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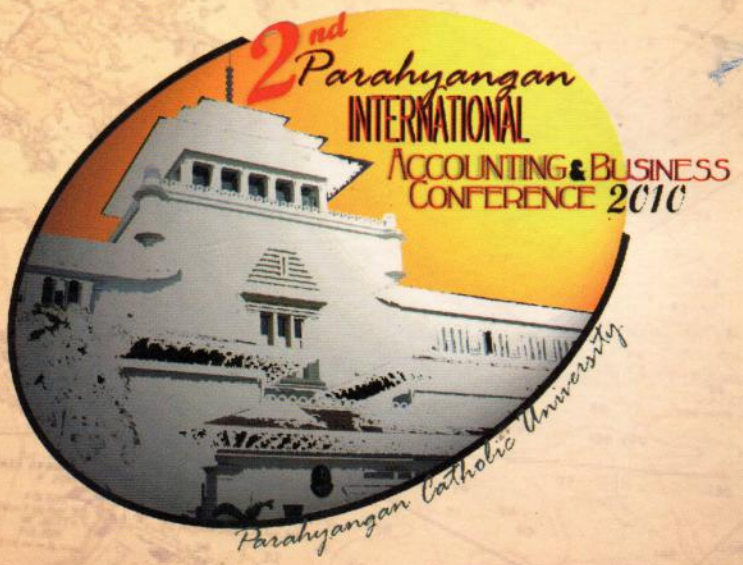

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ABSTRACT

The possibility of costly disruption from rapid climate change calls for greater attention to carbon management and accounting in the decision making process (Ratnatunga, 2008). The study on how organization uses carbon cost accounting information for their decision making is very important. This study investigates the effect of carbon cost accounting data and its information display on the attentions of decision makers and investment decision. By using combination of balance scorecard (BSC) and carbon cost accounting (CCA) information, the research aims to examine whether the incorporating CCA data into a BSC, called the SBSC, affect on carbon efficient investment.

This research is experimental study. Samples are participants consisted of undergraduate students, graduate students, and graduate. Participants have a variety of professions in accordance with the design of research for investment decisions. Participants were randomly assigned into one of three conditions in between-participants design, and then they chose between two investments using BSCs. The three conditions are: no environmental data (as control variable, called the traditional BSC); CCA data added to a BSC as a fifth perspective standalone; CCA data embedded within the traditional BSC (there is one CCA perspective embedded within four traditional BSC perspectives). By using One Way Anova, Two Way Anowa and Independent sample t-test, the hypotheses were tested.

The findings show that the carbon efficient investment was greater with the four-perspective SBSC (CCA data embedded within the traditional BSC) and five-perspective (CCA data added to a traditional BSC as a standalone perspective) rather than traditional BSC. There is no difference between four-perspective SBSC and five-perspective SBSC in the carbon efficient investment choice. Furthermore, the cognitive effort to choose carbon efficient investment was greater with both four-perspective SBSC and five-perspective SBSC rather than BSC. Finally, the finding shows that the knowledge of participants does not influence the carbon friendly investment.

Key Words: Balance Scorecard, Sustainability Balance Scorecard, Carbon Cost Accounting Information, Carbon Efficient Investment, Information Display

I. INTRODUTION

The Kyoto Protocol constitutes an amendment to the UN Working Framework Convention on Climate Change (UNFCCC), and also an international agreement on global warming. Countries which ratify this protocol commit to reduce emissions of carbon dioxide and five other greenhouse gases, or cooperate in emissions trading if they maintain or increase the amount of emissions of these gases, which has been linked to global warming. If successfully implemented, the Kyoto Protocol is predicted to reduce average global weather between 0.02 °C to 0.28 °C in 2050 (http://id.wikipedia.org/wiki/Protokol_Kyoto). One article in the Kyoto Protocol states that the importance of changing behavior to the concept of environmental economics. Whether we are conscious or not, today economic activity and human consumption have become a major causal factor of global warming.

Meanwhile, the influence of global warming on human life has led to a series of serious action from the world community as efforts to prevent global warming effects more broadly. Kyoto Protocol, which has been signed and ratified by most countries in the world are key to change for the world community. The protocol stated that the protocol ratifying governments, enterprises and consumers should immediately make efforts to a behavior change toward a new economic concept, i.e. the era of environmental economics which is called as "Carbonomics" by Ratnatunga (2008, p.1). Carbonomic era ideas will be able to become the motor of environmental protection and save the world from the problem of increasing global warming. The implications of the adoption of the Carbonomic concept will also affect on the socio culture development, professions and economic model.

Another recommendation of the Kyoto Protocol is the recognition of carbon trading schemes. This trade model can be described as follows: companies initially did a deal (most

likely through the regulation of the government) about how much Carbondioksida (CO2) to be generated by their production (the Cap). If certain firms in producing goods or services produced CO2 emissions less than the maximum limit (the cap), they have a credit score, on the contrary, if a particular company exceeds the threshold limit CO2 emissions, then they can buy credits from companies that have emissions below the threshold. The amount of accumulated carbon emissions Limit within a region should not exceed the amount of maximum accumulation limit that has been established (Ratnatunga, 2007).

The important meaning of the implementation of carbon trading in accounting is the emerging of the idea of controlling carbon cost, termed as carbon cost accounting (CCA), in the production. Companies need CCA management to control carbon emissions due to their production activity. If carbon emissions can be controlled to limit the permitted threshold, then it is a strategic advantage for future product development.

The issue of the CCA is a phenomenal thing for sustainable living, considering the impact of carbon emissions which are not controlled can cause severe environmental damage. Therefore, research on the CCA is an interesting issue for economic development and ecological sustainability. Some researches on the impact of the Kyoto Protocol and carbon cost management have been conducted by several researchers. Löschel and Zhong Xiang Zhang (2002) examine the impact of the Kyoto protocol on environment conservation due to the unwillingness of US to ratify the Protocol. But their results showed that the Kyoto Protocol contributed significantly to the reduction of gas emissions in industrialized countries. Driesen (2007) examines the impact of carbon trading in the international market for sustainable energy development. The result of the study done by Driesen (2007) show

that the international carbon market contributes very little to the development of sustainable energy.

In Indonesia, some research on the CCA has been done before by Jafar S., and Lisa K., (2009a, 2009b). The result of the first study (2009a) shows that management control systems, production management, and corporate governance practices are important variables that affect the practice of carbon accounting. A second study (2009b) showed that Environmental Paradigm affected on the Carbonaccounting Paradigm and Carbon Accounting Standards.

Unfortunately, in accounting, there is still very little research that investigates issues of the CCA, even more about the carbon cost accounting reporting model, and the impact of carbon cost accounting data for decision making. Epstein J., Marc, and Martin Freedman (1994); Hackston, D. and M. J. Milne, (1996); Salomone, Roberta and Giulia Galluccio, (2004); and Jafar S., and Dian Tanila K., (2009c) has conducted research that identified a variety of environmental information reported in the capital market; the factors that affect the environment; and the impact of disclosure of environmental reporting for the value of the company in the capital market. In general, some researchers above make recommendations about the importance of research that explores the model of environmental data reporting in the annual report. The problem is, there hasn't been any general aggreement on the environmental data display model integrated with the financial reporting. This happens because, (1) in some countries, enforcement of environmental reporting is different, some are voluntary and some are mandatory as in some European nations, (2) lack of similarity measures between environmental performance and financial performance.

Therefore, the importance of environmental reports (CCA) is still internally for management purposes.

In connection with the idea of environmental reporting model for management, the Balance Scorceard (BSC), which was initiated by Kaplan and Norton (1992), can mediate various information that has units of different data sizes for the benefit of performance measurement and corporate strategy (Campbell, et al., 2002; Silva and Prochnik , 2005; Hibbets, Aleecia R., 2006; Malina, Mary A., and Frank H. Selto, 2001; Marcela Porporato, 2009, Tayler, William B., 2009). Alewine, and Dan N. Stone (2009) later conducted a study that tested the effect of environmental data in the BSC on attention and investment decisions. Based on the researches above, this study was conducted to test the effect of CCA in the BSC data for investment decision making. Specifically this study is to reveal the effect of CCA in the BSC data against 1) the attention of participants in the investment-friendly carbon (carbon friendly investment (CFI), and 2) tendency of participants to opt for carbon friendly investment more.

This research is experiment study with the use of environmental data information, methods and analysis tools that are different from research of Alewine, and Dan N. Stone (2009). The environmental data used in this study is CCA data integrated in the BSC, while the method of data collection is performed manually (Questionnaire). This method differs from the Alewine, and Dan N. Stone (2009) that uses the help of software Visual Web Developer 2008 Express to simulate an investment choice based on the concept of integration of environmental data in the BSC. The analysis method used is Anova, Two Way ANOVA and independent sample t-test to examine the hypotheses.

The important contribution of this research is the integration of CCA data in BSC information that can be used as a strategic decision, like investment. In the field of management accounting and accounting information system, the results of this research is very important for the development of corporate strategy for achieving sustainability green economy.

II. HYPOTHESES DEVELOPMENT

Carbon accounting and strategic factors in management accounting

The impact of carbonomics idea has served in various professions, including the accounting profession. This is because the field of accounting, particularly management accounting, finance and audit, whether directly or indirectly affected by such Carbonomics era. Conversely, strategic readiness in the field of management accounting practices will encourage the acceleration of carbonomics lifestyle readiness in the company

In the next stage, the carbon accounting era will evolve if it is supported by a variety of accounting systems and adequate engineering. An idea to connect the product with the efficiency of CO2 need to have the support and concern seriously, because an idea in the efficiency of CO2 emissions is an action to rescue the world. This is the significance meaning of carbon accounting in the profession development and accounting engineering in the world situation which is struck by the anxiety caused by global warming.

A key element in Carbon accounting is the efficiency of greenhouse gas emissions, especially CO2 (the largest gas generated by human activities), associated with the manufacturing and supply of goods and services. Research of Ratnatunga (2007) conducted during 2003 to 2007 also concluded that important factors associated with the efficiency of

carbon, such as regulations from the government or the authorities that regulate the accounting standards of carbon trading system application.

Balance Scorecard

BSC is a multi-dimensional tool in the accounting system to evaluate performance and analyze alternatives with particular focus on the achievement of company strategic goals (Kaplan and Norton, 1992). Traditionally, this can be achieved by combining four perspectives of the BSC: financial, customers, internal business, and innovation / growth and learning (Kaplan and Norton, 1992). Each perspective is important in achieving the organization's success, and every parameter in BSC perspective reflects the conditions and special considerations. Metric data includes financial measures, and non-financial measures that include qualitative and non-monetary dimensions of performance that are not found in traditional financial performance measures.

Scorecards are commonly used to evaluate the performance (Dilla and Steinbart, 2005; Lipe and Salterio, 2000), but some managers also use the scorecard to evaluate future investment decisions (Bible et al. 2006). For example. Fink et al. (2005) suggested that the BSC can be used to develop future strategies by including internal resources scenarios and external markets, and then use these data to analyze business decisions may be taken. Milis and Mercken (2004) proposed a multi-step evaluation approach, which incorporates the BSC to evaluate major information and communication technology investment.

BSC can bridge the wide variety of different data metrics (Tayler, William B., 2009) such as financial data (in dollars), Human Resourches data (in the level of education), or unique environmental data (eg, in tons, parts per million, and so forth). The uniqueness of environmental accounting information and non-traditional metric data is its ability when the

data is combined with financial data in decision making. The uniqueness is recognized when the business has strategic objectives other than finance (Campbell, et al., 2002) such as environmental liabilities. Bassen et al., (In Alewine, and Dan N. Stone, 2009) conducted a case study on Siemens companies about the implementation process and the use of BSC for capital investment decisions. They found that the scorecard can be used with a mix of nontraditional data and are not familiar with traditional financial data for the benefit of long-term capital investment strategy.

BSC Versus SBSC

This study, first predicts the comparison between the traditional scorecard (BSC) with a scorecard that included CCA data in the Balance Scorecrad (Sustainability Balance Scroecard (SBSC)). Additional environmental data in the BSC may raise concern because of relevant data for decision making (Alewine, and Dan N. Stone, 2009), ie, someone will be more selective in information processing. Therefore, the hypothesis which has been developed is:

Hypothesis 1: When evaluating the scorecard data for companies that emphasize goals of financial success and environmental responsibility together, someone will use the cognitive effort more in understanding scorecards company that contains CCA data (SBSC) than the scorecard companies that do not contain CCA data (BSC).

Hypothesis 1 tests whether attention in the scorecard increase when CCA information is added. If the CCA data is relevant data, then SBSC can improve the relatively attention on BSC, the environmental information in the SBSC also improved the carbon friendly investment. In other word, attentionn to the CCA data should also be able to increase the investment value in the matrix of SBSC. Thus, the second hypothesis which

states whether the SBSC can improve the investment compared to the BSC can be stated as follows:

Hypothesis 2: when evaluating corporate scorecard that emphasizes two strategic goals, financial and environmental performance, a person will base carbon friendly investment decisions on the SBSC data than the BSC data.

Four vs. Five perspective SBSC

Refers to the cognitive theory of cost and benefit, presenting the information will affect the decision process, attention and choice of decision maker in line with the direction wished to be achieved by decision-makers. BSC data structure is the main focus in this experimental research models. BSC literature states that the BSC reporting structure will affect the decision-making (Lurie and Mason, 2007). Referring to Alewine, and Dan N. Stone (2009), there are two approaches in presenting the data structure of the BSC, namely: the fifth perspective added, such as environmental data (in this case CCA data) in the traditional BSC, and entry of CCA data in one unity of four perspectives of BSC. The debate over these two structures lies in the question of whether the separation of environmental data as the fifth perspective will be a benefit in the analysis of overall BSC (Alewine, and and N. Stone, 2009). The use of five perspectives of SBSC will enhance the cognitive effort of a person compared with the use of four perspectives (with CCA data included in the four of other BSC perspectives data). Based on the facts, the third hypothesis is proposed:

Hypothesis 3: When evaluating an investment with a panel of SBSC, individuals will expend more cognitive effort on SBSC five perspectives than SBSC four perspectives.

By the same analogy, the difference in the value of Carbon Friendly Investment may also occur in SBSC five perspectives (with the CCA perspective separated into fifth

perspective) compared with SBSC four perspective (CCA perspective are embedded in the traditional BSC) (Alewine, and and N. Stone, 2009). Thus, the fourth hypothesis is presented as follows:

Hypothesis 4: When evaluating an investment with a panel of SBSC, individuals will make more carbon friendly investment on SBSC five perspectives (CCA data added) than SBSC four perspectives (CCA data embedded).

The impact of the knowledge level of decision making

Alewine, and Dan N. Stone (2009, p. 21) states that the limitations of their research is the absence of testing the effect of knowledge level of participants to the carbon-friendly investment decision. Decisions can be different if someone involved in decision-making has a different background such as experience and knowledge. By developing the idea and shut the research limitation done by from Alewine, and Dan N. Stone (2009), this study is to examine the influence of knowledge (measured by educational level) of carbon-friendly investment decision. However, relations between the two variables is not directly so. In this case, knowledge can be viewed as a moderator variable for interaction between BSC information (traditional BSC, BSC 5 perspective and BSC 4 Perspective) by making an investment decision. That means the higher one's knowledge will increase one's beliefs in making investment decisions. Thus, the hypothesis was developed, as follows:

Hypothesis 5: there is the interaction effect of display BSC (traditional BSC, SBSC 5-perspectives and SBSC 4-perspectives) and knowledge on the carbon-friendly investment decisions.

III. RESEARCH METHOD

This research is experimental study, which involves the control variables (traditional BSC). Adopting from Alewine, and And N. Stone (2009), the first step is selected by random sample to be determined which participant belongs to one of three conditions : 1) participant in the analysis of the traditional BSC, 2) participant in the analysis of SBSC five perspectives, and 3) participant in the analysis of the SBSC four perspectives.

Each participant in each condition is faced with the BSC data under respective conditions and asked to determine the number of investment funds to be allocated in A or B investment. The total number of investment is $ 20,000,000 with two company strategic objectives; there are investment in the production factors that generate financial performance and high environmental performance (measured in efficiency of carbon emissions for each perspective of BSC).

Each participant is only allowed to fill the data according to selected cases. Carbon friendly investments and attention on the environmental data is the dependent variables, while the independent variables are the three conditions of BSC. Thus there are three independent variables; 1) traditional BSC with four perspectives, 2) BSC with the addition of CCA data as a fifth perspective (SBSC with five perspectives) and 3) BSC with CCA data embedded in the four perspectives (SBSC with four perspectives).

Tests are conducted using one way ANOVA and two way ANOVA, to figure out the effects of the BSC information and knowledge on the investment and attention to CCA data. The attention variable was measured using the intensity dimension of cognitive effort (Bonner and Sprinkle, 2002), by modifying the questionnaire developed by Cacioppo, et al., (1984). Eighteen items used by Cacioppo, et al., (1984) are summarized within three items

correspond to the object of research (CCA data display in the BSC). The three items are 1) the complexity of data, 2) the need to think and analyze about the data and 3) a genuine (serious) effort to understand the data. BSC conditions model adopted and expanded from Alewine, HC., and Dan N Stone (2009), which modifies from Banker, Chang, and Pizzini (2004), Garrison, Nooren and Brewer, (2006), and Libby, Salterio, and Webb (2004). Unlike Alewine, HC., and Dan N Stone (2009), the study does not use Visual Webb Developer software 2008 to obtain data, but developed in the form of manuals, as can be seen on the questionnaire (appendix).

The samples of research are some participants having profession as a student (Undergraduate/graduate), lecturer and accountant. The sample of students and lecturers were drawn from two economics faculty from two leading private University in Semarang, Central Java. While the sample of accountants are accountants who have employing affiliation as a faculty at one of the leading universities in Semarang, Central Java. Samples were taken in a convenience purposive random sampling as follows:

1. Convenience sampling was determined by taking samples for each student (Undergraduate/graduate) the faculty of economics that were met. Sample would, after going through various simple interviews about their achievement index /grade point (IP), then the sample was determined if their IP were more than 3 (purposive).
2. For the accountants, the purposive was determined based on whether there is affiliation with any one of leading universities in Semarang. Identification process was done at the university concerned; it can be known which accountant (teaching staff) has an accountant office or work as public accountant as well as teaching staff.

IV. RESULTS AND DISCUSSION

Descriptive Data

Initial sample of 85 participants came from students of undergraduate and graduates program majoring in accounting, lecturers of faculty of economics at two private universities in Semarang, as well as some public accountants who are also identified as a lecturer in one of the leading universities in Semarang, Central Java, Indonesia. Of the 85 participants, 19 of them did not return the questionnaire and three participants were drpped because it does not meet the requirements (do not answer questions that measured their level of understanding about the carbon-friendly investments (/ CFI) and the balanced scorecard concept (BSC). Thus there are 63 participants in this research.

As many as 31.7% participants came from undergraduate program student; 20, 6% of the graduate program students, and 47.6% are graduates. From the perspective of their profession, participants were considered feasible in making investment decisions. As many as 36.5% are students (undergraduate program and graduate program), 50% lecturers and 12.7% of public accountants. Complete data on participant descriptions shown in table one.

Table One. Descriptives Statistics

Responden Data	Level / Field	Percent (%)		
Education	Undergraduate Student	31,7		
	Graduate Student	20,6		
	Graduate	47,6		
Profession	Student	36,5		
	Lecturer	50,8		
	Accountant	12,7		
Normality Statistics				
Variables	Skewness	SE of skewness	Kurtosis	SE of Kurtosis
Carbon Friendly Investment	-0,326	0,302	-1,177	0,595
Total Cognitive Effort	-0,397	0,302	-0,802	0,595

Validity and Reliability

Hypothesis 1 tests the effect of metric data in the BSC on cognitive effort of the decision maker (participants). Cognitive effort was measured adapted from Cacioppo, JT., et al., (1984) and adjusted to the interests of disclosing of participant's cognitive effort in understanding the carbon cost accounting metric data. Thus it is necessary to test validity and reliability of the questionnaire. The test results shown in table two.

Table Two. Validity and Reliability of Cognitive Effort

Validity of Cognitive Effort

Correlations

		Cognitive1	Cognitive2	Cognitive3	Total_Cog
Cognitive1	Pearson Correlation	1	,554**	,562**	,879**
	Sig. (2-tailed)		,000	,000	,000
	N	63	63	63	63
Cognitive2	Pearson Correlation	,554**	1	,351**	,774**
	Sig. (2-tailed)	,000		,005	,000
	N	63	63	63	63
Cognitive3	Pearson Correlation	,562**	,351**	1	,783**
	Sig. (2-tailed)	,000	,005		,000
	N	63	63	63	63
Total_Cog	Pearson Correlation	,879**	,774**	,783**	1
	Sig. (2-tailed)	,000	,000	,000	
	N	63	63	63	63

**. Correlation is significant at the 0.01 level (2-tailed).

Reliability of Cognitive Effort

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,744	,742	3

The effect of carbon cost accounting metrics data on cognitive effort (hypothesis 1)

Hypothesis 1 tests whether there was an effect of carbon cost accounting (CCA) data to the attention of participants in making investment decisions. In other words, participants who paid attention to the cca data will use his cognitive effort more to understand the SBSC matrix than BSC. The results show that the CCA display data in BSC affect the total of participants cognitive effort, as shown in equation (1).

$$Y = \alpha + \beta (X) + \varepsilon \quad \text{..... (1)}$$

p-value: 0,000 0,000
F : 45,922
Levene's test: F= 0,484, p-value: 0,619

Where,
Y = Cognitive effort
X = Cases (BSC, SBSC 5 Perspective, SBSC 4 Perspective (CCA Embedded)

From equation (1), It shows that the value of Levene's test showed no significant F- values at $\alpha = 0.05$. This means that the null hypothesis (which states that the dependent variable must have the same variance within each category of independent variables) can not be rejected. On the other hand, the value of data normality for the variable of cognitive effort shows the value of z-skewness and kurtosis was below the value of -Z table (1.96) (see table one). The two suggest that the model does not violate the assumption of Anova.

Tukey test results for an average difference of the cognitive effort variable for the case of BSC, SBSC 5 perspective (CCA added), and SBSC 4 perspective (CCA embedded) is shown in Table Three.

Table Three. Test for BSC cases versus cognitive effort

Test	Cases	Dependent variable	Sig
Tukey	BSC vs BSC 5 Perspective	Cognitive Effort	0,000
	BSC vs BSC 4 Perspective		0,000
	BSC 5 Perspective versus SBSC 4 Perspective		0,561
Bonferroni	BSC vs BSC 5 Perspective	Cognitive Effort	0,000
	BSC vs BSC 4 Perspective		0,000
	BSC 5 Perspective versus SBSC 4 Perspective		0,921

From the Tukey and Bonferroni in table three it can be said that the participants have more attention to the CCA data in SBSC 5perspective and SBSC 4 perspective than the traditional BSC (control) by developing their cognitive effort. Meanwhile, there was no difference in attention significantly from the participants to the CCA data in SBSC 5 perspective and SBSC 4 perspective. This means that the form of the CCA data display in BSC is not an important factor in the decision. For participants the existence of CCA data in decision-making is a more important factor to be considered rather than just reporting model (SBSC 5 perspective or SBSC 4 perspective). This happens because the number of CCA data items either inSBSC 5 perspective the and the SBSC 4 perspective is the same, and only differ in terms of data distribution of CCA within the dimensions of the BSC.

The results of this study differ from research result sof Alewine, Hank c., and Dan N. Stone, (2009), which indicates that the total effort which is indicated (measured) with a total time used by participant for each case (BSC and SBSC (5 or 4 perspective)) is the same. Differences in results is expected by the different uses of variables measuring dimensions of cognitive effort (time versus intensity). Use of intensity dimension were more likely to be able to grasp what is felt during use of participants cognitive efforts compared to time dimension use. In accordance with the advice of Alewine Hank c., and Dan N. Stone, (2009) the use of four dimensions, ie direction, duration, intensity and strategy development (Bonner and Sprinkle, 2002) simultaneously required for advanced research.

The Effect of metric data of carbon cost accounting on carbon friendly investment (hypothesis two).

Hypothesis two test whether there was an effect of the presence of carbon cost accounting data (CCA) to investment decision which is friendly carbon emissions (carbon friendly investment). In this case it will be tested the mean difference of carbon friendly investment in the case of the

traditional BSC, SBSC 5 perspective and SBSC 4 perspective (carbon data embedded on four traditional bsc perspective). Complete results of hypothesis two testing can be seen in Appendix One, and briefly outlined in Table Four.

Table Four. Test for BSC cases versus carbon friendly investment

Test	Cases	Dependent variable	Sig
Tukey	BSC vs BSC 5 Perspective	carbon friendly investment	0,000
	BSC vs BSC 4 Perspective		0,000
	BSC 5 Perspective versus SBSC 4 Perspective		0,53
Bonferroni	BSC vs BSC 5 Perspective	carbon friendly investment	0,000
	BSC vs BSC 4 Perspective		0,000
	BSC 5 Perspective versus SBSC 4 Perspective		0,062
Levene's test : 0,605 Corrected Model (F): 111,831; p value: 0,000 Cases ; p-value: 0,000			

Table four shows that the value of Levene's test 0.605, which means that the dependent variable has the same variance, thus does not violate the assumption of anova. Tukey and Bonferroni value indicates that the mean difference value of the carbon-friendly investment is significant at the 0.000 p-value <0.05 for the case of bsc and sbsc (5 or 4 perspective).

The results of this study differ partially with the results of research done by Alewine, Hank C., and Dan N. Stone, (2009), which indicates that the value of investments for environmentally friendly investment differed significantly for traditional BSC cases with SBSC four perspective, but for the traditional BSC case with the SBSC perspective 5 showed no significant difference in value.

SBSC 5 perspective versus SBSC 4 perspective (hypotheses three and four)

Hypothesis three tested whether the participants would pay more attention to the CCA display data in the form of SBSC 5 perpsective than SBSC 4 perpsective form. The participants attention is

measured by their total cognitive effort. Hypothesis test indicated that each case (BSC, SBSC 5 perspective, SBSC 4 perspective) influence the use of cognitive effort (df 2, f = 45.922), which means attention of each participant on each case varies (see equation (1)). But Tukey and Bonferroni value is not significant at the $\alpha = 0.05$ for SBSC 5 perpective and SBSC 4 perspective (respectively were 0.053 and 0.062). As mentioned in hypothesis 1 above, it is because participants did not look important the form of CCA data reporting model in the scorecard. Participants were more likely to see the importance of the meaning of CCA data in decision-making compared to the data displays model in the scorecard.

Hypothesis 4 test whether CCA data information presented in the scorecard model SBSC 5 perspective (CCA data added) would make participants put more investment in carbon-friendly investment compared with the SBSC data presented in the model SBSC 4 perspective. Bonferroni and Tukey values in SBSC 5 perspective and BSC 4 perspective are respectively 0.921 and 0.561. From these values of Bonferroni and Tukey can be concluded that the SBSC 5 perspective and SBSC 4 perspective model gives no significant impact on investment decisions.

Even so, through the analysis technique with independent sample t-test showed a significant mean difference at the $\alpha < 0.05$ (p-value 0.021 on the equal variance assummed) (see appendix one). The differences of Anova value test with independent sample t-test was due to differences in the meaning of the two test analysis techniques. Anova, in addition to showing the significance of value differences, also show the existence of 'value effect' of the independent variables on dependent variables. While the independent sample t-test showed only differences two mean for independent samples, without being able to connect the value of these differences with the causality of independent-dependent variable.

Impact of level of knowledge on decision making

As stated in hypothesis 5, that the level of knowledge will give different impact in making investment decisions, hypothesis five test the effect of levels of knowledge (level of education) on carbon-friendly investment decisions. Results of testing with Two Way Anova showed no significant influence of the level of knowledge or interaction between level of knowledge with each BSC case on carbon-friendly investment. The test results are summarized in equation (2) and tables five

$$Y = \alpha + \beta_1 (X_1) + \beta_2 (X_2) + \beta_2 (X_1.X_2) + \varepsilon \quad \text{.....} \quad (2)$$

p-value: 0,000 0,485 0,419
F : 29,089
Levene's test: F=1,164; p-value: 0,338

where
Y = Carbon Friendly Investment
X_1 = Cases (BSC, SBSC 5 Perspective, SBSC 4 Perspective (CCA Embedded)
X_2 = level of knowledge (education level)
$X_1. X_2$ = Interaction between Cases and level of knowledge

Table Five. Test for BSC cases and Level of Education (knowledge)

Test	Cases	Sig	Education	Sig	Dependent variable
Tukey	BSC vs BSC 5 Perspective	0,000	Undergraduate students Vs Graduate Students	0,625	carbon friendly investment
	BSC vs BSC 4 Perspective	0,000	Undergraduate students Vs Graduate	0,092	
	BSC 5 Perspective versus SBSC 4 Perspective	0,052	Graduate Students vs Graduate	0,017	
Bonferroni	BSC vs BSC 5 Perspective	0,000	Undergraduate students Vs Graduate Students	1	carbon friendly investment
	BSC vs BSC 4 Perspective	0,000	Undergraduate students Vs Graduate	0,111	
	BSC 5 Perspective versus SBSC 4 Perspective	0,061	Graduate Students vs Graduate	0,018	

The absence of significant influence of educational level on carbon-friendly investment decision is expected because participants have quite homogeneous focus on carbon-friendly investment. That is, participants have the uniformity of the view that the issue of global warming caused by carbon emissions is a crucial factor to consider in any investment decision. This conjecture is proved by comparative analysis between the means value of investments in carbon-friendly versus stronger in achieving financial investment (see Table Six)

Table Six. Paired sample t-test of means value of investments in carbon-friendly versus stronger in achieving financial investment.

Cases	p-Value
Case 1	0,000
Case 2 & 3	0,000

From the Table Six it can be seen that in the case of traditional BSC the mean value between the carbon friendly investment with stronger in achieving the investment is very much different, with a significance level p-value 0.000. While in SBSC cases the mean value for both is not significantly different.

V. CONCLUSIONS AND LIMITATIONS

Conclusions

Specifically, the research concludes that:

1. Participants considers that carbon-friendly investment is one important factor in achieving the company goal attainment factors other than financial. This is evidenced by the attention of participants to the CCA data in SBSC and achieving a balance in the company's goals, both in terms of economy or ecology.

2. The result of study shows that there was no difference in attention (cognitive effort) and carbon-friendly investment value between SBSC 5 perspective and SBSC 4 perspective, indicating that more participants find it important to the value factor of the CCA data information in the scorecard rather than the form of CCA display data in scorecard.

In general, this research contributes to the field of environmental accounting, particularly carbon cost accounting, accounting information systems, management accounting, and ecology. However, further research in the field of carbon cost accounting will contribute towards controlling the rate of global warming. Meanwhile in the field of accounting information system, until now it has not been found the standard form of data reporting model carbon emissions produced in the company's annual report. Measurement differences of financial data and carbon emissions makes the integration of carbon emissions reporting in the annual report is getting further to do not find its form. However, the BSC model is allegedly able to bridge differences in the measurement of the data matrix (Hibbets, Aleecia R., 2006; Malina, Mary A., and Frank H. Selto, 2001; Marcela Porporato, 2009,Ttayler,William B., 2009). In the field of management accounting and ecology, in-depth research for the topic of carbon cost accounting will provide great benefits in the preparation of corporate strategy based on achieving synergy on economy and ecology.

Limitations

This study has limitations in terms of measuring cognitive effort. This study uses only one dimension of cognitive effort, that is intensity. Allewine, Hank C., and Dan N. Stone (2009) suggest the use of four dimensions of cognitive effort that is, directions, duration, intensity and strategy. Another limitation is the use of respondents. Respondents in this study were participants consisting of students, lecturers and accountants with experiment research design. However, further research should be designed in a model of empirical research with real respondents (bussiness praticioners or managers of company).

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Appendix One. Statistical Test

Descrptive Data

Statistics

		Gender	Education	Profession	Field	Cases
N	Valid	63	63	63	63	63
	Missing	0	0	0	0	0
Mean			2,16	1,76	2,29	1,92
Median			2,00	2,00	2,00	2,00
Mode			3	2	1	1
Skewness			-,321	,308	,627	,148
Std. Error of Skewness			,302	,302	,302	,302
Kurtosis			-1,662	-,731	-,511	-1,454
Std. Error of Kurtosis			,595	,595	,595	,595

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	L	35	55,6	55,6	55,6
	P	28	44,4	44,4	100,0
	Total	63	100,0	100,0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	undergraduate student	20	31,7	31,7	31,7
	Master / Graduate Student	13	20,6	20,6	52,4
	Graduate (Master)	30	47,6	47,6	100,0
	Total	63	100,0	100,0	

Profession

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	23	36,5	36,5	36,5
	Lecturer	32	50,8	50,8	87,3
	Accountant	8	12,7	12,7	100,0
	Total	63	100,0	100,0	

Field

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	accounting	22	34,9	34,9	34,9
	finance	15	23,8	23,8	58,7
	Management acconting	16	25,4	25,4	84,1
	Auditing	6	9,5	9,5	93,7
	production/marketing	4	6,3	6,3	100,0
	Total	63	100,0	100,0	

Cases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Traditionally BSC	23	36,5	36,5	36,5
	SBSC-5 persp (Carbon Inf. Added)	22	34,9	34,9	71,4
	SBSC-4 Persp (Carbon Inf. Embedded)	18	28,6	28,6	100,0
	Total	63	100,0	100,0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Carbon Friendly Investment	63	0	19000000	9276505	6041201	-,326	,302	-1,177	,595
Total_Cog	63	5,00	17,00	11,7143	3,11308	-,397	,302	-,802	,595
Valid N (listwise)	63								

Hypotheses Test

Impact of Cases (BSC; BSC 5 perpsective; BSC 4 perspective (Carbon Cost Accounting Information Added) on Cognitive Effort (Intensity)

Between-Subjects Factors

		Value Label	N
Cases	1	Traditionally BSC	23
	2	SBSC-5 persp (Carbon Inf. Added)	22
	3	SBSC-4 Persp (Carbon Inf. Embedded)	18

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Total_Cog

F	df1	df2	Sig.
,484	2	60	,619

Tests the null hypothesis that the error variance c
the dependent variable is equal across groups.

a. Design: Intercept+Cases

Tests of Between-Subjects Effects

Dependent Variable: Total_Cog

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	363,432[a]	2	181,716	45,922	,000
Intercept	8746,775	1	8746,775	2210,411	,000
Cases	363,432	2	181,716	45,922	,000
Error	237,425	60	3,957		
Total	9246,000	63			
Corrected Total	600,857	62			

a. R Squared = ,605 (Adjusted R Squared = ,592)

Multiple Comparisons

Dependent Variable: Total_Cog

	(I) Cases	(J) Cases	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Traditionally BSC	SBSC-5 persp (Carbon Inf. Added)	-5,2530*	,59322	,000	-6,6786	-3,8273
		SBSC-4 Persp (Carbon Inf. Embedded)	-4,6014*	,62601	,000	-6,1059	-3,0970
	SBSC-5 persp (Carbon Inf. Added)	Traditionally BSC	5,2530*	,59322	,000	3,8273	6,6786
		SBSC-4 Persp (Carbon Inf. Embedded)	,6515	,63222	,561	-,8679	2,1709
	SBSC-4 Persp (Carbon Inf. Embedded)	Traditionally BSC	4,6014*	,62601	,000	3,0970	6,1059
		SBSC-5 persp (Carbon Inf. Added)	-,6515	,63222	,561	-2,1709	,8679
Bonferroni	Traditionally BSC	SBSC-5 persp (Carbon Inf. Added)	-5,2530*	,59322	,000	-6,7140	-3,7919
		SBSC-4 Persp (Carbon Inf. Embedded)	-4,6014*	,62601	,000	-6,1433	-3,0596
	SBSC-5 persp (Carbon Inf. Added)	Traditionally BSC	5,2530*	,59322	,000	3,7919	6,7140
		SBSC-4 Persp (Carbon Inf. Embedded)	,6515	,63222	,921	-,9056	2,2086
	SBSC-4 Persp (Carbon Inf. Embedded)	Traditionally BSC	4,6014*	,62601	,000	3,0596	6,1433
		SBSC-5 persp (Carbon Inf. Added)	-,6515	,63222	,921	-2,2086	,9056

Based on observed means.

*. The mean difference is significant at the ,05 level.

Impact of Cases (BSC; BSC 5 perpsective; BSC 4 perspective (Carbon Cost Accounting Information Added) on Carbon Friendly Investment

Between-Subjects Factors

		Value Label	N
Cases	1	Traditionally BSC	23
	2	SBSC-5 persp (Carbon Inf. Added)	22
	3	SBSC-4 Persp (Carbon Inf. Embedded)	18

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Carbon Friendly Investment

F	df1	df2	Sig.
,506	2	60	,605

Tests the null hypothesis that the error variance c
the dependent variable is equal across groups.

a. Design: Intercept+Cases

Tests of Between-Subjects Effects

Dependent Variable: Carbon Friendly Investment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1,784E+015[a]	2	8,921E+014	111,831	,000
Intercept	5,854E+015	1	5,854E+015	733,814	,000
Cases	1,784E+015	2	8,921E+014	111,831	,000
Error	4,786E+014	60	7,977E+012		
Total	7,684E+015	63			
Corrected Total	2,263E+015	62			

a. R Squared = ,788 (Adjusted R Squared = ,781)

Multiple Comparisons

Dependent Variable: Carbon Friendly Investment

	(I) Cases	(J) Cases	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Traditionally BSC	SBSC-5 persp (Carbon Inf. Added)	-9952173,9*	842266,9	,000	-11976323,51	-7928024,31
		SBSC-4 Persp (Carbon Inf. Embedded)	-12086607*	888813,2	,000	-14222617,66	-9950596,83
	SBSC-5 persp (Carbon Inf. Added)	Traditionally BSC	9952173,91*	842266,9	,000	7928024,31	11976323,51
		SBSC-4 Persp (Carbon Inf. Embedded)	-2134433,3	897637,8	,053	-4291651,21	22784,55
	SBSC-4 Persp (Carbon Inf. Embedded)	Traditionally BSC	12086607*	888813,2	,000	9950596,83	14222617,66
		SBSC-5 persp (Carbon Inf. Added)	2134433,33	897637,8	,053	-22784,55	4291651,21
Bonferroni	Traditionally BSC	SBSC-5 persp (Carbon Inf. Added)	-9952173,9*	842266,9	,000	-12026637,82	-7877710,01
		SBSC-4 Persp (Carbon Inf. Embedded)	-12086607*	888813,2	,000	-14275712,49	-9897502,00
	SBSC-5 persp (Carbon Inf. Added)	Traditionally BSC	9952173,91*	842266,9	,000	7877710,01	12026637,82
		SBSC-4 Persp (Carbon Inf. Embedded)	-2134433,3	897637,8	,062	-4345273,20	76406,53
	SBSC-4 Persp (Carbon Inf. Embedded)	Traditionally BSC	12086607*	888813,2	,000	9897502,00	14275712,49
		SBSC-5 persp (Carbon Inf. Added)	2134433,33	897637,8	,062	-76406,53	4345273,20

Based on observed means.

*. The mean difference is significant at the ,05 level.

Additional Analysis
Impact of Interaction Effect Between Cases and Education on Carbon Friendly Investment

Levene's Test of Equality of Error Variances [a]

Dependent Variable: Carbon Friendly Investment

F	df1	df2	Sig.
1,164	8	54	,338

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+Cases+Education+Cases * Education

Tests of Between-Subjects Effects

Dependent Variable: Carbon Friendly Investment

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1,837E+015[a]	8	2,296E+014	29,089	,000
Intercept	5,149E+015	1	5,149E+015	652,395	,000
Cases	1,404E+015	2	7,021E+014	88,961	,000
Education	1,159E+013	2	5,793E+012	,734	,485
Cases * Education	3,134E+013	4	7,835E+012	,993	,419
Error	4,262E+014	54	7,892E+012		
Total	7,684E+015	63			
Corrected Total	2,263E+015	62			

a. R Squared = ,812 (Adjusted R Squared = ,784)

Post Hoc for Cases

Multiple Comparisons

Dependent Variable: Carbon Friendly Investment

	(I) Cases	(J) Cases	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Traditionally BSC	SBSC-5 persp (Carbon Inf. Added)	-9952173,9*	837769,8	,000	-11971185,57	-7933162,25
		SBSC-4 Persp (Carbon Inf. Embedded)	-12086607*	884067,5	,000	-14217195,78	-9956018,71
	SBSC-5 persp (Carbon Inf. Added)	Traditionally BSC	9952173,91*	837769,8	,000	7933162,25	11971185,57
		SBSC-4 Persp (Carbon Inf. Embedded)	-2134433,3	892845,0	,052	-4286175,50	17308,84
	SBSC-4 Persp (Carbon Inf. Embedded)	Traditionally BSC	12086607*	884067,5	,000	9956018,71	14217195,78
		SBSC-5 persp (Carbon Inf. Added)	2134433,33	892845,0	,052	-17308,84	4286175,50
Bonferroni	Traditionally BSC	SBSC-5 persp (Carbon Inf. Added)	-9952173,9*	837769,8	,000	-12022175,75	-7882172,07
		SBSC-4 Persp (Carbon Inf. Embedded)	-12086607*	884067,5	,000	-14271003,84	-9902210,65
	SBSC-5 persp (Carbon Inf. Added)	Traditionally BSC	9952173,91*	837769,8	,000	7882172,07	12022175,75
		SBSC-4 Persp (Carbon Inf. Embedded)	-2134433,3	892845,0	,061	-4340517,79	71651,13
	SBSC-4 Persp (Carbon Inf. Embedded)	Traditionally BSC	12086607*	884067,5	,000	9902210,65	14271003,84
		SBSC-5 persp (Carbon Inf. Added)	2134433,33	892845,0	,061	-71651,13	4340517,79

Based on observed means.

*. The mean difference is significant at the ,05 level.

Post Hoc for Education

Multiple Comparisons

Dependent Variable: Carbon Friendly Investment

	(I) Education	(J) Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	undergraduate student	Master / Graduate Student	-928728,08	1000838	,625	-3340732,64	1483276,48
		Graduate (Master)	1733828,33	810966,8	,092	-220588,55	3688245,21
	Master / Graduate Student	undergraduate student	928728,08	1000838	,625	-1483276,48	3340732,64
		Graduate (Master)	2662556,41*	932815,2	,017	414486,81	4910626,01
	Graduate (Master)	undergraduate student	-1733828,3	810966,8	,092	-3688245,21	220588,55
		Master / Graduate Student	-2662556,4*	932815,2	,017	-4910626,01	-414486,81
Bonferroni	undergraduate student	Master / Graduate Student	-928728,08	1000838	1,000	-3401647,86	1544191,71
		Graduate (Master)	1733828,33	810966,8	,111	-269947,39	3737604,05
	Master / Graduate Student	undergraduate student	928728,08	1000838	1,000	-1544191,71	3401647,86
		Graduate (Master)	2662556,41*	932815,2	,018	357711,77	4967401,05
	Graduate (Master)	undergraduate student	-1733828,3	810966,8	,111	-3737604,05	269947,39
		Master / Graduate Student	-2662556,4*	932815,2	,018	-4967401,05	-357711,77

Based on observed means.

*. The mean difference is significant at the ,05 level.

Analysis Compare Mean Between Carbon Friendly Investment (A) Versus BSC Stronger Financial Investment (B), for:

Case One

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Carbon Friendly Investment	2347826	23	2897627,488	604197,1
	Stronger in achieving financial	2E+007	23	2897627,488	604197,1

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Carbon Friendly Investment & Stronger in achieving financial	23	-1,000	,000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Carbon Friendly Investment - Stronger in achieving financial	-15304347,826	5795254,976	1208394	-17810404	-12798292	-12,665	22	,000

Case Two and Three

```
FILTER OFF.
USE ALL.
EXECUTE .
USE ALL.
COMPUTE filter_$=(Cases  > 1).
VARIABLE LABEL filter_$ 'Cases  > 1 (FILTER)'.
VALUE LABELS filter_$  0 'Not Selected' 1 'Selected'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE .
T-TEST
  PAIRS = Investment_A  WITH Investment_B (PAIRED)
  /CRITERIA = CI(.95)
  /MISSING = ANALYSIS.
```

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Carbon Friendly Investment	1E+007	40	2948283,856	466164,6
	Stronger in achieving financial	1E+007	40	18743529,364	2963612

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Carbon Friendly Investment & Stronger in achieving financial	40	-,301	,059

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Carbon Friendly Investment - Stronger in achieving financial	1930490	19831412,874	3135622	-4411904	8272884	,616	39	,542

Validity and Reliability Cognitive Effort (Intensity)

Correlations

		Cognitive1	Cognitive2	Cognitive3	Total_Cog
Cognitive1	Pearson Correlation	1	,554**	,562**	,879**
	Sig. (2-tailed)		,000	,000	,000
	N	63	63	63	63
Cognitive2	Pearson Correlation	,554**	1	,351**	,774**
	Sig. (2-tailed)	,000		,005	,000
	N	63	63	63	63
Cognitive3	Pearson Correlation	,562**	,351**	1	,783**
	Sig. (2-tailed)	,000	,005		,000
	N	63	63	63	63
Total_Cog	Pearson Correlation	,879**	,774**	,783**	1
	Sig. (2-tailed)	,000	,000	,000	
	N	63	63	63	63

**. Correlation is significant at the 0.01 level (2-tailed).

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,744	,742	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Cognitive1	7,7937	4,102	,679	,461	,519
Cognitive2	7,9206	5,300	,517	,309	,718
Cognitive3	7,7143	5,175	,524	,319	,710

Additional Analysis for Compare Means

```
T-TEST
  GROUPS = Cases(1 2)
  /MISSING = ANALYSIS
  /VARIABLES = Investment_A
  /CRITERIA = CI(.95) .
```

Group Statistics

	Cases	N	Mean	Std. Deviation	Std. Error Mean
Carbon Friendly Investment	Traditionally BSC	23	2347826,09	2897627,488	604197,1
	SBSC-5 persp (Carbon Inf. Added)	22	12300000,00	3056608,765	651671,2

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Carbon Friendly Investment	Equal variances assumed	,063	,804	-11,213	43	,000	-9952174	887589,53	-11742168,8	-8162179
	Equal variances not assumed			-11,199	42,584	,000	-9952174	888667,24	-11744848,0	-8159500

```
T-TEST
  GROUPS = Cases(1 3)
  /MISSING = ANALYSIS
  /VARIABLES = Investment_A
  /CRITERIA = CI(.95) .
```

Group Statistics

	Cases	N	Mean	Std. Deviation	Std. Error Mean
Carbon Friendly Investment	Traditionally BSC	23	2347826,09	2897627,488	604197,1
	SBSC-4 Persp (Carbon Inf. Embedded)	18	14434433,33	2397305,525	565050,3

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Carbon Friendly Investment	Equal variances assumed	1,276	,265	-14,272	39	,000	-12086607	846847,81	-13799519	-10373696
	Equal variances not assumed			-14,611	38,851	,000	-12086607	827246,04	-13760075	-10413140

```
T-TEST
  GROUPS = Cases(2 3)
  /MISSING = ANALYSIS
  /VARIABLES = Investment_A
  /CRITERIA = CI(.95) .
```

Group Statistics

	Cases	N	Mean	Std. Deviation	Std. Error Mean
Carbon Friendly Investment	SBSC-5 persp (Carbon Inf. Added)	22	1E+007	3056608,765	651671,2
	SBSC-4 Persp (Carbon Inf. Embedded)	18	1E+007	2397305,525	565050,3

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Carbon Friendly Investment	Equal variances assumed	,477	,494	-2,415	38	,021	-2134433	883874,46	-3923744	-345123
	Equal variances not assumed			-2,475	37,949	,018	-2134433	862529,54	-3880610	-388257

Appendix Two. Cases and Questionnaire
Kasus 1. BSC Tradisional (tanpa data akuntansi biaya karbon)

	Goals	Investment A	Investment B
Financial Perspective			
Return on Investment	17%	12-14%	16-22%
Annual cash flow increase	$325,000	$100,000-$300,000	$300,000-$400,000
Sales Growth	24%	22-27%	18-23%
Payback period	3 years	5 years	3 years
Customer Perspective			
Rating kepuasan konsumen	8.2 out of 10	8.0 out of 10	8.3 out of 10
Persentasi penjualan pada pelanggan baru	19%	14-18%	17-20%
Penyerahan produk ke pelanggan	11	9-12	7-10
Produk baru yang diluncurkan	10	7-12	6-8
Internal Business Process Perspective			
Waktu proses pesanan pelanggan	2 days	1-4 days	3-6 days
Jumlah produk habis saat ada pesanan	3	3-5	4-6
Tepat waktu pengiriman produk dari total pengiriman	95%	88-92%	92-96%
Waktu yang dibutuhkan untuk meluncurkan produk baru	3 months	4-6 months	2-5 months
Learning and Growth			
Turnover pegawai	12%	14-18%	10-14%
Jumlah pegawai yang memperoleh sertifikasi training	22	10-20	15-25
Tingkat kepuasan pegawai	86%	85-88%	80-84%
Jumlah kecelakaan kerja dalam suatu produksi	1	1-3	2-4

Berdasarkan kasus 1, isilah isian investasi berikut ini:

Investasi A: $.....
Investasi B: $.....

Total : $20.000.000

(Sumber, modifikasi dan pengembangan dari Allewine, Hank C., and Dan N. Stone, 2009)

Kasus 2. SBSC dengan lima persepktif (perspektif akuntansi biaya karbon disajikan terpisah sebagai perspektif kelima)

Perspectives	Goals	Investment A	Investment B
Financial Perspective	17%	12-14%	16-22%
Return on Investment	$325,000	$100,000-$300,000	$300,000-$400,000
Animal cash flow increase	24%	22-27%	18-23%
Sales Growth	3 years	5 years	3 years
Payback period			
Customer Perspective	8.2 out of 10	8.0 out of 10	8.3 out of 10
Rating kepuasan konsumen	19%	14-18%	17-20%
Persentasi penjualan pada pelanggan baru	11	9-12	7-10
Penyerahan produk ke pelanggan	10	7-12	6-8
Produk baru yang diluncurkan			
Internal Business Process Perspective	2 days	1-4 days	3-6 days
Waktu proses pesanan pelanggan	3	3-5	4-6
Jumlah produk habis saat ada pesanan	95%	88-92%	92-96%
Tepat waktu pengiriman produk dari total pengiriman	3 months	4-6 months	2-5 months
Waktu yang dibutuhkan untuk meluncurkan produk baru			
Learning and Growth			
Turnover pegawai	12%	14-18%	10-14%
Jumlah pegawai yang memperoleh sertifikasi training	22	10-20	15-25
Tingkat kepuasan pegawai	86%	85-88%	80-84%
Jumlah kecelakaan kerja dalam suatu produksi	1	1-3	2-4
Environmental Pesrpective			
Penghematan biaya energi (energy cost saving)	$325,000	$300,000-$400,000	$100,000-$300,000
Jumlah komunitas yang komplain tentang polusi emisi perusahaan	3	1-3	7-9
Jumlah emisi CO2 (ton)	30	20-30	40-55
Jumlah pelatihan pegawai per -departemen produksi untuk menemukan desain produk yang sesuai dengan tujuan efisiensi emisi karbon	275	240-300	180-250

Berdasarkan kasus 2, isilah isian investasi berikut ini:

Investasi A: $.....

Investasi B: $.....

Total : $20.000.000

Kasus 3. SBSC dengan empat persepktif (perspektif akuntansi biaya karbon disajikan menyatu dalam empat perspektif BSC)

	Goals	Investment A	Investment B
Financial Perspective			
Return on Investment	17%	12-14%	16-22%
Animal cash flow increase	$325,000	$100,000-$300,000	$300,000-$400,000
Sales Growth	24%	22-27%	18-23%
Payback period	3 years	5 years	3 years
Energy cost savings	$325,000	$300,000-$400,000	$100,000-$300,000
Customer Perspective			
Rating kepuasan konsumen	8.2 out of 10	8.0 out of 10	8.3 out of 10
Persentasi penjualan pada pelanggan baru	19%	14-18%	17-20%
Penyerahan produk ke pelanggan	11	9-12	7-10
Produk baru yang diluncurkan	10	7-12	6-8
Jumlah komunitas yang komplain tentang polusi emisi perusahaan	3	1-3	7-9
Internal Business Process Perspective			
Waktu proses pesanan pelanggan	2 days	1-4 days	3-6 days
Jumlah produk habis saat ada pesanan	3	3-5	4-6
Tepat waktu pengiriman produk dari total pengiriman	95%	88-92%	92-96%
Waktu yang dibutuhkan untuk meluncurkan produk baru	3 months	4-6 months	2-5 months
Jumlah emisi CO2 (ton)	30	20-30	40-55
Learning and Growth			
Turnover pegawai	12%	14-18%	10-14%
Jumlah pegawai yang memperoleh sertifikasi training	22	10-20	15-25
Tingkat kepuasan pegawai	86%	85-88%	80-84%
Jumlah kecelakaan kerja dalam suatu produksi	1	1-3	2-4
Jumlah pelatihan pegawai per -departemen produksi untuk menemukan desain produk yang sesuai dengan tujuan efisiensi emisi karbon	275	240-300	180-250

Berdasarkan kasus 3, isilah isian investasi berikut ini:

Investasi A: $.....

Investasi B: $.....

Total : $20.000.000

(Sumber: Modifikasi dan pengembangan dari Allewine, Hank C., and Dan N. Stone, 2009)

Perhatian (usaha kognitif) terhadap investasi (Attention (cognitive effort) to the investment)

Berikut ini pernyataan yang menunjukkan perhatian saudara terhadap matriks investasi. Isilah dengan menyilang salah satu angka dari skala 1 sampai dengan 6. Angka 1 mewakili sangat tidak setuju, sedang angka 6 mewakili angka sangat setuju.

(The following statements show your attention to the investment matrix. Fill with crosses one of the numbers from 1 to 6 scale. Number 1 represents strongly disagree, while the number six represents strongly aggre)

Pernyataan / Statement	Sangat tidak setuju →→→→ sangat setuju strongly disagree strongly aggre 1 2 3 4 5 6
Q1: Saya merasa data yang saya analisis dalam matriks scorecard sangat kompleks. *(I feel that the matrix data which I analyze in the scorecard is very complex matrix)*	1 2 3 4 5 6
Q2: Saya berfikir dan menganalisis data dalam scorecard secara bertanggungjawab. *(I think and analyze the data in the scorecard responsibly).*	1 2 3 4 5 6
Q3: Terhadap data yang tersaji dalam matriks scorecard, saya berusaha berfikir sekeras mungkin untuk mengambil keputusan investasi. *(To the data presented in the scorecard matrix, I try to think as hard as possible to make investment decisions)*	1 2 3 4 5 6

(Sumber: Modifikasi dan pengembangan dari Cacioppo, et al., 1984)

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