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Research article

Evaluation of the relationship between environmental accounting and business performance: the case of Istanbul province

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Abstract: Today, as a result of economic growth; The increase in technological developments, industrialization and population ratio brought environmental problems with it. With the increase in environmental problems, environmental awareness and the importance of the environment have improved. With the increase in environmental awareness, important developments have occurred in environmental costs and environmental accounting. At this point, businesses have had to integrate environmental accounting into their accounting systems, either voluntarily or compulsorily. Environmental accounting can be defined as the whole of the activities of determining, collecting, analyzing and reporting environmental cost information to relevant persons. The purpose of this study is to evaluate the impact of environmental accounting approaches of businesses on the overall performance of businesses. In addition, it is intended to determine the activities of the businesses being within the scope of the research on environmental issues. For this purpose, a study was carried out on businesses at Beylikdüzü Organized Industrial Zone. Multiple linear regression analysis was conducted for evaluating the relationship between the environmental accounting approaches of businesses, and the overall performance of businesses. In the analysis, the sub-dimensions of environmental accounting were addressed as independent variables, and business performance was addressed as dependent variable. The data, obtained by random sampling method, was analyzed in the SPSS 20 software package. As the result of the study, it was determined that there is a mutually significant relationship between environmental accounting, and performance. However, the environmental accounting approaches of the companies covered by the study were found to be at low level.

Keywords: business performance; environmental accounting; environment; accounting; multiple regression

JEL Codes: L25, M40, O13, Q01

1. Introduction

The businesses are establishments producing goods or services by drawing together the production factors with the purpose of meeting the requirements of the people. The businesses continuously consume the natural resources while pursuing their activities. During their activities and during consumption of their products, the environmental factors such as air, earth and water become contaminated by wastes in solid, liquid and gaseous form. Today, the consumers have become more mindful regarding environmental issues. The businesses are obliged to consider the environmental concerns since consumption of resources, scarcity of resources and environmental degradation are gradually increasing. Along with the environmental damages, an imbalance occurs at ozone layer, and on the environmental system. One of the most significant causes of environmental problems is industrialization. For this reason, first the businesses spring to mind while speaking of environmental problems. Thus, in order to ensure sustainability both the consumers and businesses have to consider the attitude of being responsible for the environment. Therefore, the businesses have begun to report more their social and environmental effects for the continuation of their commercial activities. And the businesses are obliged to compete in global economy within the frame of social restrictions characterized by gradually increasing environmental accountability. Environmental accountability covers the examination by public of businesses' environmental performance, and of disclosure of the same to public.

In this study, the effect of environmental accounting activities of the businesses, that they perform for overcoming environmental concerns, on their overall performance was evaluated. In addition, the levels of activities, that the referred businesses perform within the scope of environmental accounting, were determined. In literature, there are many studies done with respect to environmental accounting. But studies evaluating the relationship of environmental accounting and performance had not been found in the literature originating from our country. Many researchers have concluded that environmental accounting has a positive effect on financial performance. However, in the context of the various sectors of environmental accounting it has not been demonstrated to work in Turkey versatile reviewers. The importance and necessity of environmental accounting will be emphasized through this study. For this reason, working is very important. For this reason, the study also intends to fill the referred gap in literature. Businesses which operate in interaction with their environments may have negative impacts on their environment as a result of their operations. Businesses should apply environmental accounting in order to reveal these negative impacts and minimize them. Environmental accounting should be executed in an integrated manner with the environmental management accounting and the environmental cost accounting. The integrated information gathered through this activity should be taken into consideration in the decision-making process of business management.

2. Conceptual framework

2.1. Environmental accounting

Accounting is always in interaction with the environment as it is an open system. In accounting, it is required to observe not only the interests of specific persons or groups, but the interests of the whole society pursuant to the concept of social responsibility. Along with the concept of social responsibility, the concept of social responsibility accounting has emerged. Environmental accounting, forming a sub-branch of social responsibility accounting, covers the subjects of documenting, reporting and inspecting the expenditures with respect to the environment (Alagöz, and Yılmaz, 2001).

Environmental accounting covers the identification, measurement and allocation of environmental costs, and the integration of such costs with the business. In addition, it is a type of accounting covering the transmission of businesses' reports on environmental costs to their stakeholders. In this sense, a well corporate management, embracing transparency regarding businesses' social activities, is also ensured. Moreover, environmental accounting serves to present to outer world the skills of being environment friendly (Bassey et al., 2013). According to another definition, environmental accounting is an information system that generates the information clarifying the formation of environmental resources, manner of use of the resources, increases and decreases of the referred resources as the result of the activities of the organizations, and the statuses of the organizations in environmental aspect, and that transmits the same to the stakeholders (Özbirecikli, 2002).

Environmental accounting assists the accountability of the enterprises, and increases environmental transparency, and it determines the relationship of the enterprises with the society in general, and especially with environmental pressure group. Due to the ethical investment movement, the ethical investors stipulate the businesses to be environment friendly. For this reason, the businesses, being mindful about the environment, may succeed in drawing funds from "green" individuals and groups (Bassey et al., 2013). In classic accounting, the purpose is to be able to determine in monetary aspect the relationship and changes between the business' activities and economic factors, and its profit or loss statuses. Classic accounting had dealt only with the monetary aspect of activities, and had kept at the background the social costs of production and consumption, and it had not undertaken the responsibility of the factor of environment while pursuing the activities (Özkol, 1998). But contrary to that approach, environmental accounting covers environmentally-conscious production, service and trade. Another significant function of environmental accounting is decreasing and preventing the environmental costs, determining the means for increasing environmental quality, and drawing the attention to environmental costs (EPA, 1995).

The businesses' purpose in forming the environmental accounting system may be expressed as trying to decrease the costs by facilitating the environmental improvement efforts, and recording the environmental effects. But at this point it is required to consider the distinction of national level and business level. The primary purpose of environmental accounting at national level is determining the monetary values of natural resources and reflecting the same on the calculations of national income, and thus indicating the environmental information under economic information. And the purpose at business level is bringing in monetary quality for circumstances causing environmental pollution, and enabling their recording (Ergin and Okutmuş, 2007).

The areas, where environmental accounting may provide advantage at businesses, are as follows (Aymaz, 2009):

- Including the environmental problems in the inspection programs,
- Reflecting the social perception, regarding the effect of environmental problems, on the businesses' financial structures and annual accounts,
- Assisting in the inspection and examination of environmental statements and reports,
- Giving rise to theories and practices which will assist the development of environmental reports, and environmental accounting system,
- Assisting other services with respect to inspection such as environmental decision making, valuation of management systems.

2.2. Business performance

In general, performance is a measure quantitatively and qualitatively determining the outputs obtained as the result of a planned event. At enterprises, the definition and measurement of performance are uncertain (Acar, 1991). According to another definition, it is quantitatively and qualitatively revealing the consequences of a planned activity that make the enterprises attain their objectives (Öztek, 2005). Performance requires a measurement. And these measurements may be made on objective and subjective issues. The measures used while measuring the performance of the enterprises have generally focused on issues such as profitability, sales. And under the global competition circumstances of today, the performance has begun to be evaluated form a broad perspective. As performance measurement affects the strategic decision making at the enterprise, only the financial performance measurements are being insufficient in decision making at modern organizations (Yıldız, 2010). Performance of business provides the current monetary position and size of the enterprises. In addition, it provides a clue on where they want to be in the future. Thus, the areas where the businesses' resources will be directed are also determined. In other words, whether the businesses act in accordance with their purpose of presence, and in accordance with their strategic plans and programs is related to performance measurement (Grady, 1991).

Performance is a concept that varies among enterprises, and among individuals. Thus, it is required for the businesses to measure their performances in holistic manner, and to be able to analyze themselves as per the determined criteria. For this reason, evaluation of some parameters is important in terms of customers and society -getting service from the business- in order to be able to determine the performance level of a business. Briefly, the performance is evaluated as the sum of performance in terms of all the stakeholders of the businesses (Biçkes, 2011).

3. Environmental accounting and business performance

Studies on the relationship of environmental accounting and business performance are addressed in this section. Businesses are exposed to a series of environmental costs during their production activities. These costs either directly increase the cost of the related product or add an additional burden to the operating budget in order to eliminate the negative effects of the enterprise on the environment. In both cases, environmental costs have a negative impact on business profitability. Magara et al. (2015) determined that the practice constructs of environmental accounting (environmental information, environmental evaluation, conformity with environmental laws, and follow-up of environmental cost savings) were significantly related with the perceived financial performances of the businesses. Festus (2017) determined that there was a significant relationship between the environmental accounting activities and return on equity of petroleum and gad businesses. Nguyen and Tran (2019) determined that there was a close relationship between the level of revelation of environmental accounting information, and financial performance. Bassey et al. (2013) determined that the approach of environmental accounting was effective on the businesses' profitability. Homan (2016) determined that environmental accounting practices were effective on environmental and financial performance of the businesses. Mgbame and Ilaboya (2013) determined that profitability was a positive and significant determinant in evaluating the possibility of inclusion of environmental information by the businesses for external audits. Adediranand and Alade (2013) determined that there was a significant negative relationship between environmental accounting, and return on capital and earnings per share, and that there was a significant positive relationship between environmental accounting, and net profit margin and dividend per share. Che-Ahmad et al. (2015) determined that there was a significant relationship between disclosure of environmental accounting, and financial performance of businesses. Al-Tuwaijiri et al. (2004) determined that there was a significant relationship between practices of environmental accounting, and economical performance of businesses. Huseno (2018) noted in his research, however, that EMA in oil industry companies in Riau, Indonesia, caused a loss in corporate profits by as much as 15%. However, the losses will be greater if a company does not include environmental costs and EMA in its processes. Sari et al. (2020) the implementation of environmental management accounting exerted a positive effect on organizational performance. Karakuş and Erdirençelebi (2018) concluded that the green management perceptions of the enterprises and the green business functions sub-factors (production, accounting, logistics, human resources and marketing) and business performance are in a positive relationship with each other. Kaoje et al. (2020) found that environmental protection costs have a positive and significant impact on the return on equity of oil companies in Nigeria.

Despite this, Ezeagba et al. (2017) determined that there was a significant relationship between the environmental accounting disclosures, and return on equity of the selected businesses. Moreover, it had been revealed that there was a negative relationship between the environmental accounting disclosures, and return on capital and net profit margin of the selected businesses. Omnamasivaya and Prasad (2017) determined that there was a negative relationship between environmental accounting disclosures and practices, and financial performance.

4. Implementation

4.1. The purpose and significance of the research

The purpose of the research is to evaluate the relationship between the environmental accounting activities and business performance of the businesses. Thus, answers for the following questions were sought by the research;

1. *Does environmental accounting have effect on business performance?*
2. *What is the level of environmental accounting activities of the businesses?*
3. *What is the output of companies' environmental accounting activities?*
4. *What is the return of environmental accounting to businesses?*

And the hypothesis of the research is as follows;

Hypothesis 1: *There is a significant relationship between environmental accounting and business performance.*

Table 1 shows the definition of the main variables;

Table 1. Definitions of the main variables used in this study.

Variable Name	Definition	Scale	Positive effect	Negative effect
Business performance	It is quantitatively and qualitatively revealing the consequences of a planned activity.	Zerenler (2005)	Magara et al. (2015), Homan (2016), Nguyen and Tran (2019), Bassey et al. (2013), Festus (2017), Mgbame and Ilaboya (2013), Adediran and Alade (2013), Che-Ahmad et al. (2015), Al-Tuwaijiri et al. (2004), Nguyen et al. (2020)	Ezeagba et al. (2017), Omnamasivaya and Prasad (2017)
Environmental accounting	Environmental accounting covers the identification, measurement and allocation of environmental costs, and the integration of such costs with the business.	Seyitoğulları (2016)		

4.2. Sample, data collection tool, and data collection process

1,000 businesses, operating at Beylikdüzü *Organized Industrial Zone,* constitute the research's universe. In the direction of the study's purpose, a questionnaire was conducted on the executives of 214 businesses operating at Beylikdüzü *Organized Industrial Zone*. The data, obtained by random sampling method, was analyzed in the SPSS 20 software package.

A scale comprising of three sections was used in the collection of data, and *in the first section*, 4 main questions regarding the businesses were asked. In the *second section* of the scale, questions regarding business performance were asked. The scale, used regarding business performance, had been developed by Zerenler (2005). The referred scale was in the form of "1: we are much worse than our competitors" and "5: we are much better than our competitors" when the performances of the businesses were being compared with the performances of their competitors. In the *third section* of the scale, the scale developed by Seyitoğulları (2016) was used. In the referred scale, there were 20 questions intending to reveal the approached of businesses regarding environmental accounting, and there were 5-point Likert type statements. The rating system of the questions in the scale was as "1: I definitely don't agree, 2: I don't agree, 3: I partially agree, 4: I do agree, 5: I definitely agree".

4.3. Analysis of data

Regarding the analysis of data, the descriptive statistics were presented by frequently, percentage, average, standard deviation values. Multiple regression test was performed for the determination of relationship between sub-dimensions of environmental accounting, and performance. Regression analysis is the manner explaining by a mathematical formula the relationship between the dependent variable, and one or more independent variables. And the multiple regression analysis used in the research expresses the regression model of the relationship between a dependent variable, and more than one independent variable (Özcan and Ayvaz, 2015). The most general multiple regression equation is as follows as "Xi"s indicate the independent variables, and as "Y" indicates the dependent variable;

$$Y=\beta_1 + \beta_2 X_2 + \beta_3 X_3 +...+ \beta_k X_k + u \quad (1)$$

Enter method, that is being preferred considerably in literature, was used in the analysis of relationship between the variables. The data was analyzed by SPSS 20.0 statistics software package. The results of the analysis were addressed at a confidence level of 95%, and the $p < 0.05$ values were deemed as statistically significant.

4.4. Evaluation of the findings of the research

The information on the businesses, being within the scope of the study, is provided in Table 2.

Table 2. Descriptive statistics.

Variables		N	%
Sector of Business	Production	193	90.2
	Service	15	7.0
	Trade	6	2.8
	Total	214	100.0
Is your business being involved in environmental activities?	Yes	81	37.9
	No	133	62.1
	Total	214	100.0
What is the basis considered at the business for the actualization of environmental investments?	Obligation	18	8.4
	Voluntary	71	33.2
	No Investment	125	58.4
	Total	214	100.0
For how many years is your business operating?	1–7	122	57.0
	8–15	42	19.7
	16+	50	23.3
	Total	214	100.0

5. Results of regression analysis

Regression results regarding the evaluation of relationship between the environmental accounting (its sub-dimensions), and business performance are evaluated in this section.

Independent Variables:

- Planning and Costing
- Responsibility and Image
- Sustainability
- Certification and Qualification
- Environmental Consciousness

Dependent Variable: Business Performance

Table 3. Exemplary statistical results.

	Average	Standard Deviation	Observation
Performance	2.9393	0.50857	214
Planning and Costing	3.2196	0.45735	214
Responsibility and Image	3.1706	0.54665	214
Sustainability	3.2418	0.42987	214
Certification and Qualification	2.9907	0.52174	214
Environmental Consciousness	2.7620	0.42689	214

In Table 3, the statistical results of the relationship of dependent variable and independent variables are indicated. According to the results, it was determined that the average performance value of 214 businesses, included in the study, is 2.93. This result indicates that the performances of the businesses, included in the research, are at midlevel.

Table 4. Summary of model.

Model	R	R^2	Corrected R^2	Standard Deviation
1	0.579[a]	0.335	0.322	0.41872

a. Predictors: (Constant), Performance, Planning and Costing, Responsibility and Image, Sustainability, Certification and Qualification, Environmental Consciousness.

Coefficient of determination (R^2) indicates how much of the change on dependent variable is expressed by the independent variables. As the result of the analysis, the model's value of coefficient of determination (R^2) is 0.335, and the referred finding indicates that performance indicators are expressing 33% of the environmental accounting level (Table 4). And the remaining part of 67% is able to be expressed by the variables that had not been included in the model via error term (εi).

Table 5. ANOVA[b].

Model	Df	F	P
Regression	4	26.305	0.000[a]
Residual	209		
Total	213		

a. Predictors: (Constant), Performance, Planning and Costing, Responsibility and Image, Sustainability, Certification and Qualification, Environmental Consciousness.

b. Dependent Variable: Business Performance.

And the value F expresses the ratio of change of regression to the change of error term (Akgül, and Çevik, 2003). As observed in Table 5, p value is p: 0.000 at a confidence interval of 95%, and as the result of the analysis, it was determined as statistically significant. According to this finding, it was determined that there is a close and linear relationship between the performance indicators included in the model, and environmental accounting activities. Thus, the hypothesis H1 was accepted.

Table 6. Regression estimation coefficient[b]

Model	Non-standardized Coefficients		Standardized Coefficients	T	P
	B	Standard Error	Beta		
(Constant)	0.902	0.274		3.287	0.001
Planning and Costing	−0.004	0.067	−0.004	−0.066	0.947
Responsibility and Image	0.031	0.062	0.033	0.503	0.615
Sustainability	0.162	0.083	0.137	1.959	0.051
Certification and Qualification	0.477	0.062	0.490	7.656	0.000
Environmental Consciousness	0.321	0.65	0.432	2.455	0.075

b. Dependent Variable: Business Performance.

As observed in Table 6, the value B, the constant in the model, was determined as 0.902. The referred value indicates the performance level of the businesses, included in the research, even if the values of independent variables of the model established are zero. In order to evaluate the amount of effect of each of the independent variables, the section of "Coefficients" in the output should be examined (Akgül, and Çevik, 2003). When the P value of the variables are considered at a significance level of 5%, while the variable of perception of environment is significant (−0.004), and the variable of environmental requirement is significant (0.062), the other variables are not significant.

It is required to convert the model of output estimated for the performance to the form of multiple regression model being within the scope of the research. In accordance with the purpose of the study, the output model of the business performance may be established as follows;

Business Performance = −0.902−0.004 Planning and Costing + 0.031 Responsibility and Image + 0.162 Sustainability + 0.477 Certification and Qualification + 0.321 Environmental Consciousness

By this formula, the profitability of business may be estimated by the use of degree of practice of environmental accounting, and values of business performance.

6. Conclusions

The businesses are obliged to be responsible for the environment in which they are present in order to stand in the market, and to drive profit under the increasing fierce competition conditions. Environmental accounting intends to maintain positive relationship with the society, pursue effective and efficient environmental protection activities, and ensure sustainable development. It is required to have harmony between the needs of the consumers, and environmental consciousness of the business while pursuing its activities. In this study, the relationship between the concept of environmental accounting, which is very important for the businesses, and the performances of the businesses was investigated.

According to the results of the research, it was determined that there is a close and linear relationship between the performance indicators included in the model, and environmental accounting activities. In literature, there are various studies on this subject reaching the same conclusion. Similarly, Magara et al. (2015), Festus (2017), Nguyen and Tran (2019), Bassey et al. (2013), Mgbame and Ilaboya (2013), Che-

Ahmad et al. (2015), Al-Tuwaijiri et al. (2004), and Omnamasivaya and Prasad (2017) had also determined that there is a positive relationship between environmental accounting, and business performance. Homan (2016) had performed a study for evaluating the effect of environmental accounting on the environmental and financial performance of hotels. As the result of the study, it had been determined that environmental accounting practices were effective on environmental and financial performance of the businesses. Che-Ahmad et al. (2015) had researched the effect of environmental accounting on the financial performance of businesses in Nigeria. Consequently, it had been determined that there was a significant relationship between disclosure of environmental accounting, and financial performance of businesses. Ezeagba et al. (2017) had researched the relationship between the financial performance and environmental accounting disclosures of food and beverage businesses in Nigeria. As the result of the research, it had been determined that there was a significant relationship between the environmental accounting disclosures, and return on equity of the selected businesses. Moreover, it had been revealed that there was a negative relationship between the environmental accounting disclosures, and return on capital and net profit margin of the selected businesses. Nguyen et al. (2020) identified factors that impact on the environmental information disclosure such as government pressure, stakeholders' pressure, view of company managers, firm size, community pressure, business sector, profit and financial leverage. Two independent variables (profit, financial leverage) have the negative effect. However, Chaudhry et al. (2020) concluded that environmental accounting mediates the relationship between environmental innovation and financial performance positively. Deb et al. (2020) found that the better the green accounting practices, the higher the performance of the banks. Similarly, Mayndarto and Agustine (2021) concluded that environmental accounting has a positive effect on financial performance. Thus, the study is supporting the literature. Another result of the study is that the levels of environmental accounting activities of the businesses in the sample are at very low level. Therefore, trainings and seminars, that will make the businesses comprehend the importance of environmental accounting, may be organized. Professional associations need to organize seminars and conference to help managers and accountants raise awareness, and establish a learning mechanism about "environmental accounting". In addition, the government and various institutions may provide tax credit that will encourage environmental reporting. Businesses are exposed to a series of environmental costs during their production activities. These costs either directly increase the cost of the related product or add an additional burden to the operating budget in order to eliminate the negative effects of the enterprise on the environment. In both cases, environmental costs have a negative impact on business profitability. Businesses have become increasingly aware of the environmental implications of their operations, products and services. Environmental risks cannot be ignored, they are now as much a part of running a successful business as product design, marketing, and sound financial management. Poor environmental behaviour may have a real adverse impact on the business and its finances. Unless social and environmental accounting is formally recognized, firms will continue to view it as a means to convey information that enables them to manage their reputation without actually making any real efforts to improve the environment. Corporate organizations on their part should ensure that they comply with the environmental laws of the nation as it will go a long way in enhancing their performances. As a result, many researchers in the literature concluded that environmental accounting has a positive effect on financial performance. Similar results were obtained in this study. This study is quite important in terms of environmental accounting to show the activities of the companies operating in various sectors in Turkey. In addition, this study emphasized the importance and necessity of environmental accounting for companies. As can be seen in Turkey are required to make activities more sensitive to the environment. The tool for this is to integrate environmental accounting into company activities.

Restrictions of the research, and suggestions for future studies

The restrictions of the research are generally the limit of time, and lack of number of samples. In the future researches, levels of environmental accounting at all the businesses in Istanbul may be evaluated by extending the number of samples. In addition, the businesses in various provinces may be included in the research, and differences among them may be revealed. Moreover, by extending the performance scale, the change of relationship and performance of each may be revealed not only for a year, but for many years.

Conflicts of interest

The authors declare that there are no competing interests.

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