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IDENTIFICATION AND RANKING OF INFLUENTIAL ELEMENTS OF MARKETING OF RENEWABLE

ENERGY IN IRAN (FOCUSING ON SOLAR ENERGY)

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ABSTRACT

According to the record, the world's energy needs increased substantially over the past 45 years.In1960 the world's energy consumption is equal to Gtoe 3/3. In 1990 this figure was grown to Gtoe 8/8 with an average annual growth of 3/3% and in total shows increase 166%. Currently the world's energy consumption is Gtoe/Year10 and in 2020, this figure is expected to raise Gtoe/Year14. The increasing energy consumption and the end of the fossil fuel reserves created paradoxical situation. That is ambiguous the future of human society and quality of life in during or after completion of fossil fuels. However, indeveloped countries,the concern has been resolved largely. Because they achieved to the huge progress with trying in the field of research and employing renewable energy sources and enable chart clear horizon for human societies. Of course this topic will be interpreted depends on the climatic and social conditions in each country. In addition by presenting a new model in accordance with the present condition of the organization we are going to discover the closest marketing of renewable energy model &affective factors on them The proposed study uses factor analysis to extract the most influencing factors and the sample size has been chosen from experts **renewable** energy club in Iran . The questionnaire was designed in Likert scale & distributed among 200 experts **renewable** energy club. Cronbach alpha is calculated as %81, which is well above the minimum desirable limit of 0.70. The study investigates 36 factors & extracts seven important ones, which Competitive Prices, Strategic Marketing, Internal factors, Customer Information,

Promotion, Strategic Cost, Quality of Service.In this paper for analyze the data use from Factor analysis & MCDM.

Keywords: Factor Analysis, Marketing, Renewable Energy, MCDM

INTRODUCTION

Edward Holt, *et al.,* **(2011**), the main reasons from the lack of efficiency of renewable energy in Iran are Cheap and abundant fossil resources. The most likely when fossil resources are so limited that their use is no justification for the current appeal , the only countries anticipate on the use of renewable energy and have earned more necessary skills in the way ,will be capable of passing the crisis caused by the shortage of energy resources. Today in developed countries, government are trying different ways to reduce the cost of using renewable sources and here by add to the consumption market boom of renewable energy in their countries.

Torben Nielsen, *et al* **(2010),** believes that water and energy is extending development agent in any society. By increasing the level of development and prosperity in various communities, we will see every day growing in resources consumption in the world. Since the fossil resources will end in the near future, the only way to escape the misery and desperation of Communities that indiscriminate use of fossil energy sources is use of renewable energy and on top of them

undying energy that emitted from the sun daily.

Lori Birda, *et al.,* **(2005),** the International Energy Agency (WEO) has predicted by year 2020 more than 45% of the world's electricity will be produced by renewable energy that reflects the success of productive activities that had been done in this regard. Evidence shows that the attention of industrialized countries especially after the Fukushima disaster focuses on renewable energy sources more than focuses on the nuclear energy

2. Research literature

2.1. Theoretical foundations of marketing of renewable energy:

Iran has a huge potential for development of renewable energy sources, particularly wind and solar energy, and especially solar energy is more than wind energy. Some experts believe that the use of recoverable solar energy from the loot desert of Iran can meet the energy needs of human society. Studies show that radiation minimum intensity of solar in Iran is more than radiation maximum in countries such as Germany and are not comparable the number of sunny days in two countries, while the share of solar energy in

Germany's energy portfolio is constantly growing, this share is more than zero for Iran. Jim Parkin (2010), shows Solar energy is classified into 5 categories: Parabolic Trough ,CRS, Parabolic Dish, Solar Chimney, Fresnel Collector Parabolic Trough Govinda Timilsina, *et al* (2011), There are four barriers for growth market that should attention to them for development, the barriers are: cost, Reliability, complication, resistance research on promoting energy efficiency and renewable energy specifies that advertise on the environmental benefits of renewable energy technologies cannot motivate consumers to buy. Because now consumers recognize environmental benefits of renewable energy equipment, but this benefits as not much as to increase market popularity. So in addition to trying to overcome these obstacles, we will be using a marketing campaign for renewable energy to increase communication with our customers. This is most likely will increase consumer interest and motivate them for further research in this area. This kind of campaign in both financial and valuable issues will be succeeded most likely.

3. Research methodology:

3.1 Data collection and sample:

This study attempts to find the impact of marketing of renewable energy. The proposed study uses factor analysis to extract most influence factors and sample size has been choosen from experts renewable energy club.The questionnaire was designed in Likert scale & distribute among 200 peoples. To analyze the data, descriptive statistics were used to sort the data in the second part of the data analysis is performed based on statistical inference In this paper for analyze the data use from spss and MCDM software's. Factor analysis and structural equation analysis of the presumptive test was used.

3.2. Assessing reliability:

The reliability of the measurements in the survey was tested using Cronbach's a. Hair et al. (1998) stated that a value of 0.70 and higher is often "considered the criterion for internally consistent established factors" .Cronbach alpha is calculated as 0/89,which is well above the minimum desirable limit of 0/70. The Cronbach's a coefficients in parentheses indicating the internal consistency reliability of the measures (a = 0.899).

There are 36 variables and using factor analysis, We exract five factors where Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0/71(Approx. Chi-Square = 1526.038 df=465   Sig. =   0 / 0 00),which also confirms the results of our survey.

4. Analysis and results:

The proposed study designs a questionnaire and distributes it among 200experts renewable energy club. Chronbach alpha is calculated as 0/84, which is well above the minimum desirable limit of 0/70. Chronbach alpha has been calculated as 0/89 and table 1 demonstrates the results.

We extract factors where Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0/82(Approx. Chi-Square = 1526.038df=465 Sig.= 0 / 0 00),which also confirms the results of our survey. **Table 2** demonstrates the results.

Figure 1 demonstrates Eigen values for each factor and a special agent with the highest value indicates that after eleven factors, the curve becomes smooth & we choose seven factors for the proposed study. Regarding the results, we ranking of each of the components marketing of renewable energy (**Table 6**).

4.1. Interpretation of the results of the factor analysis:

The following table has been prepared based on the standard model (**Table 5**).

Table 1: Reliability Statistics

CRONBACH'S ALPHA	CRONBACH'S ALPHA BASED ON STANDARDIZED ITEMS	N OF ITEMS
.899	.899	36

Table 2: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.826
Bartlett's Test of Sphericity	Approx. Chi-Square	1526.038
	Df	465
	Sig.	0/000

Table 3: Descriptive Statistics

	N	Range	Minimum	Maximum	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
VAR00001	200	4.00	1.00	5.00	-.504	.172	-.726	.342
VAR00002	200	4.00	1.00	5.00	-.622	.172	-.495	.342
VAR00003	200	4.00	1.00	5.00	-.523	.172	-.983	.342
VAR00004	200	4.00	1.00	5.00	-.528	.172	-.734	.342
VAR00005	200	4.00	1.00	5.00	-.663	.172	-.487	.342
VAR00006	200	4.00	1.00	5.00	-.564	.172	-.697	.342
VAR00007	200	4.00	1.00	5.00	-.620	.172	-.697	.342
VAR00008	200	4.00	1.00	5.00	-.588	.172	-.450	.342
VAR00009	200	4.00	1.00	5.00	-.561	.172	-.686	.342
VAR00010	200	4.00	1.00	5.00	-.528	.172	-.726	.342
VAR00011	200	4.00	1.00	5.00	-.564	.172	-.602	.342
VAR00012	200	4.00	1.00	5.00	-.630	.172	-.571	.342
VAR00013	200	4.00	1.00	5.00	-.421	.172	-.652	.342
VAR00014	200	4.00	1.00	5.00	-.707	.172	-.275	.342
VAR00015	200	4.00	1.00	5.00	-.455	.172	-.827	.342
VAR00016	200	4.00	1.00	5.00	-.751	.172	-.323	.342

VAR00017	200	4.00	1.00	5.00	-.367	.172	-.911	.342
VAR00018	200	4.00	1.00	5.00	-.586	.172	-.621	.342
VAR00019	200	4.00	1.00	5.00	-.637	.172	-.626	.342
VAR00020	200	4.00	1.00	5.00	-.596	.172	-.664	.342
VAR00021	200	4.00	1.00	5.00	-.490	.172	-.715	.342
VAR00022	200	4.00	1.00	5.00	-.533	.172	-.810	.342
VAR00023	200	4.00	1.00	5.00	-.585	.172	-.705	.342
VAR00024	200	4.00	1.00	5.00	-.467	.172	-.781	.342
VAR00025	200	4.00	1.00	5.00	-.585	.172	-.632	.342
VAR00026	200	4.00	1.00	5.00	-.569	.172	-.560	.342
VAR00027	200	4.00	1.00	5.00	-.434	.172	-.594	.342
VAR00028	200	4.00	1.00	5.00	-.358	.172	-.850	.342
VAR00029	200	4.00	1.00	5.00	-.633	.172	-.633	.342
VAR00030	200	4.00	1.00	5.00	-.567	.172	-.603	.342
VAR00031	200	4.00	1.00	5.00	-.565	.172	-.716	.342
VAR00032	200	4.00	1.00	5.00	-.562	.172	-.638	.342
VAR00033	200	4.00	1.00	5.00	-.628	.172	-.341	.342
VAR00034	200	4.00	1.00	5.00	-.694	.172	-.388	.342
VAR00035	200	4.00	1.00	5.00	-.487	.172	-.694	.342
VAR00036	200	4.00	1.00	5.00	-.608	.172	-.479	.342
Valid N (listwise)	200							

Table 4: Total Variance Explained

Component	Total	% of Variance	Cumulative %
1	2.143	6.914	6.914
2	2.143	6.913	13.828
3	1.889	6.093	19.921
4	1.837	5.924	25.845
5	1.782	5.748	31.593
6	1.742	5.618	37.212
7	1.725	5.565	42.776
8	1.719	5.545	48.322
9	1.646	5.311	53.633
10	1.593	5.138	58.770
11	1.560	5.032	63.803

Table 5: Interpretation of the results of the factor analysis

Variable	Factor
Economical	**Competitive Prices**
Discount	
Financial services	
Price value equation	
Location offers	**StrategicMarketing**
Propaganda	
Standing ovation	
Price	
Emotional attitude	**Internal factors**
Phantasm	
Consumer perspective	
Awareness	**Customer Information**
Education	
Effective Message	
Customer Relationship	**Promotion**
Website	
Mass Media	
Cost of production	**Strategic Cost**
Opportunity cost	
The social costs	
Warranty	**Quality of Service**
After sales service	
Reliability	

Table 6: The summary of factor associated with marketing of renewable energy

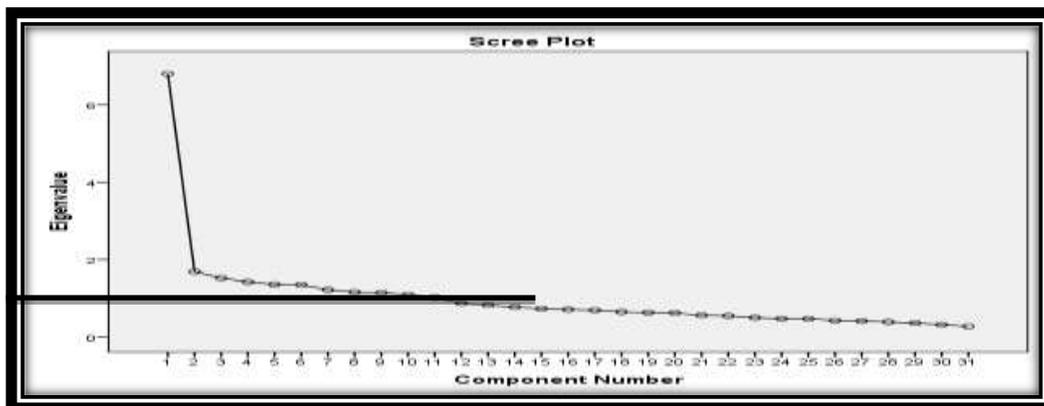| Important coefficient based on F. AHP.DEMATEL	Important coefficient based on F.DEMATEL	Important coefficient based on F.AHP	Components
0.0555	0.0505	0.0604	Competitive Prices
0.0291	0.049	0.0092	
0.0436	0.049	0.0381	
0.0487	0.0495	0.0479	
0.0322	0.0479	0.0164	StrategicMarketing
0.0388	0.0485	0.0291	
0.0451	0.0488	0.0414	
0.0525	0.0488	0.0561	
0.0476	0.0476	0.0476	Internal factors
0.0492	0.0486	0.0498	
0.0482	0.0478	0.0485	
0.0512	0.0478	0.0547	Customer Information
0.047	0.0367	0.0574	
0.0349	0.0385	0.0312	
0.0471	0.0384	0.0559	Promotion
0.0193	0.0386	0	
0.0584	0.0368	0.0799	
0.0192	0.0384	0	Strategic Cost
0.0503	0.0386	0.062	
0.0655	0.0386	0.0924	
0.0403	0.0374	0.0433	Quality of Service
0.0247	0.0384	0.011	
0.0518	0.0359	0.0604	

Figure 1: Screen plot

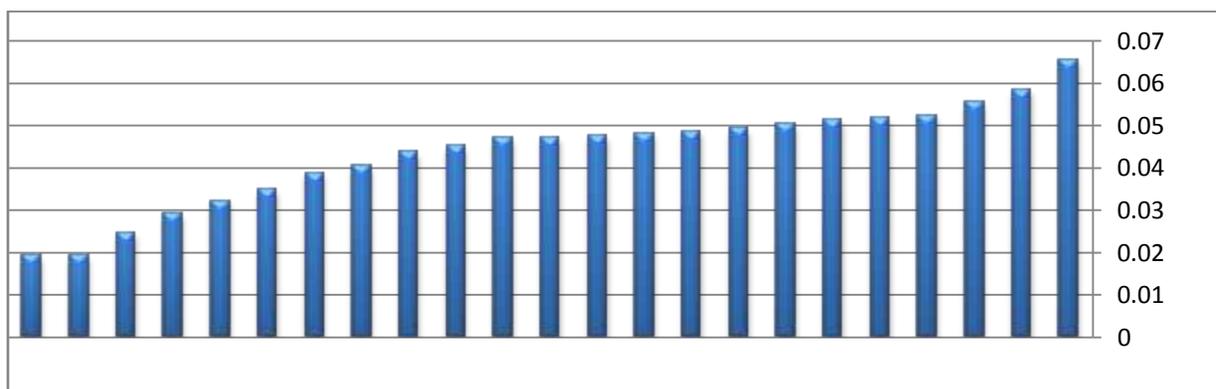**Figure 2: Important coefficient based on F. AHP.DEMATEL**

CONCLUSIONS

Iran has a huge potential for development of renewable energy sources, particularly wind and solar energy, and especially solar energy is more than wind energy. The main reasons from the lack of efficiency of renewable energy in Iran are Cheap and abundant fossil resources. The most likely when fossil resources are so limited that their use is no justification for the current appeal , the only countries anticipate on the use of renewable energy and have earned more necessary skills in the way ,will be capable of passing the crisis caused by the shortage of energy resources. This paper has presented an investigation to detect important factors influencing marketing of renewable energy. The proposed study of this paper has extracted seven important factors including Competitive Prices, Strategic Marketing, Internal factors, Customer Information, Promotion, Strategic Cost, Quality of Service. Critical component of marketing of renewable energy is the most important factor in The social costs (by a factor of 0.0655), Mass Media (by a factor of 0.0584) and Economical (by a factor of 0.0555) respectively the second & third priorities which can be considered the custodians of this section.

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