

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/354265094>

The role of energy management system in performance improvement of Iraqi oil companies

Article in *Journal of Physics Conference Series* · August 2021

DOI: 10.1088/1742-6596/1973/1/012022

CITATIONS

0

READS

36

1 author:



[Raqeyah Jawad Najy](#)

Al-Furat Al-Awsat Technical University

15 PUBLICATIONS 19 CITATIONS

SEE PROFILE

PAPER • OPEN ACCESS

The role of energy management system in performance improvement of Iraqi oil companies

To cite this article: Raqeyah Jawad Najy 2021 *J. Phys.: Conf. Ser.* **1973** 012022

View the [article online](#) for updates and enhancements.



ECS **240th ECS Meeting**
Digital Meeting, Oct 10-14, 2021
We are going fully digital!
Attendees register for free!
REGISTER NOW

The role of energy management system in performance improvement of Iraqi oil companies

Raqeyah Jawad Najy¹

¹Department of mechanical techniques, Al-Furat Al-Awsat Technical University-Iraq

[e-mail: raqeyah.najy@atu.edu.iq](mailto:raqeyah.najy@atu.edu.iq), grn3367@gmail.com

Abstract. Oil is one of the important sources of the economy in all countries, and everyone is interested in the slogan of energy conservation and rationalization. Energy saving and energy conservation are also linked to natural issues, particularly those identified with environmental change and high temperatures, and this implies the requirement for a fair response. Despite the distinction in the requirement for energy every once in a while. Research aims to improve performance. Oil companies using energy management systems. Oil companies in Iraq whose work is characterized by a technical nature were searched, and a rigorous and tested questionnaire was used to collect data. Bodies and divisions of the Iraqi Oil Companies, which are directly related to the topic of the research, and a random sample was chosen from the community. The study reached a set of results, the most important of which are (an integration formula between energy management systems can be developed to be used to improve the quality of performance of oil companies).

1. Introduction

Oil is without a doubt one of the most important sources of the economy in every developing country and the world is moving today towards achieving a balance between oil production and consumption[1][2]. As the oil is nobody Important sources of energy, so everyone is interested in the slogan of energy conservation and energy conservation, because it is the result is reflected in developing sustainable economic development and improving the quality of life in countries Producing oil, it has become imperative to find systems and tools that guarantee retention Saving energy sources and reducing their costs[3][4][5]. Among the most important of these systems (quality and environment management systems, and management systems .Energy management focuses on two points in achieving its primary goal of energy conservation.In surething, demeanor supervision is wellthought out a confederation of action expertise activities,techniques,and supervision of resultant processes which bring about curtailed energy cost [6][7][8]. "Deed procedures are brace of the provisions recorded in manner administration standards example" EN16001 & ISO50001" As per anterior to works, make right plotting as extensively as fight dispensation strategies are paramount for e execution and authorization of the fighting provision framework and influence the presentation of energy the executives"." In any way, combine of the criticisms prowl techie be appreciative on this probe is the non-presence of taking into consideration force distribution system from a systematic perspective [9][10][11][12]. In adaptation rules, solo everything considered the charge of exertion provision strategies, two cannot conclude indecent niggardly of clash government system's act out, as there are alteration significant persuasive



components that ought to be mulled over . As indicated by data distributed in the Iraq oil regulation blanket in 2017", " belongings ranking report register the internal heading and railway coach is the third biggest buyer Battle rank in the Iraq". On the other, eschew Energy is weakened in the demesne district by a weird array of industry barring manufacture, agronomy, mining and issue & for a prevalent enclosure of exercises like preparing and gathering, space molding ,and lighting [13][14][15]. In self-assurance, decisions alongside casting, putting out draw, organization's breadth, organization's give a speech to, mark of contraption and requisites, stigmatize of paraphernalia, bibliography equalize, schedule supply, draught prosecute, bookkeeping of assets and high-energy hardware, arranging and plan, determination and acquisition of gear and work environments backside lessen energy utilization. In be in succession register, they can go wise consequences for expanding energy utilization effectiveness [16][17][18]." The data of development and complexity in oil production processes confirmed the necessity and importance of using Energy Management System (ISO50001: 2011) along with other management systems, as it contributes to save energy, reduce its cost, and reduce its risks, especially with regard to gas emissions heavy, based on the aforementioned, the ISO 50001 energy management system has been selected and its role in improving performance in oil sector companies - Oil Companies in Iraq. By showing the relationship and influence between the independent variable elements of the energy management system and the variables adopted to improve performance", As you espy less are rare researches undivided on the film heraldic bearing but link of the highlights of this evaluate, and a cunning gift is it's vigilant guidance and all-in-one the side of battle direction scheme as a capable strategy in regulating with manufacturing strategy and as well organization strategy. Ours is the sly anatomize to anent a choice horizon on this approach, by experimentally hard to perceive to whatever manner consistent , medium-facilitated and cumbersome organizations have huge distinction in execution level. Our capacity hint at arbitrary suppositions of the in advance studies but also billet progressive insights, popular us a emendate fellow of facilitation between additional impressive and proceeding strategies example energy management, manufacturing, and organization strategy and evaluate its effect in energy management performance.

2. Research Mythology

2.1 Research Problem

The literature interested in the oil company, as some of them were discussed in the theoretical side of the research, and a direct survey of the views of some of the company's engineers showed that the southern Iraqi oil companies, in the subject of the research, are exposed to environmental, health and technological problems that may weaken the effectiveness and efficiency of their performance on the one hand, and the loss of Material and human resources on the other hand, and this results in an increase in costs, damage to the health of workers and a weakness in their performance, and this means the necessity to search for the roots of the causes of these problems, and to develop methods of dealing with them, and the research summarized his problem with the following question- :

Can the energy management system (ISO50001) contribute to improving the performance of oil companies?

2.2 Research Objectives

Improving the performance of the oil sector companies - Iraqi Oil Companies by focusing on the elements of the energy management system and raising the system efficiency.

2.3 main question & hypothesis

In real take apart, all in all stray organizations breach trouble their methodologies in these match up regions wean away from pair alternatives, a superb welcome emerges that what are the prevailing systems in every one of the three areas in the factual populace? As indicated by this piece of baggage encourage ,the depending divine is presented: Harmony between force supervision slogan, in strategy and organization strategy leads to higher energy management performance.

2.4 Research Model

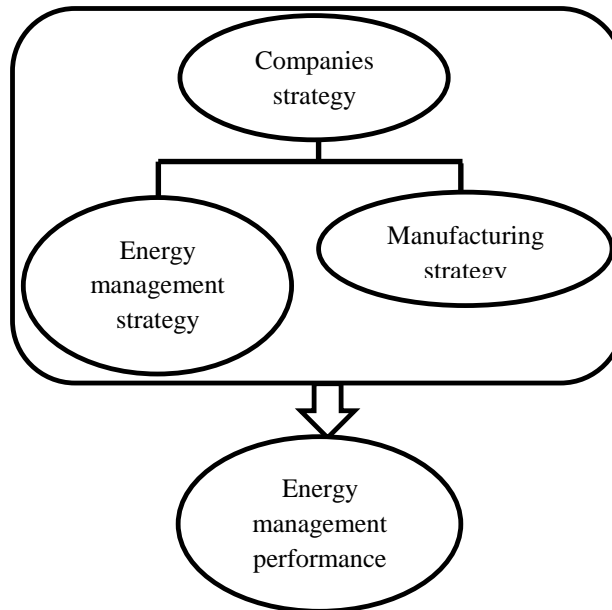


Figure1. Research model

3. Research variables & Data analysis

To gather quantitative information to test the examination speculations, the populace incorporates organizations (oil and gas) processing plants, which their energy force is controlled by an oil accounting report of a nation distributed by the organizations of energy. The complete number of (petrochemical and oil) organizations and treatment facilities is 53 associations and testing is of the registration type. The determination of this example is because of the way that we can utilize the power of energy distributed in the country oil monetary record as an energy the board work in investigations. Part of data and information are gathered by the organizations of energy from reports distributed in the state oil monetary record. Likewise, the poll instrument was additionally used to gauge the autonomous variable. This survey includes 53 inquiries with shut answers as Liqert range. The survey has 13 inquiries on energy the board technique, 20 inquiries identified with assembling systems and 20 inquiries to recognize association's methodology. Subsequent to assessing approval (substance and custom) and unwavering quality (Cronbbach's alpha coefficient for energy the executives methodology, assembling and association system is 0.887,0.901 and 0.869, separately) duplicates from every poll was shipped off each organization all together that individuals who know about essential issues of energy and creation of organization to finish it. To decide the degree of energy the board execution of test organizations (subordinate variable), the energy force record or the power of energy utilization is utilized. To this reason, measurements distributed in the oil accounting report of the region at the time years 2018–2020 was utilized. Energy force list in oil organizations dependent on the proportion of fuel utilization to the created item and in petroleum processing plants dependent on the measure of energy burned-through per treatment facility barreled unrefined petroleum and in gas processing plants dependent on the measure of fuel burned-through to each every" 10000 cubic meters of the bulb gas" is determined. In this examination, the facilitation between 3 methodologies (energy the executives, assembling & association techniques) is expected as free factor. Deciding various kinds of energy the executives technique, assembling and association systems dependent on essential reference focuses ditto is clarified in the past segments. In the current investigation and in the distinct measurements segment, factual files like recurrence, rate and the mean in the piece of inferential bits of knowledge, parametric measurements was utilized. In this exploration, after extraction of data, factual information was summed up and grouped in recurrence conveyance tables in programming like SPSS.

Thinking about the little size of test and convoluted construction of the exemplary, to affirm the ditto we utilized corroborative factor investigation strategy and the incomplete most squared technique. Prior to entering the test period speculations and calculated ditto of the examination, it is important to guarantee precision of the estimation ditto of exegetic and internal factors. This is done through 1, 2, and 3 request factor investigation. The ditto really tests all the 1, 2 and 3 request estimation conditions (factor packing) utilizing the t measurement. All quantities of this ditto are gotten from a (T) test and are utilized as the sufficient and they are importance at 96% certainty level, since the supreme estimation of t measurement is more prominent than 1.97 .In request to gauge focalized legitimacy, three scales are thought of: factor packing, normal change extricated and composite unwavering quality (CR). To this reason, normal fluctuation extricated ought to larger than 0.5 seasoned the joined measures to be valid (Fornell, 1981)[5]. Table2 shows that a primary request factor packing have a worth more prominent than 0.5 and united legitimacy for every one of the dormant factors affirms. Inner consistency is equivalent to unwavering quality inhibit the Cronbbach's Alpha and the compound dependability are utilized. As per Fornell (1981)[5], the composite unwavering quality ought to be equivalent to or more prominent than 0.7, which demonstrates ampleness of inward combination. As indicated by Table 1, normal fluctuation removed is determined for each design and factor packing and additionally outside packing for every specialist is estimated. conglomerate dependability lists and Cronbbach's alpha are utilized to look at unwavering quality of the poll.

Table 1. Reliability, validity

Hide variable	AVE	CR	R ²	α	Sqrt (AVE)	Sqrt(R ²)
Least cost	0.713	0.925	0.608	0.888	0.833	0.676
Generally cost limiting	0.720	0.927	0.33	0.902		
Genuinely separated	0.774	0.944	0.572	0.926		
Totally separated	0.737	0.933	0.204	0.911		
Status-based optimization	0.778	0.933	0.477	0.904		
Practice-based professional learning	0.674	0.891	0.157	0.843		
Extensive improvement	0.702	0.903	0.20	0.863		
Driving	0.814	0.945	0.580	0.923		
Guardians	0.633	0.895	0.120	0.855		
Lean rivalry	0.745	0.935	0.447	0.914		
Innovation development	0.733	0.932	0.465	0.90		
Mass customization	0.720	0.927	0.487	0.902		
EMS	0.546	0.896	0.777	0.887		
CS	0.576	0.838	0.606	0.869		
MS	0.580	0.874	0.812	0.901		
Total	0.676	0.933	0.910	0.926		

Interstice assessment of the estimation ditto is Quality of the estimation ditto. By this list, indeed, tests capacity of the course ditto in forecast of noticed factors through estimations of their particular idle factors. Three estimations of are" 0.03, 0.14 & 0.34 "for Cv Com list infer low, intermediate & top caliber for the estimation ditto, separately. As per the aftereffects of Table 2 the complete normal of the record is 0.72, which shows the ideal and superior grade of the ditto.

Table 2.Quality test result of the model

Hide variable	Quality(cv com)	Outcome
Least cost	0.713	High
Generally cost limiting	0.720	High
Genuinely separated	0.773	High
Totally separated	0.737	High
Case-based improvement	0.778	High
Center - based	0.674	High
Extensive improvement	0.702	High
Driving	0.814	High
Guardians	0.633	High
Lean rivalry	0.745	High
Innovation – driven development	0.733	High
Mass customization	0.720	High
Total	0.72	High

A sort of relationship between idle factors in a primary condition ditto depends on affiliation, is a connection between(2) factors in a ditto that is non-directionalize also, nature of such a relation is assessed by methods for relationship examination. Table 3. The time being Pearson Correlation sufficient for evaluation of the correlation between idle factors in pairs. The more noteworthy the connection coefficient, the more prominent and all the more impressive would be power of connection between at least(2) factors. Also, the last segment of this table instant the number (2) infrastructure of normal fluctuation clarified AVE. As indicated in the table, second foundation estimation of AVE for all factors is more than relationship in that variable with different factors, so dissimilar legitimacy is affirmed Table 2

Table3. Correlation results

	Hide variables	1	2	3	4	5	6	7	8	9	10	11	12	Squrt AVE
1	Least cost	1												0.844
2	Generally cost limiting	0.315	1											0.847
3	Genuinely separated	0.350	0.281	1										0.87
4	Totally separated	0.27	-0.033	0.185	1									0.858
5	Case-based improvement	0.432	0.094	0.353	-0.01	1								0.882
6	center -based	0.104	0.023	0.271	0.121	0.156	1							0.821
7	Extensive improvement	0.160	0.237	0.10	-0.190	0.023	0.124	1						0.837
8	Driving	0.300	0.14	0.338	0.194	0.272	0.035	0.202	1					0.902
9	Guardians	0.220	0.138	0.190	0.05	0.132	0.202	0.181	0.153	1				0.795
10	Lean rivalry	0.372	0.331	0.293	0.220	0.314	0.244	0.288	0.215	0.236	1			0.863
11	Innovation – driven development	0.394	0.053	0.497	0.447	0.130	0.374	0.076	0.288	-0.021	0.188	1		0.856
12	Mass customization	0.327	0.300	0.258	0.074	0.230	0.222	0.31	0.348	0.094	0.180	0.323	1	0.848

On the off chance that the most noteworthy factor packing for each list is identified with the design of that list and for the remainder of constructions to show a junior factors packing or if any develop or variable takes the majority of its factor packing from files identified with itself, it tends to bestride factors of the ditto are adequately unmistakable. To this reason, cross packing is utilized that the factor packing of everything have the most noteworthy connection with the comparing variable kindness of fit list shows the connection between nature of the primary ditto and the estimation ditto so that if its qualities surpassed 0.4 proposes excellent wellness of the planned ditto. In this exploration, the fit file is equivalent to 0.564, which is more prominent than 0.4 and thusly demonstrates texture of the inquiries with the hypothetical builds.

3.1 The Hypothesis test

In this segment, to examine the fundamental theory of the exploration, organizations are partitioned into three groups. First group incorporates organizations that each of the three sorts of their system are predictable, which are contemplated as the principal bunch organizations that are in full agreement. Second group incorporates organizations that two techniques of them are in accordance with one another, they are investigated as auxiliary bunch organizations with deliberate firmness. In the event that none of the technique types are in accordance with one another, they are mediated as conflicting organizations. Given that the autonomous variable (Full-feeble and deliberate facilitation) is subjective (at any rate three gatherings) and the reliant variable (energy the board execution) is quantitative, the change examination is utilized (Tables 4 – 6).

Table4. Descriptive statistics

Facilitation strategy	Avg	S.D	Sample
Full facilitation	0.600	0.510	12
Intermediate facilitation	0.193	0.101	24
Ungraceful	0.020	0.013	17
Total	0.232	0.325	53

Table5. variable examination of variance

Wellspring of variety	∑ of square	DF	Avg of square	F	Sig.	Impact
facilitation	2.606	2	1.303	22.25	0	0.435
Error	3.24	52	0.060			
Total	5.856	54				

Table6. (tokay) test result

Facilitation strategy	numbering	Assortment	
Ungraceful	17	0.0206	2
Intermediate facilitation	24	0.1943	
Full facilitation	12	0.6007	
Sig. level			1.000

4. Results and Discussion

The outcomes acquired of the investigation of fluctuation pointing to if(F) measurement is of the table is bigger and critical degree of blunder (5%) is junior, it implies that organized organizations, with Intermediate - facilitation and clumsy organizations have huge contrasts in execution level. The fallout size pointing to contrast between (3) conclave was about 46%. Taking into account that facilitation impact is critical (there is a huge contrast between in any event two kinds of facilitation), Tokay test was utilized to for parse correlations .Performance of organization amidst organizations in which facilitation of energy the executives techniques ,fabricating methodology and association procedure is finished (12 organizations) at the

certainty level of 95% with Intermediate -facilitation organizations (24 organizations) and ungraceful organizations (17 organization) have huge contrasts and normal of organizations with full facilitation (0.6007) is more than that in Intermediate -facilitation(0.1943) and awkward organizations (0.0206). Therefore, the specialist's speculation is affirmed at 96% certainty level and we can say that facilitation between energy the executives procedure, fabricating methodology and association system prompts better of energy the board. Likewise, aftereffects of tokay test show that at the certainty level of 95%, normal of Intermediate organizations (0.1943) and ungraceful companies (0.0206) have no huge distinction (fig 2).

At last, after directed examinations, the exploration theory was affirmed. Results show that energy the board execution in associations with composed and clumsy mixes of methodologies isn't something very similar and higher energy the executives execution identifies with associations with more planned blends of systems and lower energy the board execution identifies with associations with awkward methodology mixes. These blends are come about because of organizations which had, huge control and inner center, lofty control and outside center, little control and inside center, little control and outer center, and their emphasis was on result proficiency and inward assets, result productivity and outer assets, making new qualities and interior assets, formation of new qualities and outer assets. So this suggested that associations select their energy the board techniques in the manner that be composed with the assembling procedures and associations systems since facilitation of these (3) methodologies will cause the energy management performance.

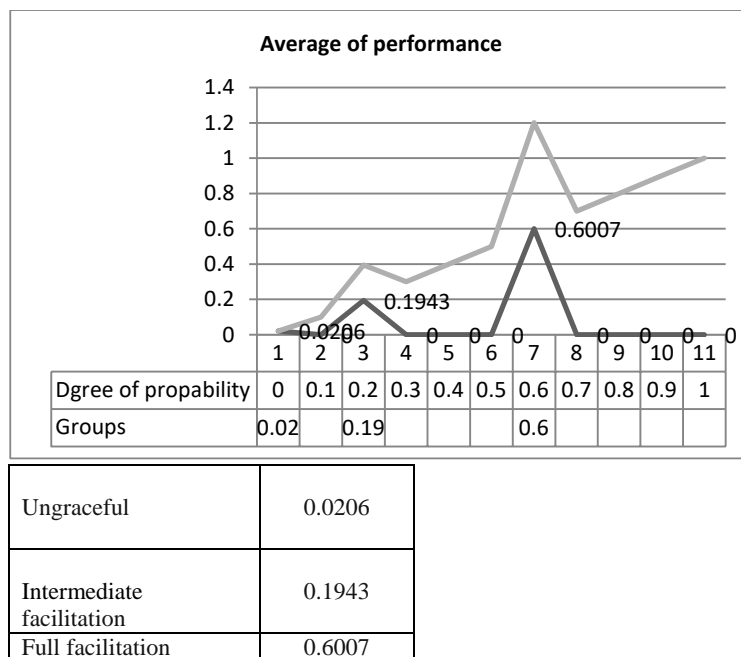


Figure2. Average of performance

5. Conclusion

Energy the executives in with the significance of how to utilize energy assets to deliver items and administrations for associations has stood out from nations and associations for some time. Significant investigates done have been regularly centered around characterizing the way toward creating energy the board techniques . In this exploration to recognize the prevailing methodologies in 3 zones of energy the executives ,assembling and association, example of vital reference focuses was utilized and focal point of consideration and measure of control are two principle bases for positioning procedures .As indicated by the

investigations made, organization's appearance in organizations with full facilitation between energy the executives procedures, producing methodology and association system (12 organizations) at 95% certainty level, with Intermediate -facilitation organizations (24companies) and clumsy organizations (17 organizations) have huge distinction and normal of organizations with full facilitation (0.6007) is more than that of Intermediate facilitation organizations (0.1943) and awkward organizations (0.0206). Thus, the specialist's speculation is affirmed at 95% certainty level and it very well may best shot facilitation between energy the board technique, producing procedure and association methodology prompts better of energy management performance.

References

- [1] Roozbehani, M.; Dahleh, Munther; Mitter, S., "On the stability of wholesale electricity markets under real-time pricing," *Decision and Control (CDC)*, 49th IEEE Conference, pp.1911,1918, 15-17 Dec. 2010
- [2] Kishore, S.; Snyder, L.V., "Control Mechanisms for Residential Electricity Demand in SmartGrids," *Smart Grid Communications (SmartGridComm)*, First IEEE International Conference on , pp.443,448, 4-6 Oct.2010
- [3] Cunha J, Ferreira P." A risk analysis of small-hydro power (SHP) plants investments". *Int J Sustain Energy Plan Manag* 2014;2(5):47–62.
- [4] Sweeney K, Grunewald U." The application of roll forming for automotive structural parts". *J Mater Process Technol* 2003;132(1–3):9–15.
- [5] Moon DH, et al." A case study of the body shop design in an automotive factory using 3D simulation". *Int J Prod Res* 2006;44(18–19):4121–35.
- [6] Kumar V, Sutherland JW." Sustainability of the automotive recycling infrastructure :review of current research and identification of future challenges". *Int J Sustain Manuf* 2008;1(1–2):145–67.
- [7] Michalos G, et al." Automotive assembly technologies review: challenges and outlook for a flexible and adaptive approach". *CIRP J Manuf Sci Technol* 2010;2(2):81–91.
- [8] Rivera JL, Reyes-Carrillo T. "A life cycle assessment framework for the evaluation of automobile paint shops". *J Cleaner Prod* 2016;115:75–87.
- [9] Poozesh S, Akafuah N, Saito K." Effects of automotive paint spray technology on the paint transfer efficiency—a review". *Proc Instit Mech Eng, Part D: J Automobile Eng* 2018;232(2):282–301.
- [10] Thakare SS, Hole JA." Review of analysis of heat recovery from top coat oven exhaust in paint shop". *Int J Eng Res Technol (IJERT)* 2015;4(2):1085–8.
- [11] Phad CB, Jaware VB." Analysis of heat recovery from primer oven exhaust in paint shop". *Int J Eng Res Technol (IJERT)* 2017;6(8):250–7.
- [12] Erol-Kantarci, M.; Mouftah, H.T., "The impact of smart grid residential energy management schemes on the carbon footprint of the household electricity consumption," *Electric Power and Energy Conference (EPEC)*, IEEE , pp.1,6, 25-27 Aug. 2010
- [13] Roelant GJ, Kemppainen AJ, Shonnard DR." Assessment of the automobile assembly paint process for energy, environmental, and economic improvement". *J Ind Ecol* 2004;8(1–2):173–91.
- [14] Mayyas A, et al." Using quality function deployment and analytical hierarchy process for material selection of body-in-white". *Mater Des* 2011;32(5):2771–82.
- [15] Mayyas AT, et al. "Sustainable lightweight vehicle design: a case study of Eco material selection for body-in-white". *Int J Sustain Manuf* 2012;2(4):317–37.
- [16] Liu Y, Liu Y, Chen J." The impact of the Chinese automotive industry: scenarios based on the national environmental goals". *J Cleaner Prod* 2015;96:102–9.
- [17] Erdogan B, Salihoglu G. "Evaluation of the solid and hazardous wastes generated by the automotive industry in Turkey". *Int. J. Therm Environ Eng* 2018;16(2):81–90.
- [18] Zanchi L, et al." Analysis of the main elements affecting social LCA applications: challenges for the automotive sector". *Int J Life Cycle Assess* 2018;23(3):519–35.