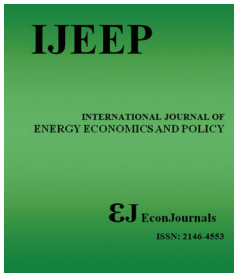

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Impact of Accounting Information System and Intensity of Energy on Energy Consumption in Sugar Industry of Indonesia: Moderating Role of Effectiveness of Supply Chain

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ABSTRACT

The goal of the existing study is to explore the impact of accounting information system (AIS) and intensity of energy on the effective energy consumption of the sugar industry in Indonesia. The goal also consist upon the moderating role of effectiveness of supply chain on the links of AIS and effective energy consumption, intensity of energy and effective energy consumption. The employees that are related with AIS and supply chain are the respondent and they provide the data by questionnaires and the data was evaluated by employing the effective tool of data analysis named as Smart-PLS. The results show that AIS and intensity of energy have positive link with the effective energy consumption. The findings also show that effectiveness of supply chain positively moderates among the links of AIS and effective energy consumption, intensity of energy and effective energy consumption. The policymakers and the upcoming researchers will be the users of this study who can get guidelines in developing regulation regarding effective energy consumption and also in exploration of this area in future.

Keywords: Intensity of Energy, Effective Energy Consumption, Accounting Information System, Supply Chain
JEL Classifications: O13, E16

1. INTRODUCTION

System of accounting information was recognized as an effective means of summarizing, recording and validating the data of financial transactions prevailing in businesses whether in the current economies of past economies. While reviewing past literature, it is also analyzed that the work which was previously done on a manual basis is quite easier through computers in the current world. The recent development in information technologies has not only enhanced the working capabilities but also has contributed significantly towards the societies and global markets. In the perspective on reality, it is generally recognized that IT assumes a significant job in the field of bookkeeping; it tends to be vital weapons to help the item and system associations (Fitriati and Mulyani, 2015). Some business associations get the upper hand by preparing new data frameworks.

Subsequently, associations will in general increment the cash for IT, which makes the proportion of IT venture to their all-out spending plan higher. In a period of worldwide rivalry, the way into an association's endurance is the constant improvement of its exhibitions. AIS of the past focused on the record, illustrating and favoring of data about business wealth related trades. These limits were performed for the various social affairs inside the affiliation that was stressed over the specific decisions identified with budgetary accounting , administrative accounting, and duty

stability issues. The need to facilitate these normally different frameworks prompted the clerk's valuation for shared databases that give a sturdy picture of the association's information, clearing out duplications and diminishing data conflicts (Nicolaou, 2000). The strong cases that innovation has had the most significant effect as accounting has been changed into an information administration calling have by and large been inadequately reflected in ongoing accounting research (Mamić and Oluić, 2013).

Therefore, the tradition of research in the field of system of accounting information while concentrating the modeling of data structure, processing of transactions, securities, and computer frauds as well as the methodologies of development seemed not to be an effective mode presented for the understanding of accounting management and information technology via management control systems. Numerous compliments have been come up with some understandable means, where the effort of leading research via the establishment of the author has inserted a significant role in the financial development while ensuring the steady significant, flourishing and sustainable activities in the system of the country (Feng et al., 2009). This is because money related advancement is a significant course that will keep on boosting monetary development that will, thus, provoke venture, subsequently empowering a created budgetary marketplace (Al-Salem, 2015).

Subsequent this, a huge upgrading in the budgetary marketplace is thusly expected to yield an expanded pioneering enhancement that will highlight inside and outer interest for energy. In a comparative example of thought attested that money related advancement allows the probability for the accessibility of a reasonable advance to get fabricating contraption, specifically machines, which would build the necessity of energy for skillful and effective fares (Reddy and Ray, 2010). The inventor keeps on stating that if Granger causality moves from the use of force to fares or there is a causal attachment connecting fares and energy, at that point arrangements to monitor energy will diminish fares, and this could, thusly, decrease budgetary improvement. Then again, If causality was set up to be moving from fares to energy or substantiation of no Granger causality toward each path, at that point the creator declared that the most feasible and suffering option is to protect energy so that it won't affect trades (Nawaz et al., 2019).

The commitments of this examination are: Having respect to the prior, this examination expects to research to what degree the requirement for financial development impacts energy utilization in Nigeria (Chen et al., 2018). Not with standing that, what is the imaginable situation of CO_2 discharges to the nation's monetary development possibilities, taking into account it being the mainly swarming nation in Africa and having the main oil stores and investigation? Is the resuscitated money related area of the nation giving any important financial commitments to the Gross domestic product? Is the Exchange receptiveness of the nation of any critical commitment? From these exact discoveries, the examination looks to decide the continuums of agreement suggestions that be present and the approach directs that could be accessible in accomplishing a practical and manageable monetary development prospect in the nation. The examination noted with distinct fascination the power difficulties of the country and the serious job of power as an important feature for feasible financial development.

To guarantee a tightfisted investigation, and relatively than other observational inquires about, that basically applied the ADF, PP, DF-GLS, KPSS, and Ng-Perron tests, the current examination practical the auxiliary test to distinguish conceivable basic breaks in the arrangement. Notwithstanding built up that the proficiency and intensity of positioning co-integration approaches by different techniques are touchy with the estimation of disturbance estimators. To keep away from this, built up an increasingly stingy co-integration strategy (Lecourt et al., 2010). This methodology joins all non-co-integrating tests in building up a uniform, proficient and solid co-integration gauges without different testing techniques.

This test is applied right now request to beat the feasible inadequacies of previous presented techniques. Following all these symptomatic examinations, the investigation practical the ARDL limits testing move toward within the sight of the basic sever, and this was approved utilizing the fare divide test, the inventive bookkeeping test, and the drive reaction analysis (Nawaz et al., 2013). By subsequent the studies and the aim to resolve the elected issues in this study has significantly contributed to the overviews on the energy consumptions for many decades, while connecting monetary growth with the spending of power, the economic growth, and directness of trade and the economic growth influences by energy consumption. Further various strategies have been taken for the introduction of data the specification of models with the procedure of model estimation.

The basic need of organization directly relates to the structure of such organization, where the mechanism of arranging information and process of different methods for energy and consumption with the intensity of energy, the system of accounts can have a vital role not for the arrangement but also the computation of such usage within the consumption criteria. Some statistical information that renders the data about such elements on which study is prevailing is to be analyzed with computation. The Table 1 and Figure 1 are showing some yearly basis data of AIS and intensity of energy on energy consumption, where the AIS has significantly shown a rise in strength of power utilization, while the strength of such energy itself is inducing impact on power consumption. There is a

Figure 1: AIS in energy consumption with IOE

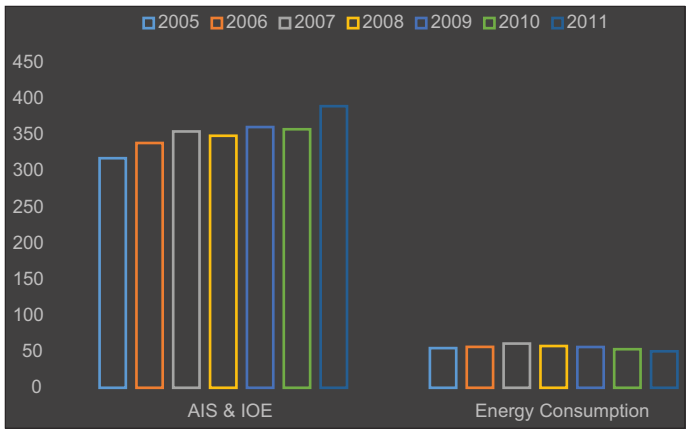


Table 1: Accounting system and IOE impacts EC

Years	AIS and IOE	Energy consumption
2005	318	54.9
2006	339	56.7
2007	355	61.2
2008	349	57.9
2009	361	56.5
2010	358	53.4
2011	390	50.5

significant figure of 318 in 2005, while it exceeded from given to 339 in 2006, there is consistent rise with certain fluctuation in 2008 at 349 and 2010 at 358, while it bumped at 390 in 2011. Where the energy consumption is fluctuating with 54.9 in 2005, where it rises at 61.2 in 2007, whereas certain statistics are rendering increase and decrease in the energy consumption yearly.

2. LITERATURE REVIEW

Many authors have employed data from different aspects while taking several companies in the overall global world. The authors viably endorsees the implementation and improvement of such software in the studied areas of research. The study further elaborates on the vast area of literature by constructing designs of the specific system "Integration of AIS" and further can have positively enumerated the functional relation amid the effectiveness of systems perceived (Brown et al., 2005). While discussing and examining the support of AIS, it is also observed that functions hypothesized the constraints of numerous contingencies which helps to intervene in the coordination of organization and requirements of controls. While reviewing literature about such area of study, it is also seen that the constraints that prevail in the society of organizational interactions have never been examined earlier before the interpretation of the AIS system in the structure of organizations.

In the sector of energy, there is a vast area of information sharing between certain departments which is functional in all organizations, such hazards that constrains the accounting system supplies could not efficiently enhance the operational activities of an organization and is also unable to support the results of participation from different aspects of the organization(Hartono and Resosudarmo, 2008). The accounting system has not only enhanced the effectiveness of managing data within the organization but also has supported the compilation of data and information from the overall department to the final execution and striving the decision-making process. In the allocation of resources by higher managements, usually, the accounting system is somehow omitted due to nonuse, while the user is much effective as the decision-making process in an organization.

After analyzing, assessed the adequacy of automated accounting data frameworks in the Jordanian business banks considering mechanical improvement through testing the quality, adaptability, effortlessness, and secrecy of these frameworks (Figge and Hahn, 2013). In this way, they built up a survey and conveyed (45) poll to the money related offices in business banks recorded on the Stock Trade of Amman. Plenty of data has been taken in the study with ultimate returns and purpose of sustainable analysis while implying the means of banking sector where the categories of risk are prevailing at some higher stages. Most of the studies regarding energy consumption links the issues prevail in the decades ago, the link is found to be directed in the implementation of some strategies to bump the systems of accounting information into the consumption of energies. The EKC theory is an experimental examination which tests the existence of an altered U molded association among monetary growth and ecological quality (Recalde and Ramos-Martin, 2012). Accessible looks into involving considered the different situations of the Natural Kuznets Bend (EKC) as for various nations, applying distinctive econometric strategies for examinations and while shifting financial condition.

In a related improvement, to give some examples, investigated the affiliation connecting income and discharges of power utilization. The creators in their discoveries proved the existence of the EKC in the divide study regions (Duro and Padilla, 2011). As opposed to that, utilized board information and offered questionable results concerning money related advancement and energy consumption discharges' affiliation. Studies on their part upheld the exact accessibility of the EKC in Brazil, India, China, Pakistan, France, Malaysia, Italy, and Romania (Aziziankohan et al., 2017). In another exploration exertion further investigated the dynamic affiliation connecting energy consumption outflows, incomes, and utilization of power in the US. Their outcome delineated that power spending discharges are the Granger reason in incomes, while power utilization has a remarkable job in the heightening of energy consumption in the US. A similar equivalent work out was completed in Malaysia and France individually, the results of their exact exercise showed how money related advancement Granger reason an expansion in the utilization of power which brings about the emanation of carbon in Malaysia and France (Velasco and Roth, 2010).

Notwithstanding that, a unidirectional causality is watched originating from money related advancement to energy utilization (Hang and Tu, 2007). While utilizing a board of 43 creating nations set up the presence of ecological Kuznets' bend (EKC) theory in the contemplated territories. The discoveries of the creators set up that the salary of a nation increments concerning its capacity to lessen the all-out substance of its energy consumption discharges. Studies that practical late econometric dealings could be initiate in the central investigation. In that evaluation the creators practical the next era Unit root test, cross-sectional improved (CADF) in addition to the cross-sectional extended (CIPS) unit root tests and the Lagrange multiplier bootstrap panel co-integration test. The point of every one of these philosophies is to dissect the since a long time ago run association that may exist among carbon dioxide outflows, genuine total national output (Gross domestic product) in the primary occasion and the square of genuine Gross domestic product in the subsequent example(Lee et al., 2017). The investigation likewise included energy utilization, exchange and the travel industry under an Ecological Kuznets Bend (EKC) copy for the association for financial co-activity and advancement (OECD) nations (Hussain et al., 2018).

The discoveries of the study built up a connection among power utilization and the journey industry. In a connected improvement,

the investigation discovered how a persistent ascent in worldwide exchange could help in improvement the ecological nature of the landmasses below evaluate. Notwithstanding this improvement, a depressing association was found among the EKC theories, Gross domestic product (Ang, 1994). The effects and ramifications of energy consumption discharge on the Gross domestic product and the earth completely rely upon the sort and substance of energy outflows. For example, energy consumption discharges, sulfur dioxide, and carbon monoxide effectively affect human wellbeing and the earth. To help this view, the investigation found how the connection between energy consumption emanations and monetary development is recognized to be measurably critical. This improvement verified the presence of altered U-shaped discoveries is the investigation. In that review, the creator set up the presence of a noteworthy connection between monetary development and expanding energy spending discharges in Taiwan (Nawaz et al., 2013).

To explain how affecting is the existence of power consumption in the Taiwanese financial system, the inventor keeps up that the Taiwanese Gross domestic invention would have been 34% less had it been power spending outflows is balanced out as contrasted and that of the 1990 level. In their trial examination establish the presence of a helpful relationship among reasonable financial improvement and power emanations (Howarth et al., 1991). Praising this finding is the honorable research discoveries in that examination exertion, the creator keeps up the viewpoint that monetary development and the abatement of natural corruption are perfect as per the EKC theory. Studies set up the existence of a positive connection among power spending outflows and monetary development at various times of their examinations. As already given, set up a depressing association among financial development and the per capita corruption emanations in the long-run (Zhao et al., 2018). In another advancement, investigated the causal affiliation connecting the utilization of energy, incomes, and emanations of energy consumption by counting speculation and work as further controllers of discharges of carbon however watched no causality connecting energy spending outflows and incomes (Hussain et al., 2012).

The observational evidence from their exploration set up that budgetary advancement, exchange transparency, monetary development, and associations need to capacity to restrict the pulverization of the biology while supporting the accessibility of the EKC idea. Supplementing the exploration discoveries in their investigation on China, built up that monetary area arrangements ought to be urged to encourage the work of current innovation by organizations that have the possibilities of lessening energy consumption emanations, as well as that, will similarly help in the effective improvement of the nearby yield (Yuan et al., 2008). Notwithstanding this point, the creators keep on keeping up that money related improvement energizes capitalization and monetary guidelines that help biological gauges ought to similarly be persuaded with the modern segments. Plenty of investigations have been a performance to minimize the effects of such contributions, where a certain investigation has put a further impact on the economic growth while consuming energy and development of financial businesses on the emission of carbon. For the sake of standards of ecology, the openness of trade, the development of economies and consumption of energies will be an effective means of overcoming issues. The study includes a certain hypothesis, which is as follows:

H_1: There is a significant association between accounting information system and the effective of energy consumption in the sugar industry in Indonesia.

H_2: There is a significant association between the intensity of energy and effectiveness of energy consumption in the sugar industry in Indonesia.

H_3: Effectiveness of supply chain moderates the relation between accounting information system and effective energy consumption in the sugar industry in Indonesia.

H_4: Effectiveness of supply chain moderates the relation between intensity of energy and effective energy consumption in the sugar industry in Indonesia.

3. RESEARCH METHODS

The goal of the existing study is to explore the impact of accounting information system (AIS) and intensity of energy on the effective energy consumption of the sugar industry in Indonesia. The goal also consist upon the moderating role of effectiveness of supply chain on the links of AIS and effective energy consumption, intensity of energy and effective energy consumption. The employees that are related with AIS and supply chain are the respondent and they provide the data by questionnaires and the data was evaluated by employing the effective tool of data analysis named as Smart-PLS. Around 710 questionnaires were distributed by the researcher among the respondents by personal visit and after 15 days only 590 questionnaires were received back and used for the analysis that represents around 83.09 percent response rate. The accounting information system (AIS) has 8 items, intensity of energy (IE) has 6 items, effectiveness of supply chain (ESC) has 10 items and effective energy consumption (EEC) has 5 items and these variables are shown in the Figure 2.

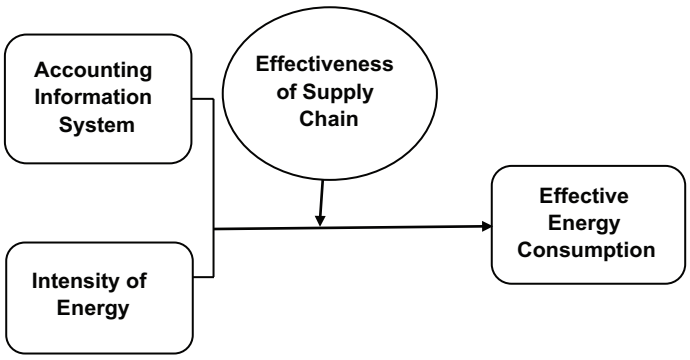
3.1. Theoretical Framework

The theatrical framework is reported in the Figure 1. It shows that variables like Accounting information system and intensity of energy are independent variables. Whereas, effectiveness of of supply Chain is acting as a moderator. In addition, effective energy consumption is the dependent variable.

3.2. Findings

The findings firstly exposed the convergent validity that show the items correlation with each other and the figure show that the Alpha values are more than 0.70 while CR values also higher than 0.70, AVE values are also more than 0.50 and loadings are larger

Figure 2: Theoretical framework



than 0.50 that is the indication of valid convergent validity. These figures are shown in Table 2.

The findings secondly exposed the discriminant validity that show the constructs correlation with each other and the figure show that the values of particular variable are larger than the other variables that is the indication of valid discriminant validity. These figures are shown in Table 3.

The findings also show the second method of checking the discriminant validity called cross-loadings that show the constructs correlation with each other and the figure show that the values of particular variable are larger than the other variables that is the indication of valid discriminant validity. These figures are shown in Table 4.

The findings also show the third method of checking the discriminant validity called Heterotrait Monotrait (HTMT) ratio that show the constructs correlation with each other and the figure show that the values of ratio are lower than 0.90 that is the indication of valid discriminant validity. These figures are shown in Table 5.

Table 2: Convergent validity

Constructs	Loadings	Items	Alpha	CR	AVE
Accounting information system	AIS1	0.834	0.941	0.951	0.710
	AIS2	0.862			
	AIS3	0.848			
	AIS4	0.813			
	AIS5	0.869			
	AIS6	0.869			
	AIS7	0.853			
	AIS8	0.787			
Intensity of energy	IE1	0.956	0.959	0.968	0.835
	IE2	0.823			
	IE3	0.955			
	IE4	0.957			
	IE5	0.821			
	IE6	0.957			
Effectiveness of supply chain	ESC1	0.568	0.919	0.925	0.589
	ESC10	0.890			
	ESC2	0.568			
	ESC3	0.883			
	ESC4	0.904			
	ESC5	0.568			
	ESC6	0.891			
	ESC7	0.904			
	ESC8	0.575			
Effective energy consumption	EEC1	0.809	0.852	0.900	0.692
	EEC2	0.840			
	EEC4	0.864			
	EEC5	0.813			

Table 3: Fornell larcker

	AIS	IE	ESC	EEC
AIS	0.842			
IE	0.398	0.914		
ESC	0.570	0.489	0.767	
EEC	0.416	0.508	0.436	0.832

The regression results show that AIS and intensity of energy have positive link with the effective energy consumption and accept H1 and H2. In addition, the results of path analysis also show that effectiveness of supply chain have positively moderation among the links of AIS and effective energy consumption, intensity of energy and effective energy consumption in the sugar industry of Indonesia (Figures 3 and 4). These path analysis are shown in Table 6.

4. DISCUSSIONS

The results show that AIS and intensity of energy have positive link with the effective energy consumption. The findings also show that effectiveness of supply chain positively moderates among the links of AIS and effective energy consumption, intensity of energy and effective energy consumption. The policymakers and the upcoming researchers will be the users of this study who can get guidelines in developing regulation regarding effective energy consumption and also in exploration of this area in future. AIS not only supports the decision-making process and managing the data works within all organizational structure but also helps to see the insights of organizations via implementing strong measures in the organization and helping for the success of the system and dynamic implementation (Sadorsky, 2010). It is not contrary to the above issue of constraints to be resolved at first, but the important task which is

Table 4: Cross-loadings

	AIS	IE	ESC	EEC
AIS1	0.834	0.291	0.465	0.330
AIS2	0.862	0.341	0.488	0.353
AIS3	0.848	0.305	0.455	0.321
AIS4	0.813	0.353	0.500	0.303
AIS5	0.869	0.345	0.499	0.324
AIS6	0.869	0.360	0.491	0.391
AIS7	0.853	0.372	0.482	0.417
AIS8	0.787	0.308	0.464	0.340
IE1	0.347	0.956	0.448	0.468
IE2	0.392	0.823	0.442	0.460
IE3	0.349	0.955	0.447	0.471
IE4	0.351	0.957	0.450	0.460
IE5	0.395	0.821	0.445	0.454
IE6	0.347	0.957	0.443	0.466
ESC1	0.679	0.187	0.568	0.164
ESC10	0.406	0.465	0.890	0.403
ESC2	0.667	0.183	0.568	0.159
ESC3	0.418	0.462	0.883	0.420
ESC4	0.377	0.471	0.904	0.424
ESC5	0.676	0.187	0.568	0.179
ESC6	0.399	0.469	0.891	0.410
ESC7	0.376	0.467	0.904	0.421
ESC8	0.678	0.199	0.575	0.180
EEC1	0.320	0.377	0.290	0.809
EEC2	0.339	0.493	0.389	0.840
EEC4	0.366	0.446	0.427	0.864
EEC5	0.361	0.358	0.330	0.813

Table 5: Heterotrait monotrait ratio

	AIS	IE	ESC	EEC
AIS				
IE	0.4180			
ESC	0.7180	0.4690		
EEC	0.4600	0.5560	0.4390	

Figure 3: Measurement model assessment

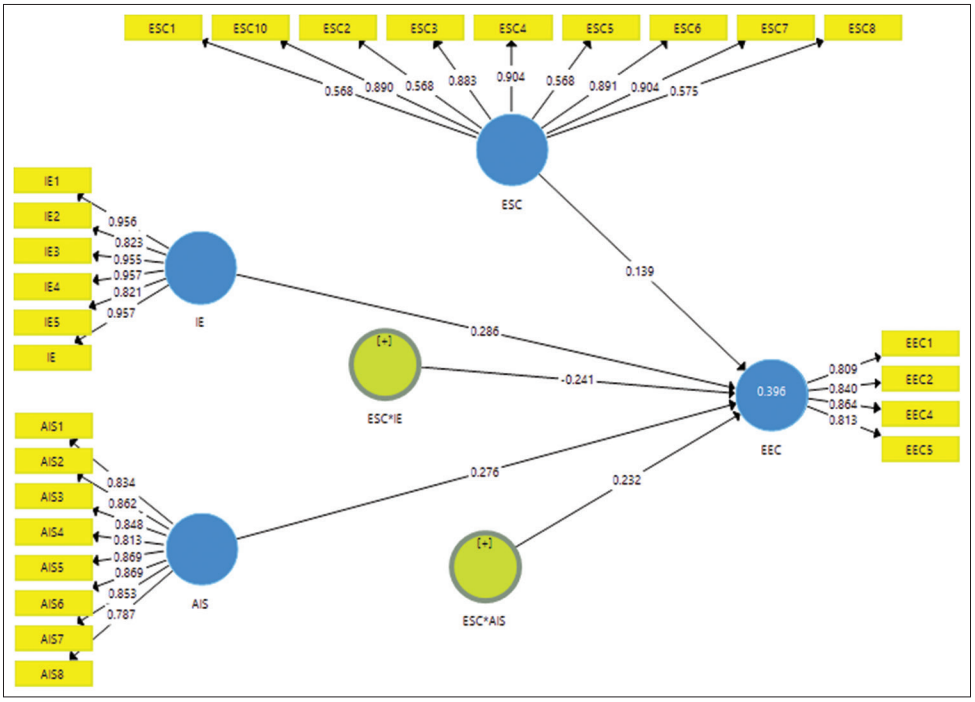


Figure 4: Structural model assessment

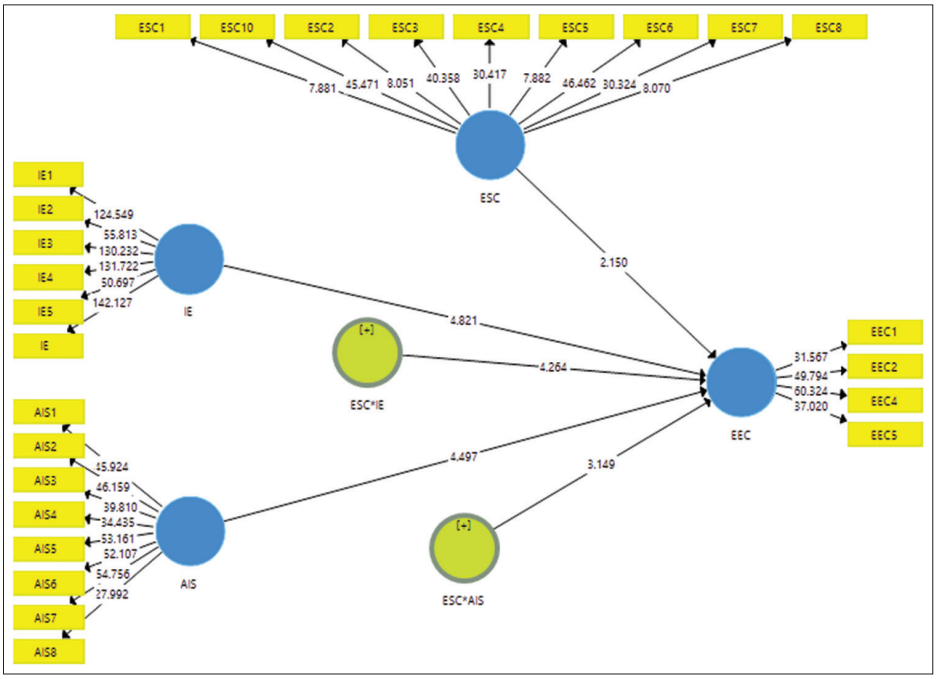


Table 6: Path analysis

	Beta	S.D.	t-values	P-values	L.L.	U.L.
AIS -> EEC	0.310	0.069	4.497	0.000	0.163	0.375
IE -> EEC	0.357	0.074	4.821	0.000	0.159	0.393
ESC ->EEC	0.153	0.071	2.150	0.027	0.020	0.228
ESC*AIS -> EEC	0.214	0.068	3.149	0.001	0.125	0.353
ESC*IE -> EEC	0.201	0.047	4.264	0.000	0.312	0.155

compulsory to be resolved is to implement an effective accounting information system to get prompt results for analyzing the growth and structure of an organization. Studies suggested that further research ought to be directed in this region. Further investigated the reasons for declining a fruitful execution of ERP framework in Egypt. Studies contemplated (45) Egyptian organizations that apply ERP framework in Egypt. Studies inferred that the information or culture-based influenced the utilization of the ERP framework adversely. Moreover, decided on the effect of the utilization of data innovation on the adequacy of accounting data frameworks.

The study considered the money related establishments recorded in the Primary Market in Amman Stock Trade which comprises

of (23) monetary organizations including banks and insurance agencies. Two surveys were created and appropriated to some of the money related and data innovation divisions of these organizations. Means and frequencies were utilized to depict the example of the study. Likewise, a t-test was utilized to test the critical theories of the investigation. The study discovered there is sway for data innovation on the viability of accounting data frameworks. The study prescribed that there is a need to focus on preparing and more investigates these issues. Studies planned to analyze the long-term money related execution because of changes in the ERP framework (Vanek and Sun, 2008). The outcomes uncovered that organizations that actualize the ERP framework demonstrated early upgrades in the monetary exhibition more than others.

5. CONCLUSION

At the end, this study concludes that the sugar industry in Indonesia have implemented effective supply chain practices along with the AIS in the organization that enhance the effective energy consumption in the firm that enhance their performance. Further executed the multivariate causality evaluation with an end goal to survey the causal affiliation connecting money related improvement, utilization of energy and energy consumption outflows. The creator utilized time arrangement information from China. The results from the exploration unveiled that money related improvement Granger causes energy utilization which thus brings about power spending depletion. Utilizing Turkish information, build up a finding that connects the speculations between monetary improvement and energy spending emanations. While utilizing South African information found that utilization of power Granger causes energy consumption discharges and that budgetary advancement is being Granger brought about by emanations of energy consumption. Interestingly, we re-explored the causality connecting the utilization of energy, budgetary advancement, and outflows of energy consumption. Right now unidirectional causality was built up moving from budgetary development to energy spending emanations (Giridharan and Emmanuel, 2018). In another strand of energy writing, investigated the contact of wealth related improvement and monetary growth on energy consumption emanations in the occasion of board nations that incorporate China, Russia, the US, Brazil and India, and in this manner investigated the capacity of associations on energy consumption discharges (Hussain et al., 2017).

This study has some limitations like it takes only AIS and intensity of energy as predictors and ignored the other factors that affecting the effective energy consumption and suggestion for future studies that they should incorporated this point in their analysis. In addition, the current study also ignored the mediating role on the effective energy consumption and future study should incorporate it also in their analysis. The results of existing study will implement only in Indonesia and future studies should add more studies to expand the scope of their literature.

6. ACKNOWLEDGMENT

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