



"Sustainability accounting methods and firm performance"

Mariam Ismail (Management: Accounting) and Hassan Ouda (Professor): The German university in Cairo

Student email: mariam.helmy@student.guc.edu.eg . Supervisor email: hassan.ouda@guc.edu.eg

Introduction:

First and foremost ,the sustainability accounting have three dimensions which are the environmental, the social and the economic.

There are three general methods for the sustainability accounting which are the Sustainable cost and full cost accounting, Natural capital inventory accounting and Input-output analysis.

In this thesis the main focus is on the enviromental pill.

The four methods to calculate the enviromental costs in this dimension which are the method of cost avoidance, The restoration method, The contingent valuation method and finally The cost damage method.

The main aim behind this thesis is to discover which of the previous methods is the best to reflect the enviromental costs in the financial statements.

Literature review:

The sustainability accounting merges the environmental ,economic and social aspects for the functions related to the firms and focusing on problems related to them.

In the 20th century the principle of general sustainability accounting

The sustainability accounting has three general diverging methods.

The first is the sustainable cost and full cost accounting which represents imagined value to return the planet to its original condition to maintain an effect on the firm.

It converts the sustainable effects to being generally familiar and acquiring the professional language of money.

The second method is the national capital inventory, it issues economic and manual estimation of stocks of natural capital that contain the data about the circumstances of the ecosystem.

The third method is the Input-output analysis its reports include the circulating of manual matters and inserting of energy ,outcomes and the physical items.

In the environmental pill has four methods to calculate the environmental costs.

The first method is the cost avoidance method, Its not shown on the statement of condition ,doesn't cause any net change and not allocated to the bottom line.

Shown by "The firm's top management (TOP)" which reveals the general company objectives.

Cost avoidance is seen as a general classification enclosing expenses which are excluded.

The second is the restoration technique, Its main aim is the obligation of the polluting firm to decline the bad impact it has on its tasks.

The restoration method cost-effectiveness can be achieved by examining the cost per number of living people or per number of grown seeds or by the possibility of meeting certain success approach.

The third method is the contingent valuation technique, Its built on questioning of people by for example interviews their own evaluation of natural products through the contingent market plan.

This method was highly recommended by professionals in the economic segment in the "National Oceanic and Atmospheric Administration" .

The cost method of damage represents the last technique in calculating the environmental costs.

It tracks the improvement of hazardous wastes since their supply up to the last effect.

The costs of assets linked to the pollution either the direct cost or indirect costs is the interpretation of damage costs approach.

The damage cost method predicts that either action in the attitude are no longer productive or there are no actions towards the exchanges in nature.

The cost damage method can be illustrated by the economic model called household production model



The Cost Avoidance Method:

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.663	.669	6

The Restoration Method:

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.762	.769	6

The Contingent Valuation Method:

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.867	.866	6

The Damage Cost Method:

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.797	.798	8

Problem statement:

The main problem of the research is it is not clear which method from the previously mentioned four environmental cost calculation is considered the best method that reflects the environmental costs in the financial statements. The research question is: Which method of the four methods can be considered as the best method to reflect the environmental costs in the financial statements? Therefore, in this thesis the aim is to investigate in details the previously stated research question and find the best method. The environmental accounting dimension perspective represents the research limitation of this thesis.

Methodology:

It will be discovered the most optimum method that will reflect the environmental costs in the financial statements. Firstly, an online questionnaire was prepared and distributed among 43 respondents using google form. Then, the gathered data from the respondents and downloaded into an excel sheet. Afterwards, the excel sheet is imported into SPSS software to analyze the data. In this study , the independent variables are the cost avoidance method, the restoration method, the contingent valuation method and the cost damage method and dependent variable of the study which is the environmental costs. It will analyzed the effect of each independent variable from the four on the environmental costs. Descriptive analysis will be performed containing reliability tests for each method to determine its acceptable level of reliability based Cronbach's Alpha value .Frequency analysis was performed for each question. Finding analysis was performed as the correlation analysis tests which considered vital as it is essential to run the simple linear regression and this correlation analysis will be based on the variables in the hypothesis. Afterwards the simple regression model was performed as well between each independent variable and the dependent variable based on the four main hypthesis.To determine the best method to reflect the enviromental costs based on the R² value.

Independent Variables:

- 1)Cost avoidance method
- 2) Restoration Method
- 3)Contigent Valuation Method
- 4)Damage cost Method

Results:

Hypothesis 1: The method of cost avoidance is the most method that reflects the environmental costs.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.625 ^a	.390	.375	.41611
a. Predictors: (Constant), Cost avoidance method				

Hypothesis 2 : The method of restoration is the most method that reflects the environmental costs.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717 ^a	.514	.502	.37140
a. Predictors: (Constant), Restoration Method				

Hypothesis 3: the method of contingent valuation is the most method that reflects the environmental cost.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.736 ^a	.542	.531	.36067
a. Predictors: (Constant), Contingent valuation method				

Hypothesis 4 : The method of cost damage is the most method that reflects the environmental costs.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661 ^a	.437	.424	.39971
a. Predictors: (Constant), Damage cost method				

1) R² of the cost avoidance method =0.390=39%

2) R² of the restoration method =0.514 =51.4%

3) R² of the contingent valuation method =0.542=54.2%

4) R² of the cost damage method =0.437=43.7%

Practically speaking, the best method to reflect the environmental costs in the financial statements is the contingent valuation method as it has the highest R² which means it is the most accurate method.

References:

1. Wortley, L., Hero, J. M., & Howes, M. (2013). Evaluating ecological restoration success: a review of the literature. *Restoration ecology*, 21(5), 537-543.
2. Dietzel, A., & Maes, J. (2015). Costs of restoration measures in the EU based on an assessment of LIFE projects. *Report EUR 27494 EN*.
3. Kimball, Sarah & Lulow, Megan & Sorenson, Quinn & Balazs, Kathleen & Fang, Yi-Chin & Davis, Steven & O'Connell, Michael & Huxman, Travis. (2014). *Cost-effective ecological restoration*. *Restoration Ecology*. 23. 10.1111/rec.12261
4. Dickie, M. (2003). *Defensive behavior and damage cost methods*. In *A primer on nonmarket valuation* (pp. 395-444). Springer, Dordrecht.
5. Seo, K.-K & Park, Ji-Hyung & Jang, Dong-Sik. (2001). *Optimal Disassembly Sequence Using Genetic Algorithms Considering Economic and Environmental Aspects*. The International Journal of Advanced Manufacturing Technology. 18. 371-380. 10.1007/s001700170061.
6. Hoevenagel, R. (1994). An assessment of the contingent valuation method. In *Valuing the environment: Methodological and measurement issues* (pp. 195-227). Springer, Dordrecht.
7. Bateman, I. J., & Turner, R. K. (1992). *Evaluation of the environment: the contingent valuation method* (Vol. 92). Norwich and London: Centre for Social and Economic Research on the Global Environment.
8. Workgroup, N. B. (2007). Benchmarking Cost Savings & Cost Avoidance. *National Association of State Procurement Officials*.
9. Wang, J., Chao, M., Lin, G., Gao, C., & Liu, D. (2015, November). Methods research to calculate equivalent of environmental cost in power industry. In *2015 International Symposium on Material, Energy and Environment Engineering* (pp. 263-266). Atlantis Press.
10. Ellram, L. M., & Tate, W. L. (2021). Cost avoidance: Not everything that counts is counted. *Journal of Business Logistics*, 42(4), 406-427.
11. Ruijs, A., Vardon, M., Bass, S., & Ahlroth, S. (2019). Natural capital accounting for better policy. *Ambio*, 48(7), 714-725.
12. Akdoğan, H., & Hicoryulmaz, E. (2015). The importance of the sustainability of environmental accounting. *Journal of Economic Development, Environment and People*, 4(2), 6-20.
13. Aminpour, P., Gray, S., Richardson, R., Singer, A., Castro-Diaz, L., Schaefer, M., ... & Chikowore, N. R. (2019). Perspectives of scholars on the nature of sustainability: a survey study. *International Journal of Sustainability in Higher Education*.
14. Ball, A., Grubnic, S., & Birchall, J. (2014). Sustainability accounting and accountability in the public sector. In *Sustainability accounting and accountability* (pp. 194-214). Routledge.
15. Bebbington, J., Unerman, J., & O'dwyer, Brendan (2014). *Introduction to sustainability accounting and accountability* (pp. 21-32). Routledge.
16. Bennett, M. D., Schaltegger, S., & Zvezdov, D. (2013). *Exploring corporate practices in management accounting for sustainability* (pp. 1-56). London: ICAEW.
17. Hecht, J. E. (1999). Environmental accounting. Where we are now, where we are heading. *Resources*, 135, 14-17.
18. Hernádi, B. H. (2012). Green accounting for corporate sustainability. *Theory, Methodology, Practice*, 8(2), 23.
19. Hopwood, A., & Unerman, J. (Eds.). (2010). *Accounting for sustainability: Practical insights*. Earthscan.
20. Jasch, C., & Stasiškieñė, Ž. (2005). From Environmental Management Accounting to Sustainability Management Accounting. *Environmental Research, Engineering & Management*, 34(4).