

-RESEARCH ARTICLE-

## THE IMPACT OF GREEN ACTIVITY-BASED COSTING AND GREEN SUPPLY CHAIN PRACTICES ON ENVIRONMENTAL PERFORMANCE OIL REFINERIES IN IRAQ

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### —Abstract—

Due to a lack of green activities, environmental deterioration is a problem that affects the entire world. Thus academics and politicians need to focus on this issue. For this reason, the current study examines the effects of green activity-based costing (ABC) and green supply chains (GSC) techniques, such as eco-friendly purchasing and internal environmental management (IEM), on the environmental performance of oil refineries in Iraq. The current study additionally examines the moderating effects of environmental awareness on environmentally friendly purchasing, IEM, and the performance of oil refineries in Iraq. Survey questions were utilized in the study to collect data from the chosen respondents. The study also employed the smart PLS to examine the relationships between the components. The findings showed a strong correlation between environmental performance in Iraqi oil refineries and the green ABC, green purchasing, and IEM. The results also showed a significant moderating effect of environmental awareness on green purchasing, IEM, and environmental performance in Iraqi oil refineries. The research aids decision-makers in developing strategies to enhance environmental performance through green ABC and GSC practices.

**Keywords:** Green activity-based costing, green supply chain practices, green purchases, environmental performance, environmental awareness

### 1. INTRODUCTION

Hence The future of the environment is now a global concern. One of the biggest problems with the climate, which is increasingly regarded as a severe global problem, is that humanity is facing it (Giral et al., 2019). Worldwide warming, extreme weather, the ozone hole, and other environmental problems that affect mankind on a global scale are

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all results of human activity's devastation of the environment. The companies have faced challenges in recent years due to the emergence of resource depletion and environmental difficulties. Green concerns have been in the spotlight for a long time, and governments, corporations, and academics worldwide are devoting time to researching various green issues. Additionally, corporations have recently come under much pressure from stakeholders to reduce the environmental problems caused by diverse commercial operations (Singh et al., 2019). To improve their social performance, businesses must integrate environmental management methods and adhere to economic values (Kim et al., 2019). Environmental performance can be enhanced by implementing green practices like Green ABC or GSC initiatives like Green Purchasing and Internal Environment Management (IEM). Green ABC examines the company's expenses from the standpoint of business operations and links the various cost drivers to measure the effectiveness of particular objects (services or products). The ABC system, a novel costing methodology that can replace the conventional costing system and overcome its limitations in technological and economic progress, was introduced in the 1980s (Quesado et al., 2021). Hsieh et al. (2020) noted that ABC comprises two stages and is expanded from modern and newest cost accounting to improve the accuracy of cost calculations. The ongoing costs in which a company's management fees are linked to various activities, and the cost of those operations is linked to commodities. They claim that well-known companies will adopt green ABC to increase their profitability, distribution speed, and operational effectiveness.

There are many green SC practices, including green purchasing, green purchasing, green logistics, IEM, green design, and green packaging. In our research, we have employed IEM and green buying, two of the primary green SC techniques. The value chain's initial stage or procedure is considered green purchasing. Its effectiveness will depend on how diverse environmental goals, purchasing practices, and environmental actions are implemented (Yildiz Çankaya et al., 2019). Green purchasing also referred to as environmental purchasing, is the practice of acquiring goods and services with less adverse effects on the environment than at different phases of the lifecycle. The need to address climate change, global warming, and the preservation of our rapidly decreasing natural resources has caused GP to attract significant attention in academics and the industry, according to Ghosh (2019)'s study. He claims that GP mandates the purchase of goods with environmental features, such as reusability, reusability, and the use of fewer or non-toxic materials. One of the crucial GSC practices, GP, aids in eliminating the detrimental effects of various resources and raw materials (Darwish et al., 2021). GP is contributing significantly to the success of the company's environmental plans by integrating environmentally friendly goals into the procurement activities in the Supply Chain (SC). In addition to raising the product's value, GP aids businesses in enhancing their perception of the environment. GP enables businesses to engage and coordinate with suppliers to design upstream SC processes, improving environmental performances (Yu et al., 2019). Environmental management in businesses helps maintain and grow internal competencies and capabilities (Singh et al., 2020). They also noted in their

research the critical impact that leadership plays in the growth of internal organizational capabilities and competencies that are important for IEM. IEM focuses on creating environmentally friendly plans and goals to attain a protected environment. Concerns under the purview of IEM included interdepartmental coordination for increasing environmental practices, upper and middle management acceptance of environmental policies, and setting up a system of environmental management (Yildiz Çankaya et al., 2019). The following categories are included in IEM costs: wages for ecologically savvy employees, adoption of GSC practices, eco-friendly materials, and eco-friendly instruments (Namagembe et al., 2019). IEM, therefore, plays a very important part in influencing environmental performance.

Organizations are forced to adopt sustainable operations and strategies as public awareness of sustainability grow. Management scholars are emphasizing the capacities and competencies of firms and managers to improve environmental performance due to the increase in environmental sustainability being seen as a competitive advantage (Dzhengiz et al., 2020). Through environmental consciousness and green practices, businesses can use these tactics to gain a competitive edge. People's beliefs about the environment can develop through awareness and observation of the environmental and social effects of sustainability. The firm's principles, such as pursuing maximum profit and individual values, could be shaped by environmental consciousness. Environmental attitudes could be formed by considering how non-sustainable processes affect the environment, motivating businesses to adopt green practices to protect the environment (Ojo et al., 2020). The world's oil sector is a vital energy source and one of the key factors strongly influencing the global economy (Mojarad et al., 2018). Iraq is regarded as one of the Asian nations that export the most oil worldwide. Because of the emissions of greenhouse gases that result from the burning of fuel for various industrial purposes, human activity is connected to problems with climate change. The energy sector, specifically the oil industry, is regarded as the foundation of the Iraqi economy and the primary source of various oil derivatives, such as gas oil, gasoline, and liquefied gas (Hashim et al., 2020). Iraq's oil industry is seriously harming society and polluting the environment. Due to disregard for environmental regulations and negligent implementation, the sustainability difficulties for the oil industry in Iraq have gotten worse (Ibrahim et al., 2019). Green techniques must be included in Iraq's oil business, though, if it is to become more environmentally friendly. The oil sector in Iraq has benefited greatly from numerous research conducted in this field. The function and significance of sustainability or green practices in the oil industry have hardly ever been covered in the analysis. This study's first point of emphasis is on the importance of Green ABC, Green buying, IEM, and environmental awareness and how these affect environmental performance. The moderating effect of environmental awareness on the relationship between green behaviors and environmental performance is also examined in this study. This paper discusses the significance of these variables for achieving an ecologically friendly oil business in Iraq rather than just the function of these green techniques. This research fills a gap in the literature by examining several ecologically

friendly strategies used in Iraq's oil business. The following components make up this essay: introduction, which discusses the study's motivations and goals. The second section reviews the literature that includes numerous theories about the Green ABC, eco-friendly shopping, IEM, and environmental awareness based on past studies. The third portion explains the process and outcome. The debate, managerial implications, and potential constraints are covered in the final part.

## 2. LITERATURE REVIEW

Businesspeople, industrialists, academics, and environmental policymakers did not pay much attention to environmental issues a few years ago because they believed their organizational policies did not significantly affect or impact the environment. Academics, governments, and businesses have been concentrating on the trade-off between environmental preservation and economic growth and categorizing various best practices for the past few years. Every year since 2008, the World Environmental Conference (WEC) has hosted the conference, which mandates that all nations address concerns about sustainability and global warming (Li et al., 2020). Environmental problems are being felt on a worldwide scale. As knowledge of environmental issues grows daily, organizations are under pressure to make their operational activities more environmentally friendly. Green initiatives aim to eliminate the industry's harmful effects on the environment. At the same time, the triple bottom line principle served as the foundation for most GSC operations. This concept urges businesses to take on responsibility for the environment and society instead of merely concentrating on their financial gain. GSC practices are not just policies or strategies but also a philosophy to green the environment through a variety of ecologically responsible business practices, thereby promoting environmental sustainability as well as the profitability of the enterprises (Rehman Khan et al., 2021). Additionally, according to Badi et al. (2019), businesses are incorporating green practices into their operations to improve sustainability, save the environment, and boost productivity in a cutthroat market. To solve environmental issues, the accounting technique ABC is used to track the indirect and direct costs of items, depending on activities and tracing the carbon tax of the product (Yang et al., 2018). According to Qesado and Silva's study from 2021, the ABC system is designed to generate clear data on the products, costs, and supporting activities so that management may concentrate on the products and processes while making the best use of resources. According to Yang et al. (2018), ABC can reduce waste while accurately estimating product costs and improving environmental performance. Organizations must take the initiative to apply green ABC to create a sustainable business and optimize revenues. As is well known, Iraq's oil industry plays a significant role in the local economy, but it also negatively impacts the environment for several reasons. Industry must use environmentally friendly procedures like green ABC to end environmental problems. Since the cost savings from lower raw material costs throughout reuse and recycling are easier to measure and calculate using green ABC methodologies, this benefits environmental performance.

**Hypothesis 1:** Green ABC has a positive influence on environmental performance.

By choosing recyclable, robust, and reusable raw materials, green purchasing helps lessen the oil industry's harmful environmental effects. Purchasing could endanger the environment in the case of wasted goods. Therefore, choosing vendors with environmental policies is crucial (Chin et al., 2020). Procurement managers can significantly reduce the impact of a product on the environment by choosing products that are harmful to the environment (Ghosh, 2019). Companies can now work with suppliers to incorporate green policies and strategies into buying decisions, so the environment will benefit from using green resources (Abdel-Baset et al., 2019). Organizations already see the value of green purchasing as a strategy to promote cleaner production, reduce adverse environmental effects, and avoid waste. Getting involved with environmentally friendly suppliers is crucial to reaching green purchasing goals. It has been discovered that if a company's suppliers behave irresponsibly in terms of the environment, a significant portion of its customers will hold the companies accountable (Afum et al., 2020). Industries like the oil sector must get their raw materials from vendors with the skills and resources necessary to achieve sustainability. Therefore, businesses must ensure that their suppliers perform environmentally and buy environmentally friendly raw materials from them. Green purchasing, therefore, has a favorable impact on environmental performance.

**Hypothesis 2:** Green Purchasing has a positive influence on environmental performance.

Internal policies, environmental strategies, plans of action, quantifiable environmental and social responsibility goals, and auditing these elements are all parts of IEM (Uddin, 2021). IEM is regarded as the foundation of GSC procedures. IEM is a sign of top and middle management's awareness of and commitment to enacting environmentally friendly plans and policies. IEM improves environmental sustainability, according to Choi et al. (2018), through managerial support and commitment from the firm's management. It would help if you had upper management support, collaboration, excitement, and company culture to increase environmental performance. IEM's dedication is the foundation for the effective integration of GSC practices. Investing in environmental initiatives, including ISO 14001 certification, TQM (Total Quality Management), and information technology, IEM, may improve environmentally friendly activities (Singh et al., 2019). On the other side, IEM can educate their workers or employees about the value of green practices by offering various training and workshops on the necessity of sustainability and preserving the environment. The organizations' efforts to educate oil industry employees about green strategies and policies will be aided by the backing of IEM. IEM must therefore play a substantial role and hold a strong position in the organizations if the oil industry is to enhance its environmental performance. Consequently, it may be inferred from previous research that IEM improves environmental performance.

**Hypothesis 3:** IEM has a positive influence on environmental performance.

Global environmental awareness is starting to develop, making the subject attractive and worthwhile to discuss. [Indriani et al. \(2019\)](#) also highlighted in their study that green purchasing, which improves environmental performance, is strongly influenced by awareness and understanding of environmental protection. Environmentally conscious employees will be more familiar with sustainable policies and practices, enabling them to make eco-friendly purchasing decisions and recognize eco-friendly suppliers. Suppliers are very important, and green business practices will encourage businesses to use more sustainable resources ([Song et al., 2019](#)). The ability to recognize and distinguish suppliers who use sustainable and green strategies and practices and work to lessen their negative environmental impact is necessary for businesses to enhance their environmental performance. Consequently, the oil industry's environmental performance will be improved. As a result, environmental consciousness influences green purchasing and environmental performance in the oil business.

**Hypothesis 4:** The moderating role of environmental awareness between green purchasing and environmental performance.

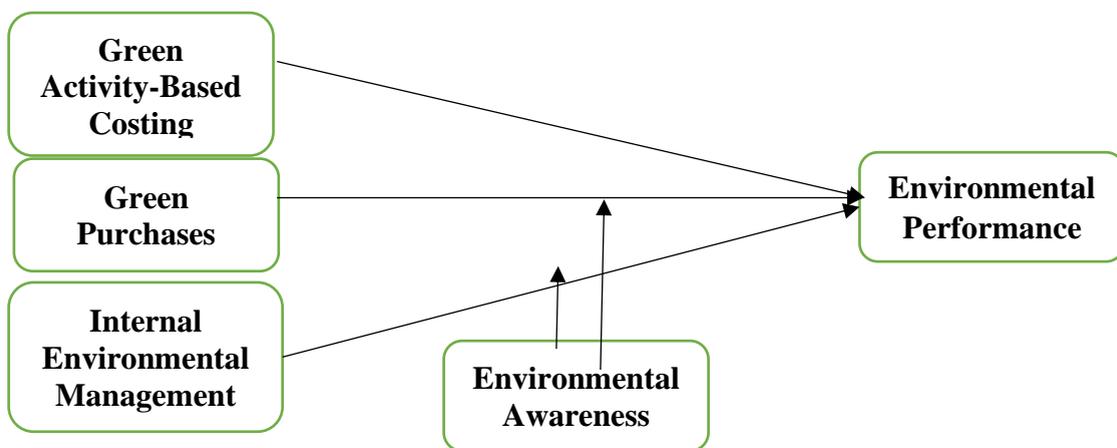
Environmental education or awareness is a key instrument for ensuring a sustainable environment. Recent research emphasizes the value of green management awareness for business performance. Environmental awareness serves two main aims: informing employees of a company's environmental regulations and changing employee behavior to foster ethical and responsible relationships with the environment ([Yildiz Çankaya et al., 2019](#)). According to [Pham et al. \(2020\)](#), IEM can offer environmental training programs to employees so they can deal with environmental difficulties by increasing environmental awareness. They contend that the environmental training programs will give the staff members the green information or environmental awareness they need to adopt sustainable behaviors in light of the company's environmental performance. According to [Singh et al. \(2019\)](#), training programs for employees on environmental performance, ethics, and sustainability advantages can also help to increase environmental awareness. They stated that in the face of stakeholder demand, businesses should implement and embrace a variety of environmental awareness measures to improve IEM and boost their environmental performance. Therefore, environmental consciousness and the oil industry's social duty to the environment will be crucial for IEM and serve as a moderating force that improves the environmental performances of the companies.

**Hypothesis 5:** The moderating role of environmental awareness between IEM and environmental performances.

### 3. RESEARCH METHODS

The study looks into the moderating effects of environmental awareness on green purchases, IEM, and environmental performance in Iraqi oil refineries, as well as the effects of green ABC, green purchases, and IEM on environmental performance. Survey questions were utilized in the study to collect data from the chosen respondents. The

researchers took the survey questions from earlier studies, such as the green ABC survey, which had eight questions taken from Tsai and Jhong (2019), the green purchases survey, which had eight questions taken from Han (2020), the IEM survey, which had five questions taken from Wang et al. (2019), the environmental awareness survey, which had seven questions taken from Novotný et al. (2021) and the environmental performance survey 2020. The study also employed the smart PLS to examine the relationships between the components. The smart PLS efficiently handles large and small data sets simultaneously (Hair et al., 2017). Additionally, it manages intricate frameworks well (Hair Jr et al., 2020). The researchers also employed three independent variables: IEM, green ABC (GABC), and green purchases (GPR). Additionally, the researchers used one moderator, such as environmental awareness (ENA), and one predictive variable, environmental performance (ENPR). Figure 1 shows these factors in a framework.



**Figure 1.** Theoretical Model

#### 4. RESEARCH FINDINGS

Convergent validity is the term for the research's examination of the item connection. The findings showed that the Alpha and composite reliability (CR) were greater than or equal to 0.70. The results also showed that the factor loadings and average extracted variance (AVE) are greater than 0.50. These findings revealed a strong link between the variables. These results are highlighted in Table 1.

Discriminant validity is a measure used in the study to assess the correlation between the variables. For this, Fornell Larcker and the cross-loadings were employed. Results showed that values indicating association with the variable are larger than those indicating a relationship with other variables. These results showed a weak association between the variables. These results are highlighted in Tables 2 and 3.

**Table 1. Convergent Validity**

Constructs	Items	Loadings	Alpha	CR	AVE
Environmental Awareness	ENA1	0.604	0.894	0.920	0.660
	ENA3	0.858			
	ENA4	0.845			
	ENA5	0.872			
	ENA6	0.871			
	ENA7	0.791			
	Environmental Performance	ENPR1			
ENPR2		0.800			
ENPR3		0.852			
ENPR4		0.822			
ENPR5		0.859			
ENPR6		0.849			
Green Activity-Based Costing		GABC1	0.775	0.875	0.898
	GABC2	0.565			
	GABC3	0.781			
	GABC4	0.738			
	GABC5	0.763			
	GABC6	0.690			
	GABC7	0.711			
	GABC8	0.754			
Green Purchases	GPR1	0.866	0.933	0.945	0.681
	GPR2	0.849			
	GPR3	0.847			
	GPR4	0.861			
	GPR5	0.864			
	GPR6	0.771			
	GPR7	0.740			
	GPR8	0.796			
Internal Environmental Management	IEM1	0.928	0.961	0.970	0.865
	IEM2	0.934			
	IEM3	0.931			
	IEM4	0.943			
	IEM5	0.915			

Discriminant validity is a measure used in the study to assess the correlation between the variables. For this, the Heterotrait Monotrait (HTMT) ratio was employed. The results showed that the values are below 0.85. These results showed a weak association between the variables. These results are highlighted in [Table 4](#).

**Table 2. Fornell Larcker**

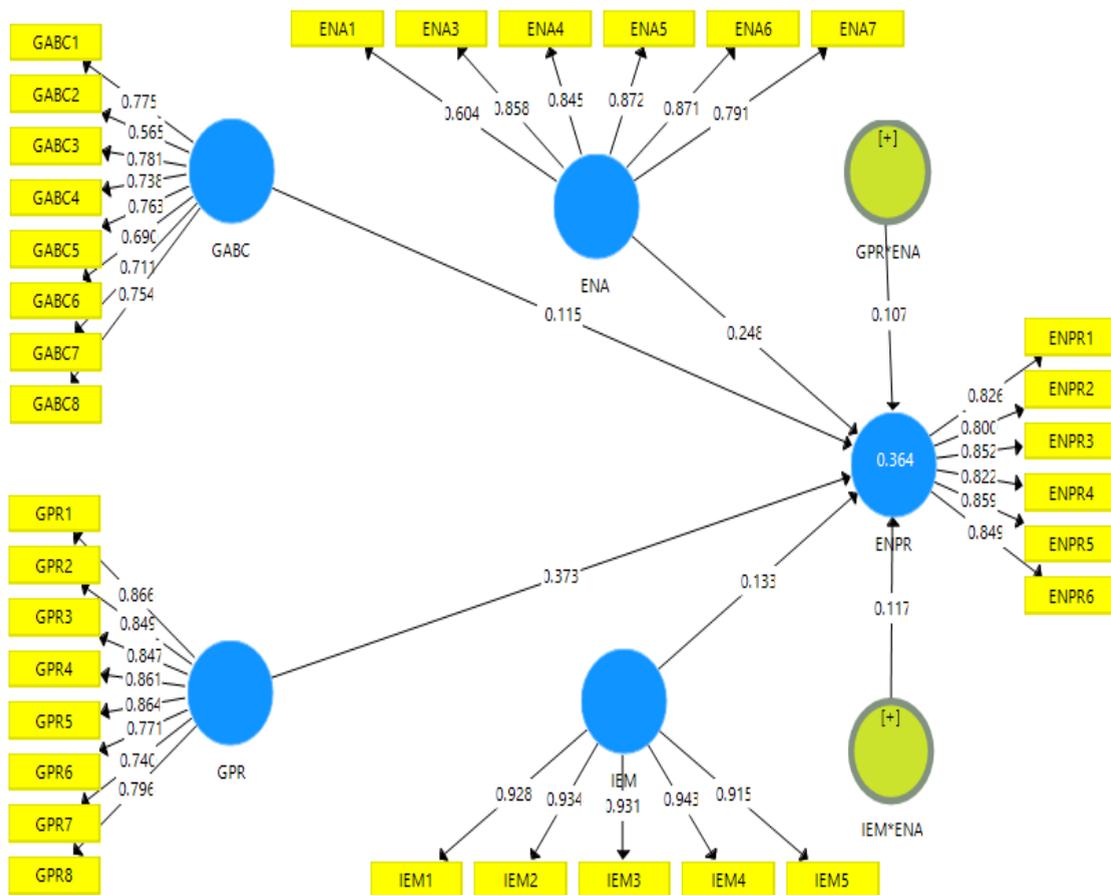
	<b>ENA</b>	<b>ENPR</b>	<b>GABC</b>	<b>GPR</b>	<b>IEM</b>
ENA	0.812				
ENPR	0.426	0.835			
GABC	0.117	0.162	0.725		
GPR	0.448	0.505	0.024	0.826	
IEM	0.423	0.401	0.117	0.506	0.930

**Table 3. Cross-loadings**

	<b>ENA</b>	<b>ENPR</b>	<b>GABC</b>	<b>GPR</b>	<b>IEM</b>
ENA1	<b>0.604</b>	0.260	-0.082	0.265	0.188
ENA3	<b>0.858</b>	0.340	-0.125	0.385	0.356
ENA4	<b>0.845</b>	0.323	-0.117	0.360	0.351
ENA5	<b>0.872</b>	0.358	-0.078	0.404	0.377
ENA6	<b>0.871</b>	0.408	-0.103	0.407	0.394
ENA7	<b>0.791</b>	0.363	-0.065	0.341	0.356
ENPR1	0.377	<b>0.826</b>	-0.126	0.458	0.342
ENPR2	0.356	<b>0.800</b>	-0.164	0.451	0.402
ENPR3	0.321	<b>0.852</b>	-0.067	0.394	0.302
ENPR4	0.369	<b>0.822</b>	-0.146	0.400	0.318
ENPR5	0.367	<b>0.859</b>	-0.165	0.422	0.328
ENPR6	0.335	<b>0.849</b>	-0.135	0.391	0.304
GABC1	-0.128	-0.126	<b>0.775</b>	-0.038	-0.088
GABC2	-0.084	-0.158	<b>0.565</b>	0.012	0.000
GABC3	-0.071	-0.105	<b>0.781</b>	-0.019	-0.098
GABC4	-0.075	-0.082	<b>0.738</b>	0.029	-0.079
GABC5	-0.136	-0.126	<b>0.763</b>	-0.048	-0.160
GABC6	-0.044	-0.021	<b>0.690</b>	0.075	-0.072
GABC7	-0.053	-0.071	<b>0.711</b>	0.013	-0.050
GABC8	-0.023	-0.120	<b>0.754</b>	-0.066	-0.126
GPR1	0.374	0.443	-0.055	<b>0.866</b>	0.403
GPR2	0.358	0.451	-0.009	<b>0.849</b>	0.452
GPR3	0.375	0.451	0.023	<b>0.847</b>	0.434
GPR4	0.371	0.432	-0.020	<b>0.861</b>	0.449
GPR5	0.379	0.426	-0.019	<b>0.864</b>	0.454
GPR6	0.358	0.373	0.005	<b>0.771</b>	0.396
GPR7	0.360	0.381	-0.094	<b>0.740</b>	0.387
GPR8	0.389	0.365	0.004	<b>0.796</b>	0.353
IEM1	0.392	0.360	-0.137	0.468	<b>0.928</b>
IEM2	0.426	0.360	-0.099	0.474	<b>0.934</b>
IEM3	0.383	0.362	-0.128	0.471	<b>0.931</b>
IEM4	0.409	0.382	-0.099	0.475	<b>0.943</b>
IEM5	0.358	0.398	-0.086	0.462	<b>0.915</b>

**Table 4. Heterotrait Monotrait ratio**

	ENA	ENPR	GABC	GPR	IEM
ENA					
ENPR	0.467				
GABC	0.124	0.158			
GPR	0.490	0.543	0.075		
IEM	0.451	0.425	0.128	0.533	

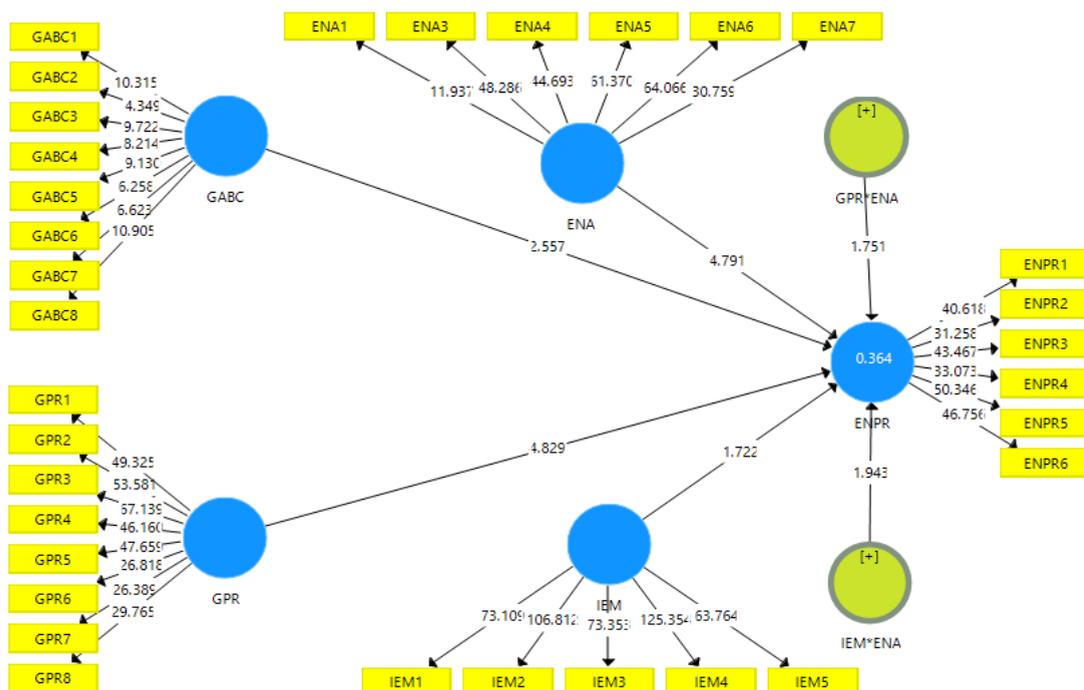


**Figure 2: Measurement Model Assessment**

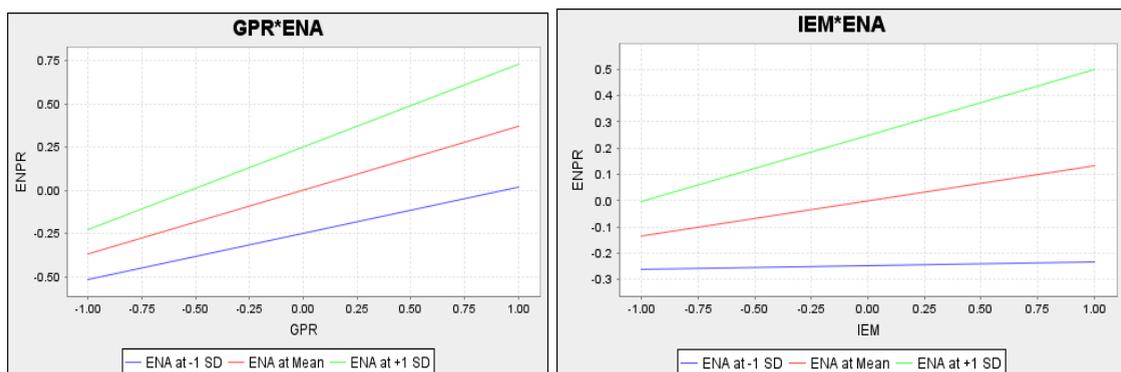
The findings showed that H1, H2, and H3 are acceptable and that the green ABC, green purchasing, and IEM have a favorable relationship with environmental performance in Iraqi oil refineries. The results also showed that environmental consciousness significantly moderates the acceptance of H4 and H5 and green purchasing, IEM, and environmental performance in Iraqi oil refineries. These results are highlighted in [Table 5](#).

**Table 5. A Path Analysis**

Relationships	Beta	Standard Deviation	T Statistics	P Values
ENA -> ENPR	0.248	0.052	4.791	0.000
GABC -> ENPR	0.115	0.045	2.557	0.006
GPR -> ENPR	0.373	0.077	4.829	0.000
GPR*ENA -> ENPR	0.107	0.061	1.751	0.041
IEM -> ENPR	0.133	0.077	1.722	0.044
IEM*ENA -> ENPR	0.117	0.060	1.943	0.027



**Figure 3. Structural Model Assessment**



**Figure 4. Moderation Analysis**

## 5. DISCUSSIONS

The findings demonstrated that green ABC positively impacts the oil industry's environmental performance. The earlier work by [Tsai, Chu, et al. \(2019\)](#) also supports these findings. They suggested using the green ABC approach to address environmental challenges. The research of [Hsieh et al. \(2020\)](#), which stated that adopting green ABC will encourage the firm's management to emphasize and concentrate on purchase behaviors, has also been used to support these studies. This has improved organizational productivity, profitability, and environmental performance of the organizations. According to [Tsai and Jhong \(2019\)](#), ABC can link the carbon tax to specific items or products to solve environmental issues, improving an organization's environmental performance. Thus, it has been demonstrated that the Green ABC model may be implemented in the Iraqi oil business to meet sustainability goals, proving that it has a favorable impact on environmental performance.

The outcomes demonstrated that green buying has a favorable impact on environmental performance. The study of [Chin et al. \(2020\)](#), which discusses the beneficial effect of green purchasing on environmental performance, also supports this finding. They contend that purchasing goods from environmentally friendly vendors will help businesses achieve their sustainability objectives. According to [Afum et al. \(2020\)](#), working with green and eco-friendly suppliers is crucial for businesses to succeed in sustainability. Additionally, they said that green purchasing is increasingly seen as an effective and important technique for promoting green behaviors, which improves environmental performance. To improve environmental performance, firms in the oil industry must concentrate on green purchasing.

Additionally, the outcome indicated that IEM positively affects environmental performance. This claim is also confirmed by a prior study by [Uddin \(2021\)](#), who determined that IEM will improve the industry's environmental performance. He believes strong IEM will always result in lower energy use, waste recycling, and resource utilization. This is what the management and the workforce think. Additionally, he said that employing green management would enable workers to use resources responsibly, making the process more eco-friendly and enhancing environmental performance. In their study, [Singh et al. \(2019\)](#) also noted that IEM has a considerable and advantageous impact on environmental performance. By starting and promoting investments in environmentally responsible management, the IEM contribution rises. [Yildiz Çankaya et al. \(2019\)](#)'s work provides additional evidence for the beneficial effects of IEM on environmental performance. They contend that for a business to be sustainable, the leadership and senior management must support and implement methods encouraging employees to act sustainably. IEM will therefore have a positive impact on the environmental performance of the oil industry in Iraq through a variety of green measures.

The findings demonstrated a strong mediator between green purchasing and environmental performance: environmental awareness. There is, however, no study that

explicitly shows how environmental knowledge influences both green purchasing and environmental performance. [Indriani et al. \(2019\)](#)'s earlier research has addressed the importance of environmental awareness in achieving sustainability. Businesses can adopt a green purchasing attitude toward their suppliers if their organizations, management, and employees know about environmentally friendly and green practices. Green purchasing and procurement practices enhance the environmental performance of their sector. Furthermore, any company can concentrate on green purchasing behavior, and improving environmental performance, with the right expertise and information on environmentally friendly practices. As a result, we can state from our research's findings that environmental performance in the oil refinery sector moderates green purchasing and environmental performance.

The findings demonstrated a moderating relationship between IEM and environmental performance mediated by environmental awareness. Any such finding does not directly support the results of this hypothesis. [Yildiz Çankaya et al. \(2019\)](#) have discussed the value of environmental education or awareness about environmental performance. Organizations will find it challenging to incorporate green practices into their operations without the help of IEM. To do so, they need to be properly informed about such procedures. Therefore, in our study, we made the case that environmental awareness plays a moderating function between IEM and the environmental performance of enterprises for the successful application of green practices in the oil industry.

## 6. THEORETICAL IMPLICATIONS

Since this work made a significant contribution to the field, it is a source of learning for many authors. In this study, we examine the relationship between green practices' effects on environmental performance, including Green ABC, Green Purchasing, and IEM, and the moderating effect of environmental awareness on the relationship between green SC practices and environmental performance. The impact of these factors on the Iraqi oil refinery business had never been collectively studied. This study also focuses on the moderating function of environmental awareness between green purchasing and environmental performance, demonstrating environmental awareness's considerable moderating influence in promoting green purchasing behavior. Only when staff members are knowledgeable about green practices and how to apply them will they be able to improve a company's environmental performance.

Additionally, we highlighted how environmental awareness influences how well IEM and environmental performances interact in our study. IEM may increase the companies' sustainability by developing green policies to lessen their negative environmental impact through environmental education. No prior literature examines the moderating effect of environmental knowledge on Green SC practices. As a result, this study significantly advances the field's understanding of how green practices affect Iraq's oil refinery business.

## **7. EMPIRICAL IMPLICATIONS**

This research is important to Iraq's oil refinery sector. The creation of various carbon emissions and greenhouse gases from Iraq's largest industry, the oil refinery, has a detrimental effect on the environment. Therefore, the government, policymakers, and management must implement such methods to improve environmental and corporate sustainability. This study shows that adopting green practices like the ABC model, green buying, and IEM can assist businesses in maintaining a favorable impact on environmental performance. The research aids decision-makers in developing strategies to enhance environmental performance through green ABC and GSC practices. Industrialists can attain a sustainable aim that not only offers them financial rewards but also makes them ecologically friendly thanks to the involvement of these green practices and environmental awareness.

## **8. CONCLUSION**

The study's main goal was to analyze the effects of the Green ABC model, Green Purchasing, and IEM on environmental performance. The findings demonstrated that businesses might track the costs of resources and provide transparency in the calculation by applying the green ABC model. With less material waste and increased profitability, this strategy will aid businesses in improving their environmental performance. Additionally, green purchases enhance environmental performance by selecting the right green suppliers. By adopting less hazardous items that contribute to a sustainable environment, businesses will be better equipped to understand how they may increase environmental efficiency. However, IEM also benefits environmental performance since effective management will work with staff members to implement green practices into daily operations. Additionally, the moderating effect of environmental awareness on the relationship between green purchasing and environmental performance suggests that businesses can implement green practices by educating employees about green purchasing. Additionally, raising IEM's understanding of environmental issues through various workshops, training, and campaigns might encourage them to use green practices, improving the oil industry's environmental performance.

## **9. LIMITATIONS**

This study has several limitations, but they can be fixed in the future. Since our only green SC practices have been IEM and green purchasing. In the future, one can incorporate the study of additional practices like eco-design, eco-packaging, and eco-logistics. Future researchers must investigate these issues to understand how green practices affect environmental performance. Another drawback of this study is that only one moderator was utilized in it. Future researchers can explore the function and effects of various green practices and environmental performance using more than one moderator in the research framework. Last but not least, this study only focuses on the Iraqi oil refinery sector. It is possible that neither developed nor developing nations can use this study.

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