CO$_2$ Emission from Oil & Gas Production - Challenges & Opportunities

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Abstract

The analysis in the report is related to the issue of emission of CO$_2$ from the oil and gas companies in Pakistan. The issue was selected considering the increasing threats for the environmental sustainability that are caused due to the emission of CO$_2$ gases on consistent basis. The variables that were chosen for the purpose of analysis were knowledge of the firm, incentives of the government, magnitude of CO$_2$, cost and scale of CCU technology. The statistical techniques that were applied were regression, correlation and Cronbach alpha analysis. The findings that were obtained through regression and correlation illustrated a positive impact between the independent and the dependent variables.

Keywords: Carbon Capture and Utilization, Awareness, Acceptance, Perception, Emissions, Greenhouse Gases, Emissions Reduction, Emissions Mitigation.

1. Introduction

The underlying research is based on the topic of "CO$_2$ emission from Oil & Gas Production – Challenges and Opportunities". The research has been conducted in the context of Pakistan and the ways in which the organizations in the country operating in oil and gas industries are involved in the emission of CO$_2$ and the challenges along with the opportunities that they face in this regard.

While carrying out general plant operations, the organizations operating in the oil and gas industry are constantly involved in removing acid gases which also include CO2 from the gas streams. As a result of that, there is a continuous flare of gas that is passed through which also consists of unwanted natural gas which passes through the process of combustion. The release of acid related gases creates significant threat for the environment as they contribute towards the emission of greenhouse gases which has resulted in causing increase in the threat of global warming. In addition to that, greenhouse gases also result in trapping heat within the atmosphere (Otene, Murray and Enongene, 2016).

The reduction within the level of emission in carbon dioxide can be made if the captured CO$_2$ can be converted into highly valued products such as Methanol or using CO$_2$ for the purpose of injecting increasing degree of Enhanced Oil Recovery. However, providing the required degree of incentives to the organizations is important by the regulatory authorities to make sure that the process can be performed in a cost-effective manner (Pinchasik and Hovi, 2017).

Nevertheless, there are different challenges and barriers that are associated with the process of implementing CCU technology for the purpose of reducing the level of carbon emission within air. The challenges include the cost associated with this process along with the lack of knowledge and awareness and the lack of effective and suitable policies of the government in this regard. In addition to that, the awareness of the individuals of the society in general is also considered as a major contributing factor in this regard (Van Heek, Arning and Ziefle, 2017).

Considering the discussion and the background that have been presented above, the aim that has been developed for this research is related to identification of the association between reduction of CO$_2$ emission and the criteria of success that is needed to be achieved in the Oil and Gas industries of Pakistan in this regard. The objectives that have been identified for the research are illustrated below

- To identify factors that can influence the success and viability of CCU implementation projects
- To analyze the challenges that oil and gas companies are facing in Pakistan in relation to dealing with the process of utilizing emitted CO$_2$.
- To obtain empirical evidence regarding the nature of success factors and success criteria and the development of relationship between them with the purpose of making a valuable contribution to the research

2. Literature Review

According to Wegener, Labelle and Jerman (2019), it is essential for the organizations operating in the Oil and Gas industry to have the knowledge about the issue of carbon emission within the organization and the need to take significant steps in order to reduce its intensity. The lack of proper company knowledge in this regard can

result in lack of proper direction in relation to the procedures adopted for the purpose of reducing the amount of CO_2 within the atmosphere. On the other hand, it is argued by Radonjič and Tompa (2018), that the knowledge of the processes is important in terms of identifying the kind of measures needed to be implemented to reduce the emission of CO_2 within the operations of the organization. Nevertheless, in the view of Obeidat, Al Bakri and Elbanna (2018), organizations need to have the required knowledge about the requirements in relation to maintaining their activities with respect to reducing or limiting the amount of CO_2 generated from the operations. The information and the knowledge factors in this regard can be considered as instrumental in terms of planning the remedial measures needed to minimize the amount of CO_2 generated from the activities of the corporation.

In the view of Rodriguez Lopez, Engels and Knoll (2017), it is imperative for the organizations to closely monitor their activities and procedures with respect to the magnitude of CO_2 emissions. This is because it analyzes the capability of the corporations in relation to bringing about reductions within the level of CO_2 emissions through their operations. Furthermore, it is stated by Cherepovitsyn and Ilinova (2016) that the level of CO_2 emissions through the manufacturing operations and activities of the oil and gas companies provide guidance regarding the extent of the improvements that are needed to be brought about in this regard. On the contrary, it is argued by Heede and Oreskes (2016) that the effectiveness of the organizations in terms of emission of CO_2 is largely dependent upon the standards prevailing within the industry and in the overall environment.

Taking into consideration the increasing threats related to global warming, the governments around the globe have been involved in developing regulations and policies through which the poisonous gases that are emitted within the atmosphere are reduced (Cass, 2016). On the other hand, it is illustrated that the contribution of government is significant in terms of creating awareness amongst the society in general and specifically to the oil and gas companies about the need to reduce CO_2 emission on consistent basis (Zhong, Wang, Fan and Xing, 2018). One of the contributions that are made by the governments in terms of reducing the emission of CO_2 is by reducing the production of greenhouse gases by means of developing carbon limits and carbon budgets. In addition to that, standard should also be established regarding the extent to which the organizations should be allowed to get indulged in the emission of CO_2 and greenhouse gases. Similarly, it is important for the policy makers of different countries to provide the necessary assistance to the companies in the oil and gas sector in terms of improving the efficiency of their operations and reduce the amount of carbon emission. The funds and the assistance that are obtained by the oil and gas companies from the policy makers can be spent in terms of undertaking researches regarding the ways in which the issue of carbon emission can be resolved. Nevertheless, to effectively achieve objectives in this regard, it is important that effective collaboration and coordination are developed between the government authorities and the decision makers of the organizations. Establishment of collaboration is important to implement effective policies regarding environmental sustainability. One of the ways in which encouragement can be provided to the organizations in terms of taking measures to reduce carbon emission is to provide them (Nong and Siriwardana, 2017).

In order to improve the performance of the corporations in terms of improving the level of carbon emission, CCU technology is being applied to make sure that the required and leftover elements of the carbon emissions are used and recycled in a proper manner. The use of this technology is considered effective in terms of storing and using carbon dioxide for the purpose of recycling (Han, 2017). There are various technologies associated with CCU that are utilized such as methanol, biofuel and other kinds of renewable sources of energy. The use of these kinds of technologies at the large scale contributes significantly towards effectively countering the issue of environmental sustainability in the long run. However, while using these technologies, it is important that a proper understanding is being developed regarding the ways in which these technologies can be used in an efficient manner (Meunier, Chauvy, Mouhoubi, Thomas and De Weireld, 2020)

Apart from the consistency and effectiveness of use, the other significant factor related to the utilization of CCU technology is concerned with the cost that is incurred in relation to using this kind of technology. The element of cost can be considered as instrumental simply because of the fact that it can have a direct impact on the profitability of the corporations. The other major factor associated with the use of cost in terms of using CCU technology is the fact that it can reduce the efficiency with which the overall process can be carried out in relation to the use of CCU technology for reducing carbon emission and improving environmental performance. Therefore, it would be fair to say that the required awareness needs to be developed regarding the efficient utilization of CCU technology in the long run.

3. Methodology
3.1 Research Design
The design that has been applied in the current research is causal design. The researches performed in the light of this kind of design generally involve identifying the pattern of relationship that exists between different variables in a research (Blalock, 2017). Since the current research is based on identifying the relationship between the factors related to success factors and success criteria regarding reducing the emission of CO_2; therefore, causal design of research is considered as appropriate for this particular research.

3.2 Research Approach

Quantitative approach is applicable in the underlying research with the view of testing the hypotheses that will be developed after conducting literature review. Keeping into consideration the need to implement quantitative approach data containing numerical elements have been obtained in the research with the purpose of deriving relevant findings. According to Babones (2016), quantitative approaches within researches are generally applied with the objective of obtaining more authentic evidence about the relationship between different variables which is not achievable in the case of non-numeric data.

3.3 Research Strategy

Survey strategy was used in the research considering the need to acquire quantitative data. Therefore, surveys through the use of questionnaire were conducted which involved the use of Likert Scale which gave different options to the respondents. The benefit of choosing the strategy of survey was that it provided researcher the opportunity to gather substantial data which was helpful in the completion of research objectives. Therefore, questionnaires were distributed to the professionals in different oil and gas companies located in Karachi. The scales that were used in the questionnaire 1=strongly disagree and 5= Strongly Agree. According to Fulton (2018), a key rationale for applying survey strategy in a research is that it enables researcher reach out towards significant number of respondents and gather large amount of data. In this way, surveys can make a telling contribution in terms of extracting meaningful findings regarding the topic of a research. However, one of the challenges that can be linked with the survey strategy is that it does not provide detailed explanation and understanding about the overall views and opinions of the respondents.

3.4 Sample Size and Selection

It is important to derive relevant sample of the data as it is difficult to reach out towards entire population. However, it is difficult to identify an adequate sample which can be considered as true representative of the population. The sample size of 50 managers of the oil and gas companies of Pakistan was adopted in the research. It was believed that including 50 respondents in the survey would be helpful in terms of obtaining diversified perspectives and opinions about the issues and the variables for the current research.

However, the selection of sample was made possible with the help of the application of appropriate sampling technique. The technique of sampling that was executed in the current research is convenience sampling. This type of sampling was applied because it provides opportunity to the researcher to include those respondents that are available during a particular period of time for the purpose of offering their opinion about a specific issue. Since there are several companies that are providing services in the oil and gas industry of Pakistan; therefore, it was important to apply convenience sampling in order to target the right kind of representatives for the purpose of conducting surveys. In addition to that, the issue which was required to be dealt with by the researcher was to reach out towards the managers which was reduced to certain extent by means of the application of convenience sampling technique.

3.5 Data Analysis

The purpose of analyzing data is to interpret it in the manner which can be understandable by the readers and that can fulfill the overall purpose of the research. There are different analytical techniques that are applied in the present research such as Cronbach alpha analysis for the purpose of deriving reliability of the data along with presentation of descriptive analysis. In addition to that, demographic analysis to go along with regression and correlation was also considered as useful for the research. All these techniques were applied through the use of SPSS which is highly effective tool for the purpose of applying various analytical techniques.

4. Findings

4.1 Reliability Analysis

The first part of the findings is related to analyzing the reliability of the scales that were used in the questionnaire for the purpose of conducting surveys. The analysis in this regard was made with the help of statistical technique of Cronbach Alpha which is considered as a reliable tool for this particular purpose.

Reliability Statistics

Cronbach's Alpha	N of Items
.948	24

Table 6: Cronbach Alpha

The value of Cronbach alpha that was reported regarding the scales was 0.948 which proved that the scales used in the instrument were highly consistent and therefore further research can be carried out on the basis of the outcomes through these scales.

4.2 Demographic Analysis

The other part of the analysis was concerned with analyzing the demography of the respondents that took part in the process of survey. Performing analysis in this regard was important in order to obtain knowledge regarding the type of respondents that took part in the research.

Age of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-35	25	25.0	25.0	25.0
	36-41	17	17.0	17.0	42.0
	42-47	21	21.0	21.0	63.0
	48-53	27	27.0	27.0	90.0
	54 and above	10	10.0	10.0	100.0
	Total	100	100.0	100.0	

Table 7 Age of the Respondents

In relation to the variable of age, most of them were between 48 and 53 and the second largest number was between 30 to 35 years of age. In addition to that, there were some managers as well that belonged to different age groups such as 36 to 41, 42 to 47 and 54 and above. The involvement of individuals belonging to variety of ages illustrated that the researcher was largely successful in terms of obtaining opinions from the individuals that belong to diversified age groups.

Experience of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-2 years	24	24.0	24.0	24.0
	3-4 years	25	25.0	25.0	49.0
	5-6 years	23	23.0	23.0	72.0
	7-8 years	28	28.0	28.0	100.0
	Total	100	100.0	100.0	

Table 8 Experience of the Respondents

Apart from experience, the other demographic variable that has been discussed in this research is related to experience that the managers had those who took part in the process of survey. The findings in this case were also diversified in nature where people having different kinds and years of experience ranging from 1 to 2 to 7 to 8 were involved in the survey. The involvement of the individuals belonging to different age groups was important as it facilitated the researcher in terms of obtaining views and opinions of the individuals having a wide range of experience while working in the oil and gas industry of Pakistan.

4.3 Descriptive Analysis

The purpose behind performing descriptive analysis is to identify the pattern or the trend of responses that were obtained regarding all the independent and the dependent variables.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
We believe that possessing knowledge about environmental factors is important in terms of reducing CO_2 emissions	100	1.00	5.00	3.9200	1.33847
Knowledge about internal processes is important in reducing CO_2 emissions	100	1.00	5.00	4.0400	1.31748
Knowledge about legal factors is important in reducing CO_2 emissions	100	1.0	5.0	3.920	1.4048
Possessing knowledge regarding measures needed to be taken to reduce CO_2 emissions is important	100	1.00	5.00	4.3900	1.18312
Valid N (list wise)	100				

Table 4(a)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
It is important to analyze the magnitude of CO_2 generated from the operations	100	1.00	5.00	4.2000	1.11949
The magnitude of CO_2 emissions differs from one time period to another	100	1.00	5.00	3.5000	1.44600
Increase or decrease in magnitude of CO_2 affects our performance	100	1.00	5.00	3.5900	1.44317
We are intending to reduce the magnitude of CO_2 generated from our operations	100	1.00	5.00	3.7700	1.37698
Valid N (list wise)	100				

Table 4(b)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Incentives provided by the governments cover up our cost of taking measures related to sustainability	100	1.00	5.00	4.0300	1.11423
Technical incentives by the governments are helpful in terms of reducing CO_2 emissions	100	1.00	5.00	3.9400	1.15312
Collaborating with the regulatory authorities is important in relation to improving environmental performance	100	1.00	5.00	3.9800	1.17189
Incentives can offer long term benefits	100	1.00	5.00	3.9800	1.14574
Valid N (list wise)	100				

Table 5

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Cost is one of significant hurdles in terms of reducing CO_2 emissions through CCU technology	100	1.00	5.00	4.2800	1.32024
Cost affects our overall budget of using CCU technology	100	1.00	5.00	4.1400	1.30050
We are constantly looking towards ways to reduce the cost of CCU	100	1.00	5.00	4.1000	1.32024
Cost is affected by the scale at which we use CCU	100	1.00	5.00	4.0200	1.29786
Valid N (list wise)	100				

Table 6

4.4 Regression Analysis

Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.644	.321		5.118	.000
Knowledge	.583	.085	.569	6.853	.000

Table 7

Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.683	.134		5.098	.000
Magnitude	.853	.035	.925	24.067	.000

Table 8

Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.227	.355		3.459	.001
Incentives	.638	.087	.597	7.371	.000

Table 9

Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.116	.190		5.863	.000
cost	.688	.047	.828	14.636	.000

Table 10

Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.588	.227		2.588	.011
Scale	.817	.056	.825	14.478	.000

Table 11

The findings of the regression analysis have been obtained by means of conducting test of the hypotheses in the light of the sig values that have been derived through the analysis in the SPSS. The sig values that have been obtained regarding all the variables are below the standard value of 0.05. On the basis of this value, we can accept all the hypotheses and can conclude that there is a positive relationship between all the independent and the dependent variables in the context of the oil and gas companies operating in Pakistan. In other words, it can be stated that knowledge of the organizations, magnitude of CO_2 emissions, government policies, cost and the scale of CCU technologies have a positive impact on the process of reducing CO_2 emissions. In other words, it would be fair to say that bringing about improvement in the process of implementing the independent variables would be directly related to reducing the overall level of CO_2 emissions within the environment in Pakistan.

The details regarding the extent of the association that exists between these variables would be provided through correlation analysis.

4.5 Correlation Analysis

The major characteristic of the correlation analysis is that it provides information regarding the extent of the relationship that exists between the independent and the dependent variables. Therefore, correlation analysis is generally applicable to provide further strength to the overall findings. The values regarding correlation have been calculated differently for different variables. The figures that have been obtained in relation to correlation analysis are provided below;

Correlations

		Knowledge	Magnitude	Incentives	cost	Scale
Knowledge	Pearson Correlation	1	.664**	.388**	.377**	.837**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	100	100	100	100	100
Magnitude	Pearson Correlation	.664**	1	.443**	.681**	.835**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	100	100	100	100	100
Incentives	Pearson Correlation	.388**	.443**	1	.494**	.508**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	100	100	100	100	100
cost	Pearson Correlation	.377**	.681**	.494**	1	.641**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	100	100	100	100	100
Scale	Pearson Correlation	.837**	.835**	.508**	.641**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	100	100	100	100	100
Reduction	Pearson Correlation	.569**	.925**	.597**	.828**	.825**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	100	100	100	100	100

Table 12

Correlations

		Reduction
Knowledge	Pearson Correlation	.569**
	Sig. (2-tailed)	.000
	N	100
Magnitude	Pearson Correlation	.925**
	Sig. (2-tailed)	.000
	N	100
Incentives	Pearson Correlation	.597**
	Sig. (2-tailed)	.000
	N	100
cost	Pearson Correlation	.828**
	Sig. (2-tailed)	.000
	N	100
Scale	Pearson Correlation	.825**
	Sig. (2-tailed)	.000
	N	100
Reduction	Pearson Correlation	1
	Sig. (2-tailed)	
	N	100

Table 13

There are different values that have been obtained regarding the impact of different independent variables on the dependent variable owing to the differences within the nature of impact between them. The value of correlation that has been obtained regarding knowledge and reduction of CO_2 emission is 0.5 illustrating a positive influence of knowledge on reduction of CO_2 emission. In relation to the variable of magnitude, the value of correlation that was obtained is 0.9 which demonstrated that there is a very strong positive relationship between magnitude of CO_2 emissions and the ability of the organizations to reduce CO_2 emissions in Pakistan. On the basis of these findings, it would be fair to say that the organizations should be aware of the magnitude or value of CO_2 emission that is generated from their operations. Similar results were also obtained in relation to the variables such as cost, scale and speed. The value of correlation regarding all these variables is well over 5 demonstrating the evidence of strong positive association. The outcomes of the research clearly depicted that the oil and gas companies in Pakistan should take into consideration the implementation of these factors on consistent basis in the long run with

the objective of making a positive contribution towards the sustainability of environment in the long run. However, it should be noted that the commitment of the policy makers is instrumental in terms of making sure that these measures are being applied in a sustainable manner.

5. Discussion

The findings obtained in the research were generally reliable as it is illustrated from the consistency of the scales that was obtained with the help of applying Cronbach Alpha technique of reliability. In terms of the responses that were obtained, majority of the representatives of the organizations that participated in the research stated that they are fairly or very much aware about their responsibilities in terms of reducing the amount of CO_2 from the environment. The first finding that was obtained was regarding the knowledge of the decision makers in terms of taking the steps needed to take part in the process of reducing CO_2. The findings demonstrated a positive relationship between the variables identified in relation to this particular issue. The managers that were contacted for the survey provided a positive response regarding the importance of different kinds of knowledge and their significance for the reduction of CO_2 emissions such as knowledge of the environmental factors along with having the knowledge about the internal processes of the organization. Some other aspects of knowledge that were identified as important include knowledge about the legal factors and the methods needed to be implemented to reduce the emission of CO_2. In the view of Wegener, Labelle and Jerman (2019), the knowledge of the policy makers in the field of oil and gas industry is essential to reduce the impact of CO_2 emission in order to protect the sustainability of the environment. Nevertheless, it is stated by Obeidat, Al Bakri and Elbanna (2018), that the continuous commitment of the decision makers should be present to undertake all the measures deemed necessary for protecting the environment from CO_2.

One of the most important findings that were obtained was regarding the contribution of the government of Pakistan in terms of supporting the initiatives of these companies. Vast majority of the representatives that took part in the survey were of the opinion that the Government should come forward and provide financial as well as technical support to the companies in the Oil and Gas Industry in terms of improving the quality of overall environment. A major reason that was identified as suitable in this respect was relate to the fact that the Government has the resources and capabilities to take radical measures in this respect. In addition to that, the support of the Government in terms of financial incentives is also expected to reduce the cost that Oil and Gas Companies can incur while applying CCU technologies. Therefore, in the view of Heede and Oreskes (2016), the contribution of Government and the regulatory authorities is crucial in terms of providing the necessary support and guidance to the decision makers in the Oil and Gas industries regarding reducing the degree of carbon emission. However, it is argued by Cass (2016), that the willingness of the policy makers of the Oil and Gas Industry is important in terms of reducing the emissions of CO_2 through the use of CCU technology on consistent basis. This is primarily because of the fact that these companies are primarily responsible for the emission of these gases into the atmosphere.

The findings also illustrated positive associations between independent variables such as scale and cost of CCU technology in terms of reducing the amount of carbon that is emitted within the atmosphere during a particular period of time. This is because scale determines the long-term application of this kind of technology; whereas, the element of cost is important as it affects the overall profitability of the corporations. The outcomes of the research in this respect can be supported through the analysis of the literature of Han (2017) and Meunier, Chauvy, Mouhoubi, Thomas and De Weireld (2020), which further demonstrated the value of taking into view the factors such as cost and scale of CCU technology needed to be used for reducing carbon emission.

In addition to the elements discussed above, the other element which was considered as instrumental in the research is the magnitude and the volume of CO_2 emissions that take place within the companies. The findings that were generated in this regard generally provided mixed responses where some of them stated that there is a greater degree of emission that takes place within their companies; whereas, there were some which were involved in lesser degree of CO_2 emissions. The value of correlation that was obtained in this respect also demonstrated a positive association which further highlighted the significance of managing the level of CO_2 emissions within the organizations. In the view of Zhong, Wang, Fan and Xing (2018) the level of CO_2 emissions which take place in the corporations through different activities need to be stopped and controlled efficiently as it improves the capability of the firms to contribute towards reducing the degree of CO_2 emissions within the atmosphere.

Apart from cost related factor, there are certain other key challenges that can adversely influence the oil and gas companies in terms of reducing the level of CO^2 from the environment. Example of these challenges includes aligning their activities in accordance with the interest of the country and the economy along with maintaining a proper balance in this regard. Balance needs to be maintained between the requirements of the industry and the economy and in relation to avoiding performing operations that would have a detrimental impact on the environment.

6. Conclusion

The conclusion of the research has been based on the findings that were obtained through the application of statistical techniques on the data that was obtained with the help of questionnaire. The findings illustrated that the knowledge of the policy makers of the corporation regarding the ways in which the issue of emission is required to be dealt with is important as they are mainly responsible to take concrete measures in this regard. Apart from the policy makers of the organizations, the contribution of the Government of Pakistan is significant in this case as they can provide financial assistance to the corporations working towards this issue along with playing its role in terms of creating the required degree of awareness. In addition to that, the elements such as, cost and scales were also recognized as significant in this case. The combination of all these elements has been identified as instrumental in relation to dealing efficiently with the issue of reducing carbon emission. Nevertheless, it is important for the policy makers of the corporations in the Oil and Gas industry to deal with certain challenges such as identifying the methods that are needed to be adopted along with dealing with the cost related issues in terms of taking measures related to reducing emission of CO_2.

However, there are certain areas in the future that can be explored with regards to the topic of the current research. One of these areas is related to identifying the ways in which Government can provide technical assistance to the Oil and Gas Companies in Pakistan in terms of successfully reducing the emission of CO_2 in the country. Performing research in this area is important keeping into view the significant positive contribution that the government can make in this regard.

The other area that needs to be studied with respect to the current research is the identification of the ways through which the overall cost of using CCU technology in relation to carbon emission can be minimized. It is important to conduct extensive research in this particular area because of the fact that the factor of cost in relation to the use of CCU technology ultimately results in influencing the overall cost structure of an organization.

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