflict of interest and develop pluralism, it is based on values based on mutual benefit. It creates cohesion and unity among those in power with the stakeholders (Alae Nejad and Haj Hosseini, 2019). In other words, multiple benefits with equal values to meet a common goal are created based on pluralistic decision-making. In fact, by emphasizing different preferences and expectations, pluralistic decision-making in conflict of interest seeks to help increase effectiveness in building satisfaction and trust by creating a basis for common interests (Ishaque, 2020). Based on a framework, Abend (2019) presents pluralistic decision-making, including three parts in the following model.

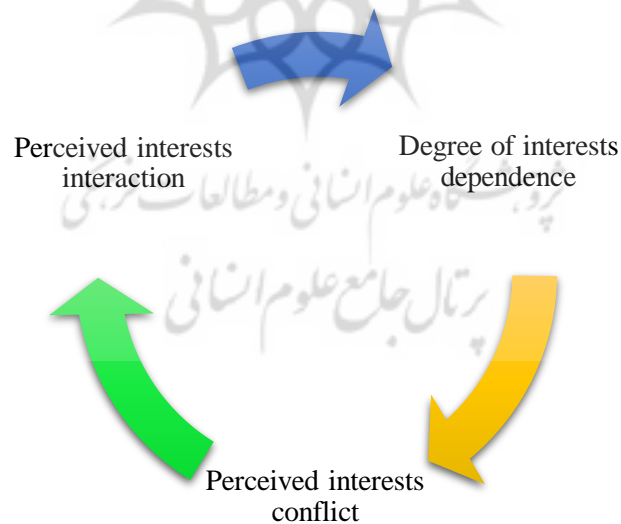


Figure 2

Dimensions of pluralistic decision-making

According to the above framework, the degree of dependence of interests refers to the level of conflict of mutual interests between managers and stakeholders such as shareholders and investors. The degree of dependence of benefits in pluralistic decision-making is the basis for creating cohesion in developing

common interests among stakeholders (Mehrani et al., 2011). On the other hand, perceived interest conflict is a level of recognition of interest preferences and expectations that, through perceptual coherence, can increase synergy in achieving shared interests and pluralistic decision-making. At this level, the decision-maker tries to create common goals for resolving decision-making conflicts based on direct interaction with stakeholders. Finally, the perceived interaction of interests refers to the level of decision-maker interactions to make a decision based on common interests (Ali Nejad et al., 2015). In other words, at this level, stakeholders' representation seeks to make decisions based on common interests by holding meetings.

2.3. Prior research

Khodamipour et al. (2022) conducted a study entitled "Fuzzy AHP–TOPSIS Method for Ranking the Solutions of Environmental Tax Implementation to Overcome its Barriers under a Fuzzy Environment". Ranking the barriers and solutions is a complicated multi-criteria decision-making (MCDM) problem that requires considering multiple feasible alternatives and conflicting tangible and intangible criteria. This study addresses the prioritization of solutions for environmental tax implementation by proposing hybrid MCDM methods based on the fuzzy analytic hierarchy process (Fuzzy–AHP) and the fuzzy technique for order preference by similarity to an ideal solution (Fuzzy–TOPSIS) under a fuzzy environment. Fuzzy AHP is used to determine the weight of each barrier using a pairwise comparison, and fuzzy TOPSIS is used to finalize the ranking of the solutions for more effective implementation of environmental taxes. The results showed that environmental tax reform (ETR) (S3) has the highest value among the solutions for more effective implementation of environmental taxes. The result of the proposed model is validated by performing sensitivity analysis. Gnanon (2022) conducted a study entitled "Tax Revenue Instability". The empirical analysis has suggested that non-resource tax revenue instability negatively influences non-resource tax revenue share of gross domestic product. The magnitude of this negative effect is higher in less developed countries than in relatively advanced countries. This negative effect materializes through public expenditure instability: non-resource tax revenue instability exerts a higher effect on non-resource tax revenue share as public expenditure instability increases. Finally, non-resource tax revenue instability exerts a higher negative effect on non-resource tax revenue share as economic growth volatility rises, inflation volatility increases, and terms of trade instability increase. Ouslati (2020) conducted a study entitled "Growth and Welfare Environmental Tax Reform and Public Payment Policy". This study aimed to investigate the impact of environmental tax reform and public payment policy on growth and welfare in a general equilibrium model of random dynamics in the UK economy from 2000 to 2017. This researcher uses a two-part endogenous growth model in which the interactions between health, education, and the environment are considered. This result suggests that tax reforms (to increase taxes) and a proportionate change in the structure of public payments may improve growth and prosperity in the long run. Ho et al. (2020) conducted a study entitled "Shareholder Pluralism in Board Decision-making". This study focuses on influential board decision-making capabilities in shareholder value pluralism. The results of this study show that the development of maximum tangible values for shareholders can help increase the dynamics of confidence-building at the competitive level of the capital market. Moller (2019) conducted a study entitled "The Demand for Electricity and Other Energy in Denmark" to develop green tax approaches. The study's statistical population was Denmark's industry and trade sector, which was surveyed from 1996 to 2013. In fact, the purpose of developing green tax approaches has been to examine the possibility of using environmental taxes to replace electricity as an environmental protector with other energies in eight industry sub-sectors. For this purpose, using the partially integrated VARs method, the relations of rising demand were estimated separately for the sub-sectors. The effect of changes in the relative prices of electricity and other energy inputs on their substitution was investigated. The

results show that the high demand for energy in the five sub-sectors confirms the possibility of using taxes to replace electricity with other fossil fuels. Sotoudeh Niakrani et al. (2020) conducted a study entitled "The Study of the Effect of Green Tax on Energy Consumption and Social Welfare in Iran Using the Recursive Dynamic Computable General Equilibrium (RDCGE) Method". MATLAB software was used for data analysis. The results show that along with the increase in the green tax rate if there is a positive shock to gross domestic product (GDP), the trend of increasing consumption of oil, gas, natural gas, and gasoline will decrease. Further, with the application of a 0% and 5% green tax, the consumption of fossil energy is inefficient; with the application of a 10% green tax, the consumption of natural gas and gasoline is efficient, but the consumption of oil and gas is inefficient. By applying a 20% green tax, the consumption of fossil fuels will be efficient. Along with the increase in green tax rates, if there is a shock to GDP, the process of increasing emissions will decrease; the green tax rate should be more than 10% to reduce emissions in economic growth. Therefore, among the studied scenarios, implementing a 10% green tax is the best scenario to increase social welfare. Ahangari et al. (2016) conducted a study entitled "The Effects of Green Taxes on Economic Growth and Welfare in Iran: A Dynamic Stochastic General Equilibrium (DSGE) Approach". In this study, the effect of imposing green taxes on the Iranian economy on economic growth and welfare was investigated in the framework of the New Keynesian small random dynamic stochastic general equilibrium model. For this purpose, a DSGE model has been calibrated and simulated for the Iranian economy regarding major household, enterprise, government, and foreign sector sectors. The simulation and analysis of instantaneous reaction functions of the model show that the imposition of green tax in the form of four scenarios has a very negative effect on economic growth in both the short and long term. Moreover, the results show that green tax in the form of four of the above scenarios has a small positive effect on well-being. Considering the simultaneous effects of green tax on economic growth and welfare, it is clear that if the government's approach is to increase environmental quality, reduce pollutants, and consequently, sustainable development and increase welfare, it must accept the reduction of economic production. The results of all four scenarios show that the decline in the total output of the economy and the increase in welfare are minimal.

3. Methodology

Given the existence of three primary results, the purpose and type of data in the methodology of any research should be stated. This research is considered part of developmental research because, theoretically, the concepts related to the analysis of the consequences of green tax based on the existence of pluralistic decision-making, theoretically do not have a coherent framework. Since this research seeks to develop the theoretical basis of this concept in the field of taxation, it is considered a development from this perspective. Also, based on the purpose, this research is among the descriptive research to explain the phenomenon of green taxation. Finally, in terms of logic, data collection is inductive-deductive because the qualitative part, first relying on the inductive approach, examines the theoretical foundations of green tax consequences and congestion decisions. Furthermore, the components and propositions identified in the target community are explained on a deductive basis. In this research, which is a hybrid research, meta-combination is used in the qualitative part. Meta-synthesis includes steps to arrive at components and propositions, perhaps the most important of which are the Sandlowski and Barros (2008) process steps. It covers a range of topics, from recognizing the root cause of the problem in the form of research question formulation to presenting a specific model based on identifying components and propositions from previous research results through the participation of panel members. Also, quantitatively, the most effective propositions identified through the analysis of Rough theories are determined as a hierarchical model. Then, based on Delphi analysis, an attempt is made to analyze the propositions back and forth between experts to assess the theoretical

adequacy according to the two criteria of average and agreement coefficient. Finally, in the quantitative part, through the analysis of the total roughness according to the propositions of pluralistic decision-making, the most effective dimension of green tax sustainability is selected.

3.1. Statistical population of the research

In the qualitative part, through homogeneous sampling, this research selected 15 specialists and experts in accounting at the university level to participate in determining the components and propositions based on the theoretical approach to the research topic. Also based on meta-synthesis, in this part of the research, sites such as University Jihad in Iran, Iran Database of Publications, Iran Islamic Computer Science Research Center, International ScienceDirect, Emeraldinsight reference, and OnlineLierary reference were used to determine components (consequences of green tax) and research indicators (pluralistic decision propositions). In the second phase, to explain the components and propositions of the research to the target community, 22 managers of petrochemical firms were asked to be members of the focus group; after evaluating the identified components and propositions of the qualitative section and confirming them, they should respond to the developed matrix questionnaires. In fact, since this method is an analysis based on the analysis of complex systems at certain levels and should be based on a specific criterion such as experience or expertise by participants, due to the lack of a lot of incomprehensible answers, the cross-matrix questionnaire with 15 participation takes up to 30 people. Researchers such as Zhang et al. (2016), Shyng et al. (2007), and Pawlak (2005) predicted the optimal sample size selection in the range of 15 to 25 people and based the selection of the sample population on the available sampling method according to the filters in accordance with the nature of the research.

3.2. Research validity

To confirm the validity of the constructed questionnaires, the content validity ratio (CVR) was used, based on which 10 panel members were asked to meet the three criteria of “necessary”, “evaluate useful but not necessary”, and “unnecessary” statements. Each participant had to choose one of the above three options to confirm the validity of the research; in the end, it was found that all the statements were approved above the set standard of CVR.

4. Findings

To link the consequential components of green tax sustainability and pluralistic decision-making propositions, meta-analysis is used to enter the phase of rough analysis by compiling the identified components and propositions in the form of research matrix checklists in the quantitative section.

4.1. Meta-synthesis findings

The method of meta-analysis through theoretical and research screening seeks to identify components and propositions related to the research topic. The period for analyzing similar research was from 2017 to 2020. In other words, to find similar articles and research and using international and domestic research databases and references, research works related to the research goal were identified

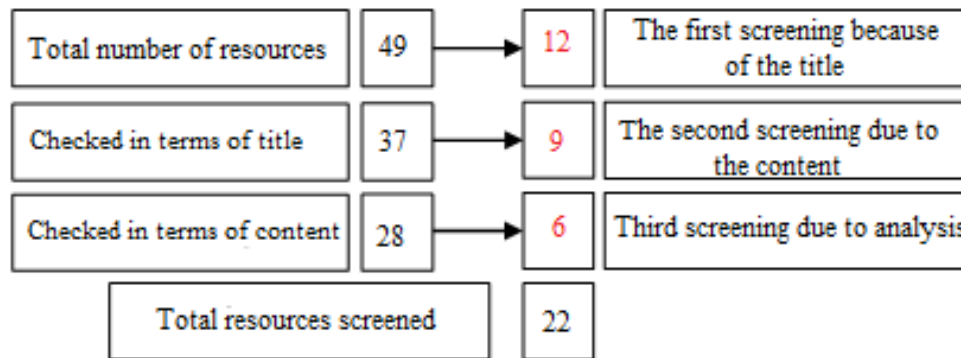


Figure 3

Screening of initial research

Figure 3 shows that all the primary sources identified are 49. After a few stages of the screening process regarding content, title, and analysis, 22 studies appropriate to this study's content, title, and analytical methods are selected. It is found that 11 studies are related to determining the components of green tax sustainability, and 11 are related to pluralistic decision-making propositions. At this stage, concepts should be broken down into components and propositions so that the most critical consequences of green tax sustainability can be determined based on the themes of pluralistic decision-making in the form of scorecards. Pluralistic decision-making propositions are attempted through the criterion of critical evaluation based on 10 criteria of research objectives, logic of research method, research design, sampling, data collection, reflectivity, accuracy of analysis, theoretical and transparent expression of findings, and research value in section A to determine the components of green tax outcome and in section B.

4.2. Identify the consequential components of green tax sustainability (A)

According to the explanations, this section identifies the consequential components of green tax sustainability with the symbol (A). Table 1 evaluates the components based on a 50-point index in the form of scores from 1 to 5 based on the 10 criteria described.

The scores presented based on the fashion index showed that the three studies were excluded because they received less than 30 out of a total of 50 points; according to the guidelines for the adequacy of the scores of this analysis, the studies with a score of 30 or higher were eliminated. The reason was removed from the investigation. Next, the components of the consequences of green tax sustainability were extracted. Accordingly, the following scoring method was used to determine the mentioned components. Based on this method, all subcriteria extracted from the text of the approved articles are written in the table column, and then the names of the approved research researchers are given in the row of each table. Based on each researcher's use of the subcriteria written in the table column, the symbol "✓" is inserted. The scores of each ✓ are added together in the subcriteria column, and scores above the average of the conducted research are selected as research components.

This analysis found that four components have the highest frequency and, therefore, are examined as outcome measures of the glass roof in this study. In this section, after analyzing the theoretical foundations of the approved research, each identified component has been defined according to Table 3.

Table 1

The process of critical analysis of screened research

Critical evaluation criteria	Researchers	Research purposes	The logic of the research method	Research plan	Sampling	Data collecting	Reflexivity	Ethical considerations	Accuracy of analysis	Theoretical and clear expression of findings	Research value	Total
		Oueslato (2020)	3	5	4	3	3	3	4	5	4	4
Zhu et al. (2020)	3	3	2	2	3	3	3	3	3	3		
Rodriguez et al. (2019)	3	4	4	4	3	4	4	4	3	4	37	
Neu et al. (2018)	2	3	2	2	2	2	3	2	2	3		
Bauer et al. (2018)	4	3	3	4	3	3	3	4	4	4	31	
Lorenzi (2017)	4	5	5	3	4	3	3	3	4	4	38	
Ghaith and Epplin (2017)	3	4	5	4	3	3	2	3	3	4	30	
Sotoude Niakrani et al. (2020)	3	4	4	4	4	3	3	3	4	4	36	
Ahangari et al. (2018)	4	5	4	4	3	4	4	3	5	4	39	
Emami Meybodi et al. (2018)	3	3	3	3	4	4	3	3	4	4	34	
Izadkhasti et al. (2018)	4	3	4	4	3	4	4	3	4	4		

Table 2

The process of determining the main components of research

Research status	Researchers	Economic growth	Pollution reduction	Increase government revenues	Tax justice	Competitive effectiveness	Social welfare
	Oueslato (2020)	-	✓	✓	-	✓	-
	Rodriguez et al. (2019)	✓	✓	✓	✓	-	✓
International researches	Bauer et al. (2018)	-	-	-	-	✓	✓
	Lorenzi (2017)	✓	-	✓	✓	✓	✓
	Ghaith and Epplin (2017)	-	✓	✓	✓	-	-
	Sotoude Niakrani et al. (2020)	✓	✓	✓	-	-	✓
Internal researches	Ahangari et al. (2017)	-	✓	✓	✓	✓	✓
	Emami Meybodi et al. (2018)	✓	-	✓	✓	✓	✓
	Total	6		8			2

Table 3

Consequential components of green tax sustainability

Components	Symbol	Definitions
Pollution reduction	A1	One of the most important consequences of applying a green tax is the reduction of environmental pollution. Because of such tax rates, companies are forced to use more efficient functions in the production of their products, and this can reduce environmental pollution. The environment is less polluted due to changes in companies' strategic approaches. In other words, taxing producers who cause environmental pollution can help improve the process and mechanisms of production, ultimately reducing these pollutants and increasing social benefits (Oueslato, 2020).
Tax justice	A2	Inequality of tax rates for taxpayers has always been one of the concerns of researchers about the issue of tax policy formulation. However, as one of the most important strategies of governments, green taxation can create social justice resulting from paying taxes through progressive tax policies and tax incentives for leading companies in the green field. In this case, the level of incentives to pursue a reduction in tax costs increases (Rodríguez et al., 2019).
Competitive effectiveness	A3	Competition is another component of green tax sustainability that indicates the competitive capacity of companies that have produced products in accordance with environmental demands and requirements based on the existence of green tax. In other words, the consequence of the effectiveness of competition due to the formulation of green taxes indicates that companies should strive to succeed in green competition by increasing their functions and production methods in compliance with the requirements of green tax while taking advantage of incentives to reduce their tax costs. Therefore, such an environment can help increase competitive effectiveness (Lorenzi, 2017).
Strengthen production infrastructure	A4	Ultimately, the consequence of green tax sustainability is strengthening production infrastructure. Due to reduced tax costs, companies and industries operating in the market must improve their machinery and technology levels. In other words, the consequence of strengthening the production infrastructure means that through green taxes, producers can use fewer technologies that cause pollution, and their energy consumption is high and move toward using the user's production process (Bauer et al., 2018).

4.3. Identify pluralistic decision propositions (B)

Pluralistic decision-making is determined in the above steps and following the critical evaluation method in this section. According to the explanations, this section identifies pluralistic decision-making with the symbol (B). Table 4 evaluates the contents of a proposition based on an index of 50 points in the form of scores from 1 to 5 based on the 10 criteria described.

Based on the fashion index, the scores presented showed that out of 13 studies related to pluralistic decision-making, 4 received less than 30 out of 50 scores. According to the guidelines for the adequacy of this analysis's score, the studies with a score of 30 or higher were approved, eliminated, and excluded from the review. Next, the research propositions are extracted. Accordingly, the following scoring method determines pluralistic decision propositions. The results confirm six information-based pluralistic/pluralism decision propositions based on the high distribution frequency. In this section, after analyzing the theoretical foundations of the approved research, each of the identified propositions is defined according to Table 5.

Table 4

The process of critical analysis of screened research

Critical evaluation criteria												
	Researches	Research purpose	The logic of the research method	Research plan	Sampling	Data collecting	Reflexivity	Ethical consideration	Accuracy of analysis	Theoretical and clear expression of findings	Research value	Total
	Guitouni (2020)	4	5	4	4	4	3	4	4	4	4	40
	Gerlick and Liozu (2020)	2	3	2	3	2	2	2	2	2	3	
	Brush (2020)	3	3	3	3	3	4	3	3	3	5	33
	Muresan (2019)	4	3	4	4	4	4	4	4	4	4	39
	Kopec (2018)	2	2	2	1	2	3	2	3	3	2	
	Dzwonkowska (2018)	4	4	4	5	4	3	4	4	4	4	39
	Turner et al. (2018)	4	5	5	3	4	3	3	3	4	4	38
	Javaheri et al. (2020)	5	3	4	3	4	3	4	3	4	4	37
	Darvish et al. (2020)	5	5	4	5	4	4	4	4	4	4	43
	Aghdas Tinat et al. (2019)	3	3	3	3	2	3	3	4	4	5	32
	Alaenejad and Haj Hosseini (2019)	4	4	3	4	4	4	3	3	4	4	37

Table 5

Congratulatory/pluralistic decision propositions

Propositions	Symbols	Definitions
Ethics in decision-making	B1	The ethicist proposition in pluralistic decision-making is an approach based on spirituality and conscience in the decision-maker who considers the priority of maintaining interests to adhere to values of ethics that depend on the individual's cultural, social, and educational characteristics. This proposition helps predict decision-making behavior and provides the basis for increasing dynamism and satisfaction in pluralistic decision-making (Morrison 2019).
Social responsibility in decision-making	B2	This statement in pluralistic decision-making is essential and is influenced by decision-makers' approaches toward maintaining adherence to social issues. In fact, increasing social values in decision-making is an approach based on the pluralism of public interests at the community and market level, the resulting benefits of which can help create more and equal social welfare (Guillotina 2020).
Stakeholder participation in decision-making	B3	According to this proposition, in pluralistic decision-making, conditions are created for stakeholder minorities to participate equally in decision-making concerning equal citizenship rights. In this dimension, decision-makers, like managers, based on stakeholder knowledge acquisition approaches, try to improve the level of satisfaction among stakeholders while meeting their needs and expectations. In fact, pluralistic decision-making creates the ground for harmony and protection of public interests of all groups (Darvish et al. 2020).
Adhere to the principles and rules in decision-making	B4	Another theme of pluralistic decision-making is following the rules and regulations and maintaining the assigned orders' authenticity. In other words, maintaining formality and not deviating from the laws and regulations causes decision-making functions to move toward more equal value creation (Javaheri et al., 2020).

Propositions	Symbols	Definitions
Reduce conflict of interest in decision-making	B5	Congestion decision-making resolves the conflict between groups, establishes justice, and distributes power among these groups, so there is not necessarily a single group in power. These are the same goals and missions the corporate governance system pursues by appointing a manager in the business units to achieve fair and equal values for the stakeholders. In other words, the existence of this approach in congestion decisions causes the mission of business units to be considered to ensure the interests of all stakeholders. For this purpose, the systems, rules, and pillars of business units should be adjusted so that the risks of the controlling company and managers are accountable for protecting the interests of minor and major shareholders and other stakeholders of the company (Darvish et al., 2020).
Legitimacy in decision-making	B6	One of the most important violations of pluralistic decision-making is the incompatibility of legitimacy with authority. In other words, power is often formed where influence is exercised illegally. The theory of pluralism occurs when the equilibrium of value equality for all stakeholders occurs when the concept of power is equated with legitimacy on the one hand and authority on the other hand. In this case, the level of congestion decisions is associated with legitimacy, authority, and accountability (Dzonkowska, 2018).

To determine the reliability and generalizability of technological startup development propositions as a set and designated components of entrepreneurial ecosystems at the university level as a reference (according to the relationships defined in the rough method), we used Delphi analysis to reach the theoretical saturation point. For this purpose, these statements and components were provided to experts in the form of a checklist of seven options for the survey, and Table 6 shows the results of the Delphi analysis.

Table 6
Delphi analysis process

Identified components	The first round of Delphi			The second round of Delphi			Result
	Average	Coefficient of agreement	Standard deviation	Average	Coefficient of agreement	Standard deviation	
Pollution reduction	5.50	0.75	0.70	6	0.80	0.95	Confirm
Tax justice	5.10	0.55	0.63	5.20	0.60	0.72	Confirm
Competitive effectiveness	5.20	0.60	0.56	5.50	0.75	0.66	Confirm
Strengthen production infrastructure	5.10	0.55	0.78	5.10	0.58	0.82	Confirm
Identified propositions	The first round of Delphi			The second round of Delphi			Result
	Average	Coefficient of agreement	Standard deviation	Average	Coefficient of agreement	Standard deviation	
Ethics in decision-making	5.50	0.78	0.84	6.10	0.82	1.002	Confirm
Social responsibility in decision-making	5.30	0.64	0.45	5.50	0.80	0.94	Confirm
Stakeholder participation in decision-making	6.00	0.80	0.55	6.20	0.85	0.63	Confirm
Adhere to the principles and rules in decision-making	5.00	0.50	0.96	5.10	0.55	0.80	Confirm
Reduce conflict of interest in decision-making	5.00	0.50	0.88	5.10	0.55	0.80	Confirm
Legitimacy in decision-making	5.20	0.60	0.67	5.30	0.65	0.69	Confirm

As it is known, all components and propositions in line with the nature of analysis and concept, due to the participation of research experts in the form of panel members, have the necessary theoretical adequacy because it is approved by all of them both in terms of scores obtained from the average and in terms of scores obtained from the agreement coefficient.

4.4. Rough set

This step is used to determine the weight of the criteria according to the separation of reference variables from member variables and to better understand and deduce more significant coding.

Table 7

Coding of components and propositions for rough analysis

Purpose	Elements	Research component codes
Consequential components of green tax sustainability	Pollution reduction	A1
	Tax justice	A2
	Competitive effectiveness	A3
	Strengthen production infrastructure	A4
Pluralistic decision propositions	Ethics in decision-making	B1
	Social responsibility in decision-making	B2
	Stakeholder participation in decision-making	B3
	Adhere to the principles and rules in decision-making	B4
	Reduce conflict of interest in decision-making	B5
	Legitimacy in decision-making	B6

According to the final weight of each component and proposition, it is determined that the incompatibility values are below 0.1, based on which the second step of the rough analysis can be entered. The next step after calculating the weight of the research criteria is to form a problem decision matrix. From the distance decision matrix, experts' opinions on each option's status in each criterion were first collected using the Vickor questionnaire presented in Table 8.

Table 8

Expert opinion on each option based on the criteria

The first participant						
	(B1)	(B2)	(B3)	(B4)	(B5)	(B6)
A1	3	4	4	5	6	5
A2	4	3	5	3	5	4
A3	4	4	3	3	3	4
A4	3	3	4	2	3	4
The second participant						
	(B1)	(B2)	(B3)	(B4)	(B5)	(B6)
A1	3	4	5	3	4	4
A2	6	4	4	4	4	4
A3	3	3	4	4	4	3
A4	2	5	4	3	4	4

* Note: Due to the limited pages of the article, only the answers of two participants are provided.

After distributing and analyzing the experts' opinions about each option's status in each proposition, a decision matrix is formed to analyze the problem. To form a problem-solving decision table, one must first turn the analysis of the opinions of 22 executives of petrochemical firms as members of the target community into quantitative numbers and distance numbers. Equations 1–6 are used to convert score analyses to distance numbers. Table 9 lists the distance decision matrix obtained from the rough method:

Table 9

Decision analysis distance analysis matrix

	(B1)		(B2)		(B3)		(B4)		(B5)		(B6)	
	Low limit (L)	Upper limit (U)	Low limit (L)	Upper limit (U)	Low limit (L)	Upper limit (U)	Low limit (L)	Upper limit (U)	Low limit (L)	Upper limit (U)	Low limit (L)	Upper limit (U)
A1	17	19	24.36	26.18	19.07	20.93	18.18	20.43	23.85	25.76	24.51	27.36
A2	14.49	16.50	21.23	22.63	18.74	20.01	20.16	23.52	25.90	28.011	25.65	28.12
A3	13.79	15.32	24	26	21.19	23.10	18	20	26.36	29.71	23.70	25.10
A4	19	21	21.49	23.19	17.27	19.13	21.13	23.64	31.8	34.17	25	28

Based on the result of the distance decision matrix, three propositions of social responsibility in decision-making were identified (B2); reducing conflict of interest in decision-making (B5) and legitimacy in decision-making (B6) are considered the most effective pluralistic decision-making propositions in the companies under study. The upper limit of these three propositions is higher than other propositions. Then, to analyze Grey Vickor, research options will be examined and evaluated. The first step in the Grey Vickor method after forming the decision matrix is to identify the values of the positive ideal (f_j^*) and negative ideal (f_j^-) in each of the criteria of the decision matrix. Table 10 tabulates the results obtained.

Table 10

Determining positive and negative ideals

	(B1)	(B2)	(B3)	(B4)	(B5)	(B6)
Positive ideal (f_j^*)	17.92	23.17	19.54	21.63	25.77	24.10
Negative ideal (f_j^-)	14.15	20.11	15.70	20.07	22.32	21.16

As can be seen, none of the propositions has a higher negative than the positive ideal, which shows the effectiveness of all propositions about the development of technological startups. Nevertheless, based on the results, it was confirmed again that three statements of social responsibility in decision-making (B2), reducing conflict of interest in decision-making (B5), and legitimacy in decision-making (B6), all as the most effective pluralistic decision-making propositions, have a higher degree of desirability than other propositions. As this result shows, the level of pluralistic values based on the above three propositions is at the level of the petrochemical firms. However, to understand the most influential dimension of the green tax outcome based on the existence of petrochemical firms' decision-making, one must rely on the Grey Vickor method as the last step. That is, based on Equations 16–19, first the

proposition, S_i^U , S_i^L , R_i^U , and R_i^L , are calculated; then, by specifying the propositions, the central propositions of Grey Vickor, like Q , determined by Equations 20–21, are used. Table 14 presents the results of the calculations.

Table 11
Analysis of Grey Vickor method propositions

Consequential components of green tax sustainability	Code	S_i^U	S_i^L	R_i^U	R_i^L	Q_i^U	Q_i^L
Pollution reduction	A1	0.460043	1.106351	0.180954	0.305327	0.184509	0.320344
Tax justice	A2	0.513540	1.253454	0.186093	0.331156	0.200483	0.402769
Competitive effectiveness	A3	0.883342	1.736200	0.276399	0.463781	0.336254	0.532264
Strengthen production infrastructure	A4	1.00473	1.846635	0.302871	0.538171	0.413540	0.690016
Assessment criteria	Propositions			S^*	S^-	R^*	R^-
	The number of propositions			0.652410	3.40561	0.503451	1

Since proposition Q represents the most important law in rough analysis, like the most crucial feature for modifying or improving the components in this study based on Table 14, it was determined that Q is related to strengthening production infrastructure (A4) and is the highest among research components. However, since, according to the Rough analysis guidelines, the lowest Q value determines the center component, which is called the inverse of Rough analysis, it was determined that the lowest component, pollution reduction (A1), is the most important component of green tax sustainability. Moreover, the importance of innovative functions of the entrepreneurial ecosystem at the university level (Y4) is in second place. In fact, this result shows that the most effective consequence is a sustainable green tax, reducing environmental pollution, which has the highest priority in terms of green tax consequences and is most strongly influenced by pluralistic decision-making propositions.

5. Conclusions

One of the most important concerns of the petrochemical firms due to the separation of ownership from management is always the difference in values and benefits between shareholders and companies. With the growth of science and social change, the sensitivity to the level of decision-making increased from the purely practical and selfish decisions of companies, and scientific approaches in this field were proposed to better understand the decision-making functions of companies; pluralistic decision-making is the level of decision-making that takes into account the interests of the maximum number of stakeholders. The existence of such values in decision-making can lead to greater interaction between the company and stakeholders. It can help increase sustainability in various areas, such as the environment, taxation, and economics (Darvish et al., 2020). This study has considered the consequences of green tax sustainability based on the themes of congestion decision-making at the petrochemical firms' level. The results showed that based on analytical processes in line with the first and second questions of the research, four macro components on the consequences of green tax sustainability and six propositional themes on pluralistic decision-making were determined through meta-synthesis analysis and systematic screening of similar research texts. Based on a weighted interpretive analysis of each of the components and propositions in petrochemical firms, it was determined that the most significant level of pluralistic decision-making in petrochemical firms is related to the three themes of social responsibility propositions in decision-making (B2), reducing

conflict of interest in decision-making (B5), and legitimacy in decision-making (B6). In fact, this result shows that the level of the most important statements from the perspective of petrochemical firms' managers to make pluralistic decisions, the existence of social responsibilities in company decisions, and disclosure of information to increase the level of commitment to social benefits play an important role in and impact increasing equality and moderation in the company's operations in the competitive environment of the petrochemical firms. While the company's responsible view of the economic, environmental, social, political, and cultural aspects is a competitive advantage at the same time, social responsibilities can help increase the level of acceptance of the company by stakeholders because the existence of social concerns such as the environment makes leading companies in the social field more popular among shareholders and investors. On the other hand, conflict-of-interest approaches in the company's decisions show the importance of stakeholders' interests and feedback to shareholders, which causes stakeholders to react more positively to the company's commitment to their interests. In fact, companies that can reduce conflicts of interest with their stakeholders in representation have a higher level of pluralistic decision-making, based on which they can provide more effective functions for petrochemical firms' trust and confidence. It was also found that legitimacy in decision-making is another factor in increasing pluralistic decision-making. Legitimacy in decision-making is a superficial parity of laws with the scope of decision-makers in companies. This can lead to increased accountability and responsibility to stakeholders through effective oversight and strengthening of their cultural and behavioral dimensions. In other words, the statement of legitimacy in congestion decision-making shows decision-making functions in conflict of interest by increasing accountability for their powers and responsibilities; they strive to promote equal values among all stakeholders. Because of the increase in green taxes, companies are trying to develop their social responsibilities to reduce emissions by strengthening the production infrastructure and to enrich social security and trust by disclosing information in the form of financial statements through insight into pluralistic decisions. In other words, pluralistic decision-making layers can contribute to the continuity of green tax by developing values from the market environment and the wants and needs of stakeholders. However, the most effective component of green tax sustainability under the three drivers of pluralistic decision-making is the reduction of environmental pollution. In other words, based on the prioritization of the consequences of green tax sustainability, it was found that reducing environmental pollution due to the pursuit of values resulting from congestion decisions will continue more consistently in the petrochemical firms. Because changing values can pave the way for changing companies' culture and performance norms about the environment. In fact, the reduction of environmental pollution is the most likely consequence of the components of green tax sustainability, which strengthens the competitive functions and infrastructure of green production; this issue reduces environmental pollution while reducing production costs such as overhead costs and depreciation costs of companies. The results obtained correspond to the works of Brush (2020), Morrison (2019), Darvish et al. (2016), and Aqhdas Tinat et al. (2019).

Based on the obtained results, it is suggested that regulatory institutions such as the National Petrochemical Company, in cooperation with other regulatory institutions, take the first step to increase the level of equal values, both from the perspective of stakeholders and sustainable development in decision-making policies and strategies. This means taking the necessary steps to adopt realistic strategies in large areas, such as green tax sustainability, by bringing the values of industry and companies active in the petrochemical firms closer together. In this way, they can increase the capacity of green tax sustainability while strengthening the production infrastructure and competitive effectiveness among companies; at the same time, it should cause the environmental pollution to be gradually reduced in the form of macro perspectives, and the environment should be maintained as a strategic resource in the sustainable economic and social development of the country through the vision

of decision-making values. On the other hand, it is suggested that companies try to gain trust and confidence by promoting timely and reliable information to stakeholders, promoting pluralist values in their decisions, and reducing the agency cost gap. One of these values, which was the focus of the results of this study, was the reduction of environmental pollution, which makes companies more and more responsible for the future due to the strengthening of pluralistic decision-making values, increasing confidence and trust.

In addition to the above controversy, there are also increasing research and policy suggestions that advocate for environmental taxes on the basis that environmental tax initiatives that increase these taxes while reducing other taxes and maintaining the same level of government revenue mobilize result in a double benefit.

Nomenclature

AHP	Analytic hierarchy process
CVR	Content validity ratio
DCGE	Dynamic computable general equilibrium
DSGE	Dynamic stochastic general equilibrium
ETR	Environmental tax reform
GDP	Gross domestic product
MB	Marginal benefits
MCDM	Multi-criteria decision-making
TOPSIS	Technique for order of preference by similarity to ideal solution

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