

## **A STUDY OF FINANCIAL ADMINISTRATION USING DATA MINING TECHNOLOGY IN OIL COMPANIES OF INDIA & IRAQ**

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### **ABSTRACT**

*Financial Decision Support System is established and developed based on the layer of Accounting and Financial Management in Accounting Information System. Corporate Financial Data and Financial Management in Accounting Information system are excess and Information is deficient would seriously effect role in Financial Decision Making. This Paper enquires about the use of Data Mining in Oil Companies of India & Iraq and also see that Application of Data Mining in the Accounting Information System impacts Decision Making Process, which ultimately shows the Indian Oil Companies using SAP/ERP systems, with possible use of Data Mining tools and as such Iraqi oil companies used manual system and do not use any programs either.*

**KEYWORDS:** *Data Mining, Accounting Information System, SAP, strategic decision mking*

**JEL CLASSIFICATION:** *G32, M15, M41*

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### **1. INTRODUCTION**

Oil companies are one of the important tributaries in funding investments. it is one of the key industrial area in support of the national economy, hence the interest of the researcher is to find out the extent of use of Data Mining applications in the field of accounting and its use in making appropriate decisions.

The importance of information technology companies need to adopt them in order to ensure the continued survival and the face of competition, The information system is defined as a set of activities to collect, process and summarize the data and delivery information across the channels of communication to decision-makers and information technology has great importance in light of the information age and has impact on the accounting information and performance of the companies.

Modern technology available today has changed the methods used for accounting information systems (AIS), as was the adoption of modern technology in the operation of AIS much of today's enterprises. The right choice for AIS can have a positive impact not only in data processing but also in the efficiency of corporate activities (Chong, 1996; Ghosh, 2012; Koyuncugil & Ozgulbas, 2008; Mraovic, 2008, Sharma & Panigrahi, 2012; Tarsauliya, et al., 2010). Hence the need to integrate these diverse systems led to the accountant's appreciation of shared databases that provide a cohesive picture of the organization's data, eliminating duplications and reducing data conflicts. Therefore the list of stakeholders are primarily interested in the organisations financial performance, investment, return and of course creditors also assessing company's long term payment ability. Hence the prediction of the future profitability of the company is very important to assist them in putting their strategies and future decision making, with the help of data mining technology especially artificial neural networks which the researcher adopted to indicate the importance of data mining technology comparison with the traditional statistical analysis.

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### **Indian petroleum sector:**

Even as the economies around the world continue the process of recovering from the financial crisis, the Indian economy remained one of the few to grow at a reasonable rate. While the GDP is growing steadily at around 5.5%, this can be attributed to a large extent on the good performance of the agriculture sector on account of the good monsoon.

The industrial sector has started showing signs of slowing down but the beginning of the 2016 which continued in 2017 became stable.

As per the provisional figures released by the Petroleum Planning & Analysis Cell in the Ministry of Petroleum & Natural Gas, consumption of petroleum products in the country in 2013-14 was of the order of 141.75 MMT as against 137.81 MMT in the previous year. This represents an increase of 2.86% over the previous year. The retail segment of the market, comprising of transportation fuels like Motor Spirit (MS) and High Speed Diesel (HSD), has grown over the previous year by 7.4%. While the consumption of MS has gone up by 10.8% over the previous year, demand for HSD went up by 6.6%. However, when seen in the context of the growth in 2012-13 to 2015-16, , the rate of growth has been lower in both MS and HSD. During the year under review, the average cost of the Indian basket of crude oil stood around USD 35 to 45 per barrel as compared to an average cost of USD 25 to 35 per barrel declining in the previous year.

At the same time, the country's energy requirements keep increasing and companies like BPCL, HPCL, & IOCL will have numerous opportunities to grow. However, with India's large dependence on crude oil imports, the volatility in international prices will have a major impact. The decontrol of MS pricing has been an important first step which will ensure that the selling prices will get aligned to movements in the international market. Decontrol of HSD pricing will be crucial considering the large share which HSD has in the overall sales basket of petroleum products. With competition from private players expected to increase once pricing controls are removed, the public sector marketing companies will need to ensure that they have effective strategies in place to leverage their current strengths and brand image.

### **Petroleum sector Iraq:**

Ministry of Oil in Iraq have three Oil Company the bigger one is South Oil Company (SOC) is a national Iraqi company responsible for the oil in the south of Iraq. It is situated in Basrah, Iraq. South Oil Company is one of the major fundamental formations of the Iraq National Oil Company (INOC). It was the first nucleus and the basis of national direct investment projects in the 1970s, where the SOC was subsidiary to the national company.

Events and activities have escalated steadily and rapidly, rising since the beginning of the 1970s. Investment and development stages of the north Rumaila field were completed in three stages, leading to a rate of production of 42 million tons per year and this coincided with the expansion of works in all fields.

The expansion began with drilling works, building and expanding production facilities, and implementing investment projects associated with natural gas fields in north and south Rumaila. Also developing new fields in Luhais, Saba, Nuhran Ben Ummer and oil fields in Maysan. Laying out an exporting pipe line, expanding export facilities and infrastructure sites for the company.

The SOC was exposed to substantial damage during the war (1991). This reduced the production level to 2 million barrels per day (320,000 m<sup>3</sup>/d) before the events of the year 2003. After the events of the year 2003 the whole of the fields, establishments and facilities of the company were damaged by vandalism, theft, arson and destruction. The destruction ratio was 80-90% of the SOC's property. This caused production to drop to 150,000 barrels per day (24,000 m<sup>3</sup>/d).

By extensive and intensive reconstruction the company managed to increase production to 500,000 barrels per day (79,000 m<sup>3</sup>/d) during the month of June the same year. It exported the first shipment of oil from the company's port during the same month. Due to the efforts of the staff, the company was able to restore production to 2.15 million barrels per day (342,000 m<sup>3</sup>/d) during the first quarter of the year 2004 and reached to 4.1 million barrels per day at the end of 2015.

## 2. RESEARCH METHODOLOGY

Data is collected from survey questionnaire designed to supplement and enrichment of the qualitative data. Data is also collected from interview questions designed to supplement & enrich quantitative data.

### Sample Size:

The research sample was determined by three oil companies of both India and Iraq, because there are eleven mixed companies in India, three main companies in India IO, BP and HP with contribution of the government 90% and 10% private sector it has been neglected on the Iraqi side there are only three companies the government contribution 100% i.e. south Oil Company, SOC, NOC, MOC, Hence for this reason three oil companies from India and Iraq were selected. Researcher determined ten forms for each company distributed by himself as well as a personal interview of each respondent, therefore the total questionnaire set is Thirty for each of the Indian oil companies and Iraqi, hence become the proportion of the forms received from the distributed 100%.

### Method of Analysis:

The researcher used two methods to collect quantitative and qualitative data. The questionnaire was used to collect qualitative data regarding the quality of accounting information using data mining technique and importance in all the functions of the company, particularly in decision-making. Researcher used the system SPSS as statistical tools as following:

- 1 - A measure of central tendency (arithmetic mean) to indicate the severity of the concentration of the answer.
  - 2 - Standard deviation of the data to answer the degree of dispersion or homogeneity.
  - 3 - T test to demonstrate the significance of the model answer in each paragraph.
  - 4 - ANOVA test.
  - 5- Correlation.
  - 6- Regression. As for the use of data mining technology, the researcher used artificial neural networks and using WEKA software to analyze quantitative data extracted from the financial statements and results of operations of the companies for past ten years.
- Statistical methods used were: Trend analysis, ARIMA, Time Series analysis Prediction, Artificial neural networks.

## 3. RESULTS AND DISCUSSION

Objective No. I - To explore the level of Data Mining awareness and readiness within the oil companies in India & Iraq.

For the purpose of verification of this goal were analysed responses to the question 13, which specified a statement prepared for the companies to apply modern technology.

Table 1 show the averages and standard deviation and test T of the questions addressed to the study sample of India's oil Companies

Here all companies have more readiness data mining in their AIS. Where, record the arithmetic mean of all the companies and all questions about the readiness of the technology more that (4) its more that the standard measurement (3) and this rate is very good, as it shows that the technology gives greater control at all activities in the daily work, and that all respondents have a desire to get on the technological development talk. It also showed the value of T is greater that the calculated scheduled so it's a positive function.

**Table 1. The averages and standard deviation and test T of the questions addressed to the study sample of India's oil Companies**

<b>One- Sample statistics</b>				
	N	Mean	Std. Deviation	Std. Error Mean
q13a	30	4.4000	.81368	.14856
q13b	30	4.2667	.78492	.14331
q13c	30	4.4000	.81368	.14856
q13d	30	4.2667	.78492	.14331
q13e	30	4.2000	.76112	.13896
q13f	30	4.0000	.64327	.11744
q13g	30	4.0000	.90972	.16609
q13h	30	4.3333	.80230	.14648
q13i	30	4.4000	.81368	.14856
q13k	30	4.0000	.90972	.16609

**One Sample Test**

	Test Value = 3					
	t	df	Sig.(2t -ailed)	Mean Differ -ence	95% Confidence Interval of the difference	
					Lower	Upper
READINESS	8.962	29	.000	1.22667	.9467	1.5066

Source: Primary Data

**Table 2. Averages, Std. Deviation and test T of the questions addressed to the study sample in Iraqi's Oil Companies**

<b>One- Sample statistics</b>				
	N	Mean	Std. Deviation	Std. Error Mean
q13a	30	4.3000	.70221	.12821
q13b	30	4.2333	.62606	.11430
q13c	30	4.3000	.70221	.12821
q13d	30	4.4000	.67466	.12318
q13e	30	4.0000	.83045	.15162
q13f	30	4.3000	.65126	.11890
q13g	30	4.0667	.94443	.17243
q13h	30	3.7333	.98027	.17897
q13i	30	4.2667	.58329	.10649
q13k	30	4.2000	.66436	.12130

**One Sample Test**

	Test Value = 3					
	t	df	Sig. (2tailed)	Mean Difference	95% Confidence Interval of the difference	
					Lower	Upper
READINESS	10.137	29	.000	1.18000	.9419	1.4181

Source: Primary Data

Objective No. II - To describe how the application of Data Mining in the Accounting Information System could impact on the Decision Making Process.

For the purpose of verification of this goal 16 questions were analyzed which specified a statement

prepared for the companies to expect impacts of data mining in companies. The table 3 shows the average, standard deviation and test T of the questions addressed to the study sample of India's Oil companies.

**Table 3. Average, standard deviation and test T of the questions addressed to the study sample of India's Oil companies.**

<b>One- Sample statistics</b>				
	N	Mean	Std. Deviation	Std. Error Mean
q16a	30	4.2667	.78492	.14331
q16b	30	4.1333	.81931	.14958
q16c	30	4.3333	.88409	.16141
q16d	30	4.1333	.73030	.13333
q16e	30	4.1333	.81931	.14958
q16f	30	4.2000	.76112	.13896
q16g	30	4.2000	.76112	.13896
q16h	30	4.2000	.99655	.18194

<b>One Sample Test</b>						
	Test Value = 3					
	t	df	Sig.(2-tailed)	Mean Difference	95% Confidence Interval of the difference	
					Lower	Upper
IMPAISDM	9.012	29	.000	1.20000	.9277	1.4723

*Source: Primary Data*

Through the arithmetic mean and standard deviation it is clear to us that the entire answer questions were positive and higher mean it was (4.33), which shows that data mining increases the performance of accounting information systems, and it supports the currency decision making, which is illustrated by the value of T calculated it's bigger from tabulated T. while Iraqi firms did not use data mining.

### **Hypothesis:**

- I) There are various factors effecting the variations of Data Mining in Accounting Information System.
- II) There is no significant relation between Accounting Information System using Data Mining and Strategic Decision Making.

### **Degree of Reliability:**

In this context using a test (Cronbach's alpha) for measuring the validity and reliability of measurement tool, as the value of all variables of Indian companies questionnaire (alpha=98%) and in Iraqi companies are (alpha 99%) The Excellent percentage being higher than the percentage that is acceptable is 60% in the human study and administration sciences.

### **Testing of Hypotheses:**

Using regression analysis in the first and second hypotheses to see what more factors effect and which best model for both group companies in India and Iraq.

### **I) Hypothesis: "There are various factors effecting the variation of data mining in Accounting Information Systems"**

The result of regression analysis of India oil companies are shown in the four tables (4, 5, 6 & 7) below:

**Table 4. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate
1	.923 <sup>a</sup>	.851	.846	.26245

Source: Primary Data

**Table 5. Anova<sup>b</sup>**

Model		Sum Squares	df	Mean squares	F	sig
1	Regression	11.052	1	11.052	160.464	.000 <sup>a</sup>
	Residual	1.929	28	.069		
	Total	12.981	29			

a. Predictors: (Constant), FDM b. Dependent Variable: DMAD Source: Primary Data

**Table 6. Coefficient**

Model		Unstd. Coefficients		Std Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.874	.253		3.462	.002
	FDM	.755	.060	.923	12.667	.000

a. Dependent Variable: DMAD Source: Primary Data

**Table 7. Coefficient**

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.222	.118		1.879	.072
	FTDM	.407	.081	.495	5.021	.000
	FTDM	.593	.057	.806	10.328	.000
	FTDM	.667	.064	-.993	-10.392	.000
	FTDM	.593	.115	.662	5.164	.000

a. Dependent Variable: DMAD Source: Primary Data.

By using linear regression analysis to see whether there is a relationship between the dependent variable (Data Mining in accounting information systems) and the independent variable (success factors of Data Mining)(FDM), the table (4) shows coefficient of linear correlation is (.923), and the extent of accuracy in the estimation of the dependent variable (DMAD) is (0.851) This is an indication very acceptable. And see in table (5) calculated F (160.464) higher than the tabular this mean is significant relationship between variables DMAD and FDM.

Also the value of calculated T (3.462) is greater than the value of tabular T (2.042) and the level of significance test (.002) less than the significance level the null hypothesis (0.05), then we refuse the null hypothesis, which is that content (the regression line is inadequate data), and the value of the tendency regression (0.874) is statistically significant, **So we accept alternative hypothesis**, this means there are several factors influential on the use of data mining in accounting information systems. For purpose of knowing which factors more influential than others, multiple regression analysis has been used, as shown in the table (4) As it shows that the organizational factor is the most influential on the use of data mining in AIS, represented in support top management and provide sufficient financial resources, Was the technological and human factors have less impact, while the external factor did not have any effect. As well as in Iraqi companies if the companies adopted data mining, those organizational factors are the most effect, as tables (8, 9, 10, and 11) show that below:

**Table 8. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate
1	.201 <sup>a</sup>	.040	.006	.14947

a. Predictors: (Constant), FDM *Source*: Primary Data

**Table 9. Anova<sup>b</sup>**

Model	Sum Squares	df	Mean squares	F	sig
1 Regression	.026	1	.026	1.178	.287 <sup>a</sup>
Residual	.626	28	.022		
Total	.652	29			

a. Predictors: (Constant), FDM b. Dependent Variable: DMAD *Source*: Primary Data

**Table 10. Coefficient**

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.1461	.101		14.442	.002
	FDM	-.044	.041	-.201	-1.085	.287

a. Dependent Variable: DMAD *Source*: Primary Data

**Table 11. Coefficient<sup>a</sup>**

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.531	.127		12.054	.000
	FTDM	-.030	.060	-.163	.504	.618
	FODM	-.153	.106	-.702	-1.448	.160
	HFDM	.091	.066	.530	1.380	.180
	FEDM	.035	.109	.148	.325	.748

a. Dependent Variable: DMAD *Source*: Primary Data

The table (8) shows coefficient of linear correlation is (0.201), and the extent of accuracy in the estimation of the dependent variable (DMAD) is (0.040) This is acceptable indication. And see in table (9) calculated F (1.178) less than the tabular this mean is not significance relationship between variables DMAD and FDM. Also value of T calculated (-1.085) is less than the value of T tabular (2.042) and the level of significance test (0.287), a greater level of significance of the null hypothesis (0.05) , **So we accept the null hypothesis**, that is means there are not factors influential on the use of data mining in accounting information systems in Iraqi's companies because they haven't use data mining.

**II Hypothesis: "There is no significant relation between Accounting Information System using Data Mining and Strategic Decision Making"**

The result of regression analysis of India oil companies are shown in the four tables (12, 13, 14, 15) below:

**Table 12. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate
1	.970 <sup>a</sup>	.942	.940	.15127

a. Predictor (Constant) DMAD *Source*: Primary Data

**Table 13. Anova <sup>b</sup>**

Model	Sum Squares	Df	Mean squares	F	sig
1 Regression	10.341	1	10.341	452.284	.000 <sup>a</sup>
Residual	.640	28	.023		
Total	10.981	29			

a. Predictors (Constant), DMAD b. Dependent Variable: IMPACAISDM Source: Primary data

**Table 14. Coefficient <sup>a</sup>**

Model	Unstd. Coefficients		Std. Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.692	.171		4.051	.000
DMAD	.893	.042	.970	21.267	.000

a. Dependent Variable: IMPACAISDM Source: Primary Data

**Table 15. Coefficient <sup>a</sup>**

Model	Unstandardized Coefficients		Standard Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.229	.280		.817	.424
q1	.006	.037	.009	.168	.868
q2	-.029	.110	-.043	-.265	.793
q3	-.046	.039	-.051	-1.163	.258
q4	-.119	.069	-.141	-1.728	.099
q5	.579	.120	.687	4.828	.000
q6	.588	.139	.476	4.245	.000
q7	-.064	.086	-.067	-.746	.464
q8	.095	.116	.117	.814	.425

a. Dependent Variable : IMPACAISDM Source: Primary Data

By using linear regression analysis to see whether there is a relationship between the dependent variable (strategic decision-making)(IMPACAISDM) and the independent variable (Data Mining in accounting information systems)(DMAD), the table (12) shows coefficient of linear correlation is (.970), and the extent of accuracy in the estimation of the dependent variable (IMPACAISDM) is (0.942) This is an indication very acceptable. And see in table (13) calculated F (452.248) higher than the tabular this mean is significance relationship between variables IMPACAISDM and DMAD.

Also the value of calculated T (4.051) is a greater than the value of tabular T (2.042) and the level of significance test (.000) it's less level of significance of the null hypothesis (0.05) , the value of the tendency regression (.692) is statistically significant , **So we reject the null hypothesis and accept alternative hypothesis**, this means there is positive relationship between the use of data mining in accounting information systems and decision-making strategy. For purpose of knowing which factors more influential than others , has been used multiple regression analysis , as shown in the table (12) , ' data mining is the most influential on the use of data mining in AIS, represented in the contribution of data mining to support and speed decision-making process in Indian Oil Companies.

While Iraqi companies, the calculated F (0.677) less than the tabular this mean is not significance relationship between variables IMPACAISDM and DMAD.

And value of calculated T (-.823) is less than the value of tabular T (2.042) and level significance test (0.418) is greater than the level of significance the null hypothesis (0.05). **So we accept the null hypothesis** that the effect (the regression line inappropriate the data), that means no relationship between the accounting information systems and strategic decision-making in Iraqi



companies, And this was endorsed by managers through personal interviews conducted by the researcher with them. As shown in that tables (16, 17, 18, 19) below:

**Table 16. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate
1	.154 <sup>a</sup>	.024	-.011	.16306

a. Predictors: Constant), DMAD *Source*: Primary Data

**Table 17. Anova<sup>b</sup>**

Model		Sum Squares	Df	Mean squares	F	sig
1	Regression	.018	1	.018	.677	.418 <sup>a</sup>
	Residual	.744	28	.027		
	Total	.763	29			

a. Predictors: (Constant), DMAD b Dependent Variable: IMPAISDM *Source*: Primary Data

**Table 18 Coefficients <sup>a</sup>**

Model		Unstandardized Coefficients		Standard Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.200	.275		7.990	.000
	DMAD	-.166	.202	-.154	-.823	.418

a. Dependent Variable: IMPAISDM *Source*: Primary Data

**Table 19. Coefficient <sup>a</sup>**

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.660	.215		12.396	.000
	q1	-.152	.081	-.451	-1.885	.074
	q2	-.039	.034	-.154	-1.140	.268
	q3	-.279	.071	-.802	-3.903	.001
	q4	-.086	.081	-.135	-1.063	.300
	q5	-.086	.074	-.163	-1.168	.256
	q6	-.248	.075	-.659	-3.302	.004
	q7	.161	.066	.376	2.440	.024
	q8	.111	.047	.429	2.351	.029

a Dependent Variable: IMPACASDM *Source*: Primary Data

#### 4. CONCLUSION

The development in the use of accounting information systems and the expansion in the application of quantitative analysis methods in addressing the problem companies, Decision-makers has become more dependent on the accounting and as a result of appropriate information generated by them for the purpose of decision-making and planning long-term activities that are related to the future. The Indian companies used a data mining technology and used the SAP system similarly the associated accounting information systems with all the company's activities. The Iraqi companies did not use Data Mining and it depends on the manual system in the preparation of the final

accounts, budgets and financial reports required. It also used System like Visual Basic to assemble data at the end of month prepared manually and stored on the computer.

However the staff in Iraqi Oil Companies lacked knowledge of work in Data Mining but had good highest qualification and experience, whereas Data Mining contributed to reduce degree of uncertainty associated with Decision Making at the Indian Oil Companies.

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