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Prediction and evaluation of international marketing management factors for wind renewable energy equipment

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Abstract

Countries have made significant investments in the last decade to reach the international market of renewable energy. Studies potentially have indicated a beneficial renewable energy market. Accordingly, firms must alter their business model to enter the global market. This research aims to discover strategic factors in international marketing management for new renewable energy products. The community of this research includes experienced managers and experts in the field of renewable wind energy. The analysis is applied in terms of purpose and is of the qualitative-quantitative method. In this study, structural equation modeling and Smart PLS software have been utilized for data analysis. The results indicate that 11 strategic factors could influence the international marketing management for new wind renewable energy products, and their effect is at a significant level. Finally, the research model was analyzed using fuzzy inference system (FIS) and Matlab software.
Key words: Marketing, International Marketing Management, Wind Turbine, Fuzzy Inference, Renewable Energy

Introduction

Threats of global warming, acid rain and nuclear disasters (Halou, 2012) and the effects of climate change due to the consumption of unhealthy fossil fuels have encouraged the widespread acceptance of renewable energy sources in countries (Dhunny et al., 2019). Energy crises are also another issue that countries are looking for renewable energy (Hashemi Dezaki and Hersini, 2018). For this reason, renewable energy sources are considered as an important driver of economic and social activities worldwide (Waziri et al., 2018), In the last decade, countries have invested heavily in accessing the international renewable energy market. Global investment in renewable energy projects reached $ 242 billion in 2016 (Kuik et al., 2019). Turkey is one of the largest wind turbine export markets in the world with more than 70,000 MW of wind capacity. (Mohtadi and Kohlert, 2016). The results of research show that the GCC countries are interested in renewable energy, and they have found that great opportunities are emerging in the field of renewable energy (Ferroukhi et al., 2013), Thus, studies potentially indicate a lucrative renewable energy market. In this regard, companies must change their business models to enter global markets. In this part of

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the energy, it is necessary to examine the level of companies and the level of the industry as a whole (Hinnells and O'Neil, 2012), Market globalization is one of the most important challenges that marketers face today (Wu, 2016). Today, marketing in its very complex form includes global marketing management and the correct understanding of international marketing is achieved by knowing the exact definition and differences of domestic marketing (Onkvisit and Shaw, 1993). The policymakers are suggested to approve supporting laws in knowledge- based productions of the country to support the sale of these products, prevent the import of products already produced in the country, and encourage their purchasing by internal companies (Doulabi et al., 2020).Thus, international marketers face with a wide range of environmental factors compared to internal marketers (Musso, 2012). International marketing includes activities in several foreign markets and in these markets not only uncontrollable factors vary from country to country but also there is a strong possibility that controllable factors also differ from one market to another (Fallah Orimi, 2012). One of the most important decisions of international companies in the field of international marketing activities is to decide on the selection of export target markets (Arabi and Dehghan, 2010), The huge prospects for the wind energy market have led to changes in international marketing management issues. It seems that managerial, strategic and commercial development and in general specific market factors and indicators in the renewable wind energy industry have not been fully studied. It is a question of what these specific factors and indicators are and what model will form the future of renewable wind energy marketing management, Based on the stated theoretical foundations and empirical background studies, although the study of global markets in different industries is considered based on some corporate, political and economic variables, so far no purposeful effort has been done to design an international marketing management model for specific

industry of renewable wind energy. While considering the new and important nature of this industry and that the goals of such organizations may be different from other organizations, research in this field will be useful and innovative.

Literature Review

Regarding to launching of new markets (such as, renewable wind energy) around the world and the changing competition from different companies worldwide, companies have tried to follow global or international marketing strategies. For firms, choosing entry mode is an important strategic decision for competitive advantage and performance. In addition, entering foreign markets includes different patterns of resource deployment, control levels, and risk / return exchanges (Baena and Cerviño, 2015). Wind turbine manufacturers enter new markets through exports, joint ventures, technology licensing, wind farms, financial facilities, or the acquisition of a local company (Lacal-Ar_antegui, 2019). This part of energy is one of the pillars of growth, development and competitiveness of modern companies and economies (Bórawski et al., 2019). International capability to enter international markets includes six components: encouragement, expert stimulation and motivation, empowerment and promotion of international capabilities, facilitation of exports, making the groundwork for export development, and an advantageous approach (Hemmati, 2018). International capability to enter international markets can be defined in reviewing and developing international marketing strategies (Gisma, 2018).

Uncertainty of destination country, product market uncertainty, competitive uncertainty, uncertainty in the behavior of potential partners, international experience, technical knowledge, marketing skills, total investment, intensity of industry competition, nature of activity and location attractiveness are effective factors in choosing strategies of entry to foreign markets (Rezvani and Gol Alizadeh, 2011). Renewable

energy market strategies are defined in the following steps (Christian Schlenker, 2020):
1. Defining the overall goal - vision and mission
2. Defining target markets - Markets with the greatest potential for product
3. Product, sales and marketing strategy development, - dealing with target markets
4. Developing an action plan - actions to implement the strategy.

Examined the interaction between environment and strategic orientation in choosing the mode of entry into global markets. Findings show that the choice of the level of commitment of these companies is influenced by the characteristics of the host market. It is often thought that the choice of entry mode for global start-ups is strongly influenced by the risk characteristics of the host country market and encourages the selection of low-commitment entry modes in high-risk markets. As the findings show, global start-ups are also sensitive to the opportunities offered by the host market, which sometimes leads to an entry mode with high-level commitment (Efrat and Shoham ,2013). On the other hand, the marketer is exposed to different sets of macro-environmental factors and constraints resulting from different political systems, legal frameworks, cultural norms and economic conditions (Kala et al., 2015). Companies need to examine at how to enter global markets. Because not examining it can be costly for the company (Laufs, Schwens, 2014). Defining and identifying the factors determining the choice of foreign market entry mode show that cultural distance, market attractiveness, international experience of the company, intangible assets, company size and ownership structure are determinants of selection mode (Andreu et al., 2017).

Investigated knowledge of decision-making for entry mode for small and medium-sized companies and found that innovation, product features, advertising intensity, export intensity and the industry have positive effects on choosing a high level of resource commitment in foreign markets. Experimental results show

that the mode dependence between current and past modes plays an important role in determining the choice of entry mode (Lin and Ho 2018). However, if the mode adopted in the previous period is related to the poor performance of the parent company, the impact of government dependence will be significantly reduced (Chen and Chang, 2011). There is a direct relationship between mode performance and future mode selection. Evidence also suggests that the assumed effects of transaction cost factors in choosing entry mode in the dynamic selection process are supported.

According to the theoretical literature of renewable energy, two important factors including internal factors (technological progress and cost advantage (price)) and external factors (related to political, social and organizational factors) influence the business model decision of this industry (Lüdeke-freund, 2010). The impact of these two factors on the marketing and performance of companies has been indirectly emphasized by others (Wu, 2016). The results of the study show that in the renewable energy industry, the resources and capabilities of research firms, such as the need for funding and rapid commercialization, and the launch of the latest technologies for technology development, are key factors that encourage them to enter international markets (Zolfaghari and Rialp-Criado, 2017). On the other hand,evaluating technological capability is on of the key tools in the field of technology management that uses this tool to identify strengths and improvments to measure the technological gap (Khamseh and Marei, 2020). Inereasing strategic capability, by increasing the number of identified technologies that are in line with the vision of technology evelopment, provides the basis for prioritization and effective selection of technology. (Radfar and Zolaikhaei, 2020).

The success of a company depends on its resources and capabilities, as well as its ability to adapt to the potential conditions of the industry and the markets in which it operates. Thus, for success in foreign markets, it should

adopt different strategies (Rua, 2018). Intelligent marketing solutions for renewable energy businesses are proposed in two forms: sales promotion (Promotion) and distribution channels (Place) (Falahatkar, 2015). Competition at the company level can be defined as the ability of companies in that sector to sell goods and services in the market and business compared to international competitors. Therefore, companies should enjoy a competitive advantage in the global market (Kuik et al., 2019).

Managers' motivation is one of the influential factors (Mburu David Kiarie, 2017) that firms need to participate in foreign markets including increased sales, short-term profits, long-term profits, technological upgrades, readiness for globalization and global success (Ahmadian and Parsamanesh, 2016). Investigated competitive advantage in the renewable energy industry through an attraction model in the following indicators: 1. GDP, 2. Geography, 3. Shared language, 4. Past colonial relations, 5. Regional trade agreements, 6. Neighborhood (Shared Borders), 7. Demand, 8. Policies of country of origin on renewable energy. They reported that this model provides evidence of competitive advantage that is positively related to domestic renewable energy policies sustainable in the wind industry (Philippe Quirion, et al., 2018).

Proposed new criteria for choosing the entry mode into emerging foreign markets. According to them, the frequent changes in government policies are involved in the performance. For example, policies regarding the use and legal protection of foreign brands or imported raw materials may change. In addition to the political stability of the host market, they cited economic potential and the unemployment rate as independent variables. Moreover, other variables that may influence the choice of entry mode include geographical distance between the host and the home country, international experience of voting right, and the efficiency of contract execution in the host country (Baena and Cerviño, 2015). Governments can support firms to access international networks.

Specifically, the government should constantly support small and medium-sized enterprises to participate in international trade fairs and exhibitions. (Aali et al., 2021)

An examination of the theoretical foundations of research shows that, characteristic of the world economy in the twenty-first century, are related processes, among which we can mention globalization, internationalization and transnationalization. These processes not only affect the functioning of global markets, but also lead to fundamental changes in the competitive strategies of countries and companies. Because tough competition and changing circumstances force them to use different markets for strategic planning and achievement of long-term benefits. Meanwhile, deciding on the choice of strategies to enter international markets, on the one hand due to the dynamic and complex nature of entry methods and on the other hand due to the influence of different variables on it, is a complex and difficult task. In addition, due to time constraints and resources of companies, it is not possible to examine all variables. This is doubly important especially for renewable energy sources. Therefore, it is necessary to identify the strategic variables that determine the strategies for entering international markets for renewable energy and to develop a local model in this regard.

All the reaearch backgrounds has been addressed in the table .1 beside the Research variables.

Method

The current research is applied because its result is utilized for renewable energy industries. However, the study is a descriptive survey method considering the extraction of variables from the research literature and interviewing with experts by organizing a specific panel .finally, data collection from the statistical community. Confirmatory factor analysis and structural equations were utilized using SMART PLS software to confirm the variables achieved in table 1. This software is

used due to the limited volume of the statistical community and non-normalized data because this software is not sensitive to the normality of the data. Managers and experts are part of the statistical population of the research, which has been selected in the form of targeted and available sampling. The statistical population has a bachelor's degree or higher with more than seven years of work experience. Finally, the research model was analyzed using fuzzy inference system (FIS) and Matlab software.

Table 1.
Research variables

Dimendions	Factors	Sym.	Reference
Enter the wind turbine market (M.E)	Entering the market by export method	M.E.1	(Hemmati ,1397) (Lin & Ho , 2018)
	How to enter the market	M.E.2	(Bagheri , 1395) (Justin Paul & Erick Mas , 2019)
	Enter the market with online , direct distribution	M.E.3	(Christian Friege & Carsten Herbes , 2017)
	Enter new markets to boost sales	M.E.4	(Shi Yi ,2011)
	Method of market entry	M.E.5	(Gisma/ 2018)
Characteristics of Wind Turbine Products (P.C)	Product innovation capability	P.C.1	(Corinna Do¨gl , 2010) (Lin & Ho , 2018)
	Technical specifications of the product	P.C.2	(Experts) (Shi Yi ,2011) (Bagheri , 1395)(Lin & Ho , 2018)
	Wind turbine products production technology	P.C.3	(Zhongying Wang & Junfeng Li ,2009)
	Differentiation of wind turbine products	P.C.4	(Marek-Andres Kauts , 2015)(Deborah Baker Brannan ,2012)(Christian Friege & Carsten Herbes , 2017)
	Environmental benefits of wind turbine products	P.C.5	(Experts) (Christian Friege & Carsten Herbes , 2017)
	Create a proportionate value chain	P.C.6	(Falahatkar , 1394)
	Knowledge and experience of producing wind turbine products	P.C.7	(Experts) (De Villa , 2015)
	Existence of technology capability and technology resources	P.C.8	(Miečinskienė , 2014) (Chen & Chang , 2011)
	Construction cost and cost	P.C.9	(Deborah Baker Brannan , 2012) (Gustavo Henrique , 2013) (De Villa , 2015)
Target Market Characteristics (M.C)	Economic situation GDP (GDP - in billion dollars)	M.C.1	(Experts) (Miečinskienė , 2014) (Firuzian , 1389)
	Tendency to other renewable energies	M.C.2	(Marek-Andres Kauts , 2015)
	Identify markets with the greatest potential for the product	M.C.3	(Baena & Cerviño, 2015)
	Market specifications	M.C.4	(Christian Schlenker , 2020)
	Market potential and company position in it	M.C.5	(T.SOMASUNDARAM , 2019) (De Villa , 2015)
	Market attractiveness	M.C.6	(Gisma, 2018) (Justin Paul & Erick Mas , 2019) (Reza Mohtadi , 2016)
	Existing wind farms	M.C.7	(Morschett, 2010) (Baena & Cerviño, 2015) (Andreu, Claver & Quer, 2017) (Laufs & Schwens, 2014)

Dimendions	Factors	Sym.	Reference
	Demand	**M.C.8**	(Marhaf Kharat Halou ,2012)
	Wind energy market opportunities	**M.C.9**	(Rabia Ferroukhi , 2012) (Philippe Quirion- Onno Kuik - Frederic Branger , 2018)
Political factors (P.O.F)	Host country risk	**P.O.F.1**	(Marhaf Kharat Halou ,2012) (Gustavo Henrique , 2013) (De Villa , 2015)
	Political stability of the host country	**P.O.F.2**	(Experts) (De Villa , 2015) (Andreu, Claver & Quer, 2017) (Efrat & Shoham, 2013) (Morschett, 2010)
	Country of origin policies on renewable energy	**P.O.F.3**	(Baena & Cerviño, 2015)
	The political atmosphere of the host country	**P.O.F.4**	(Experts) (Philippe Quirion- Onno Kuik - Frederic Branger , 2018)
	Political relations with the host country	**P.O.F.5**	(Experts)
	Host country wind energy policies	**P.O.F.6**	(Marhaf Kharat Halou ,2012) (Gustavo Henrique , 2013)
	Existence of regional trade agreements of the host country	**P.O.F.7**	(Experts) (Gisma, 2018) (Philippe Quirion- Onno Kuik - Frederic Branger , 2018)
Cultural factors (C.F)	Cultural-demographic issues	**C.F.1**	(T.SOMASUNDARAM , 2019) (De Villa , 2015) (Firuzian , 1389)
	Social-environmental issues	**C.F.2**	(Gustavo Henrique , 2013)
	Cultural distance from the host country	**C.F.3**	(Miečinskienė , 2014) (Laufs & Schwens, 2014) (Andreu, Claver & Quer, 2017) (Morschett, 2010) (Corinna Do¨gl , 2010)
	Past exploitative relations	**C.F.4**	(Philippe Quirion- Onno Kuik - Frederic Branger , 2018)
	common language	**C.F.5**	(Philippe Quirion- Onno Kuik - Frederic Branger , 2018)
Legal factors (L.F)	Laws related to renewable energy	**L.F.1**	(Experts) (Mburu David Kiarie , 2017) (Firuzian , 1389) (Ahmadian & Parsamanesh, 1395) (Morschett, 2010)
	Supportive laws in the field of wind energy	**L.F.2**	(T.SOMASUNDARAM , 2019) (Corinna Do¨gl , 2010)(Zhongying Wang & Junfeng Li ,2009)
	Renewable Energy Development Program (MW)	**L.F.3**	(Experts)
	Existence of green industrial policies	**L.F.4**	(Experts)
	Deterrent laws in the host country	**L.F.5**	(Gisma, 2018) (Reza Mohtadi , 2016) (T.SOMASUNDARAM , 2019)
	Renewable energy incentive policy	**L.F.6**	(Experts)
Geographical factors (G.F)	Geographical factors related to wind energy	**G.F.1**	(Philippe Quirion- Onno Kuik - Frederic Branger , 2018) (Miečinskienė , 2014) (T.SOMASUNDARAM , 2019) (Firuzian , 1389) (Experts)
	Distance to target market (km)	**G.F.2**	(Experts)
	Competitive position of the host country	**G.F.3**	(Morschett, 2010)
	Neighborhood (common border)	**G.F.4**	(Philippe Quirion- Onno Kuik - Frederic Branger , 2018)

Dimendions	Factors	Sym.	Reference
	Wind energy potential	**G.F.5**	(Rabia Ferroukhi , 2012) (Marhaf Kharat Halou ,2012) (Corinna Do¨gl , 2010) (Gustavo Henrique , 2013)(Experts)
	Distance to destination country	**G.F.6**	(Christian Friege & Carsten Herbes , 2017) (Reza Mohtadi , 2016)
Internal factors of the country of origin (E.F)	Industry trends	**E.F.1**	(Laufs & Schwens, 2014) (Deborah Baker Brannan , 2012) (Ahmadian & Parsamanesh, 1395) (Lin & Ho , 2018) (Marhaf Kharat Halou ,2012)
	Commercial balance of origin with the destination country	**E.F.2**	(Experts)
	Mother market environment	**E.F.3**	(Bagheri , 1395) (Laufs & Schwens, 2014)
	Type of currency exchange	**E.F.4**	(T.SOMASUNDARAM , 2019)
	Production relations between the subsidiary and the parent company	**E.F.5**	(Corinna Do¨gl / 2010) (Chen & Chang , 2011)
	Export Incentive Policies	**E.F.6**	(Experts)
Firm Conditions in country of origin (B.F)	size of the company	**B.F.1**	(De Villa , 2015) (Andreu, Claver & Quer, 2017) (Lin & Ho , 2018) (Chen & Chang , 2011)
	Research and development capabilities	**B.F.2**	(Zhongying Wang & Junfeng Li ,2009) (Corinna Do¨gl , 2010)
	Having international technical and system certifications	**B.F.3**	(Zhongying Wang & Junfeng Li ,2009)
	Extent of international experience in the field of renewable energy	**B.F.4**	(Laufs & Schwens, 2014) (Andreu, Claver & Quer, 2017) (Lin & Ho , 2018) (Chen & Chang , 2011) (Zhongying Wang & Junfeng Li ,2009) (Experts)
	Enterprise ability (financial, technological, etc.)	**B.F.5**	(Andreu, Claver & Quer, 2017) (Firuzian , 1389) (Baena & Cerviño, 2015) (Reza Mohtadi , 2016) (Ahmadian & Parsamanesh, 1395) (Bagheri , 1395) (De Villa , 2015)
	The focus of management on renewable energy	**B.F.6**	(Mburu David Kiarie , 2017) (Ahmadian & Parsamanesh, 1395) (Rezvani, 1390) (Experts)
	Access to raw material resources	**B.F.7**	(Marek-Andres Kauts , 2015) (Chen & Chang , 2011)
	Advantageous approach	**B.F.8**	(Hemmati ,1397)
	Existence of vision and mission definition in the field of renewable energy	**B.F.9**	(Experts) (Christian Schlenker , 2020)
Marketing Implementations (M.I)	Tendency to control international operations	**M.I.1**	(Rezvani, 1390)
	Intensity of advertising	**M.I.2**	(Shi Yi ,2011) (Efrat & Shoham, 2013) (Lin & Ho , 2018)
	Promotion and marketing communications	**M.I.3**	(Shi Yi ,2011) (Laufs & Schwens, 2014) (Ahmadian & Parsamanesh, 1395) (Alona Tanasychuk , 2019)
	communication network	**M.I.4**	(Chen & Chang , 2011)
	Perform market segmentation	**M.I.5**	(Falahatkar , 1394)
	Provide smart marketing solutions	**M.I.6**	(Alona Tanasychuk , 2019) (Falahatkar , 1394)
	Existence of green marketing	**M.I.7**	(Gustavo Henrique , 2013)
	Existence of market development strategy	**M.I.8**	(Zhongying Wang & Junfeng Li ,2009) (Marhaf Kharat Halou ,2012)

Dimendions	Factors	Sym.	Reference
	Empower and enhance international marketing capabilities	**M.I.9**	(Alona Tanasychuk , 2019) (Hemmati ,1397)
	International marketing research	**M.I.10**	(Experts) (Reza Mohtadi , 2016) (Alona Tanasychuk , 2019)
	Targeting environmentally conscious consumers	**M.I.11**	(Deborah Baker Brannan / 2012)
	Review and develop international marketing strategies	**M.I.12**	(Gisma, 2018) (Hemmati ,1397) (Christian Schlenker , 2020)
Competitive Status (P.F)	Intensity of competition	**P.F.1**	(Falahatkar , 1394)
	Create distinctive value proposition	**P.F.2**	(Marek-Andres Kauts , 2015) (Experts)
	The financial strength of competitors	**P.F.3**	(Marek-Andres Kauts , 2015) (Experts)
	Diverse competitors	**P.F.4**	(Marek-Andres Kauts , 2015) (Experts)
	Buyer desire for first-class brands	**P.F.5**	(Deborah Baker Brannan , 2012) (Christian Friege & Carsten Herbes , 2017) (Gisma, 2018)
	Brand position	**P.F.6**	(Corinna Do¨gl , 2010)
	Competition in the domestic market	**P.F.7**	(Experts) (Christian Schlenker , 2020)
	Intensity of competition	**P.F.8**	(Falahatkar , 1394)
	Create distinctive value proposition	**P.F.9**	(Marek-Andres Kauts , 2015) (Experts)

Findings

In this research, with a review of the literature in table 1, 83 initial indicators were identified influencing the International Marketing Management of Wind Renewable Energy Equipment and were categorized in the form of 11 strategic factors. A research questionnaire was designed, distributed, and collected among the statistical population. The SMART PLS software was used for analyzing the results. Figure 1 illustrates the basics of structural equation modeling along with factor load coefficients.
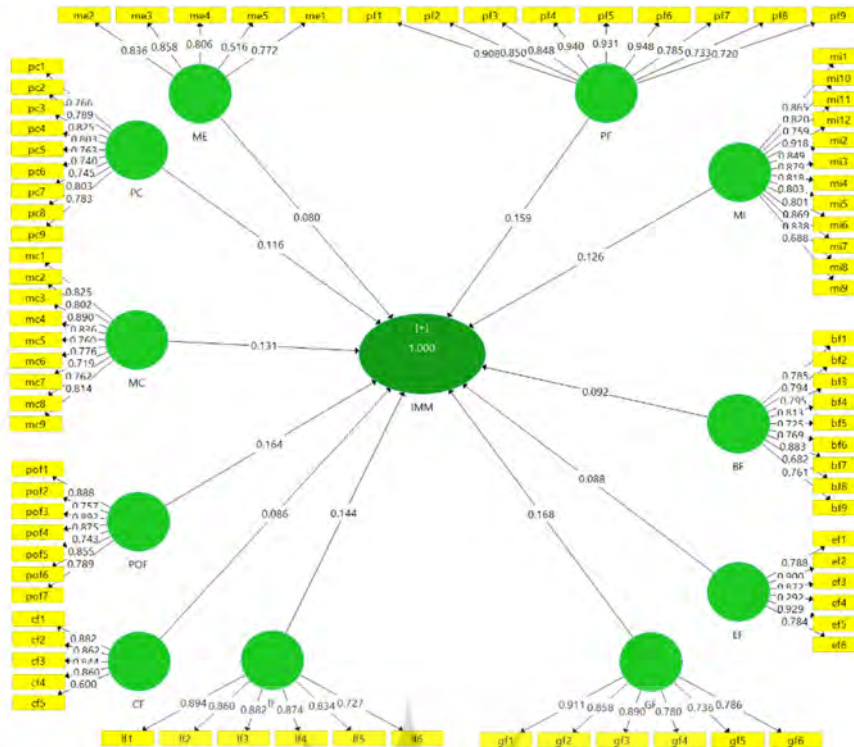
Figure 1. Initial measurement model in the mode of estimating standardized coefficients (factor load)

The questionnaires validity was verified by using expert judgment. Apart from this, SMART PLS software was used for performing Divergent and convergent validity. The Cronbach's alpha has been used to evaluate the questionnaire's reliability, and for all factors, the calculated Cranach's alpha value was higher than 0.7. Therefore, the questionnaire has the required reliability. The reliability, convergent validity, and quality of the model, the validation tests of the Reflective measurement model are given below based on table 2. It can be seen that all of them are within the allowed and accepted range due to the explanations given below.

A) Test of homogeneity and fit of measurement models

Criteria for the appropriateness of values for factor load coefficients at 0.7 is SMART PLS, and above Hair et al.,2006,2011) (Gefen & Straub, 2005). The model could be more accurate in this software if the factor load were considered 7.0 and above. According to Figure 1, five indicators that had a factor coefficient of less than 0.7, including codes me5, cf5, ef4, bf8, and mi9, were removed, and another 78 indicators with acceptable factor loading coefficients were accepted depending on the corrective model in figure 2; as a result, the homogeneity and fit of the measurement model are obtained.

Figure 2. Corrective measurement model (accepted model) in the standard coefficient estimation mode (factor load)

B) Convergent validity test and the reliability of the reflective measurement model

An appropriate criterion for Cronbach's alpha is 0.7 for all factors. The combined reliability, and Cronbach's alpha coefficient, the obtained shared reliability for the variables has illustrated that the internal consistency is at the desired level in table 2. According to the entire factor loads results, the questions are significant after fitting concerning convergent validity. Therefore, the t-value was more significant than the absolute value of 1.96; moreover, all factor loads were more significant than 0.7. The average variance extracted greater than 0.5 compared to the combined reliability with it, for each factor is CR> AVE. Thus, the research model has an appropriate convergent validity.

Table 2. The Reliability results, Convergent validity, and Quality of the model

Strategic factor	Code	Reliability			Convergent validity	
		Cronbach's alpha	Shared reliability	Combined reliability (CR)	average variance extracted	CR>AVE
Source of origin condition	**BF**	0.921	0.643	0.935	0.643	OK
cultural factors	**CF**	0.901	0.771	0.931	0.771	OK
Internal conditions of the origin country	**EF**	0.809	0.735	0.933	0.735	OK

Strategic factor	Code	Reliability			Convergent validity	
		Cronbach's alpha	Shared reliability	Combined reliability (CR)	average variance extracted	CR>AVE
Geographical condition of the environment	**GF**	0.808	0.688	0.929	0.688	OK
Legal factors	**LF**	0.820	0.718	0.938	0.718	OK
Target Market Characteristics	**MC**	0.829	0.639	0.941	0.639	OK
Entering the Wind Turbine Market	**ME**	0.861	0.706	0.905	0.706	OK
Marketing Procedures	**MI**	0.759	0.705	0.943	0.705	OK
Wind Turbine Product Features	**PC**	0.819	0.609	0.933	0.609	OK
Political factors	**PF**	0.910	0.732	0.950	0.732	OK
Competitive situation	**POF**	0.827	0.697	0.939	0.697	OK

C) Divergent validity tests of a reflective measurement model

1) Evaluating the indicators of intersection load: It can show each indicator's factor load, not only on its factor but also on other factors. The factor load of each indicator on its elements must be at least 0.1 more than its factor load on other indicators. The software output in all cases representing 0.1. (Fornell&Larcker, 1981)

2) Fornell and Larker test: Fornell&Larcker (1981) suggested that the correlation correlated to hidden variables is investigated. All prime diameter numbers must be greater than the numbers below their column, which shows the correlation between the hidden variables. The Software output confirms this subject.

3) Measurement model quality and structural model: the measurement model could have a good quality if the composite validity index of the SSE / SS0 measurement model or CV-COM is positive for hidden variables (Fornell & Larcker, 1981). The software output represents positive numbers and verifies the quality of the measurement model and its structure.

Structural Model Analysis

In this part, Figure 3 is a structural model the case of estimating the path coefficients, which signifies the contribution of each factor in the model, and Figure 4 is a structural model in the significant state of path coefficients, shows the significance of the relationship between independent and dependent variables.
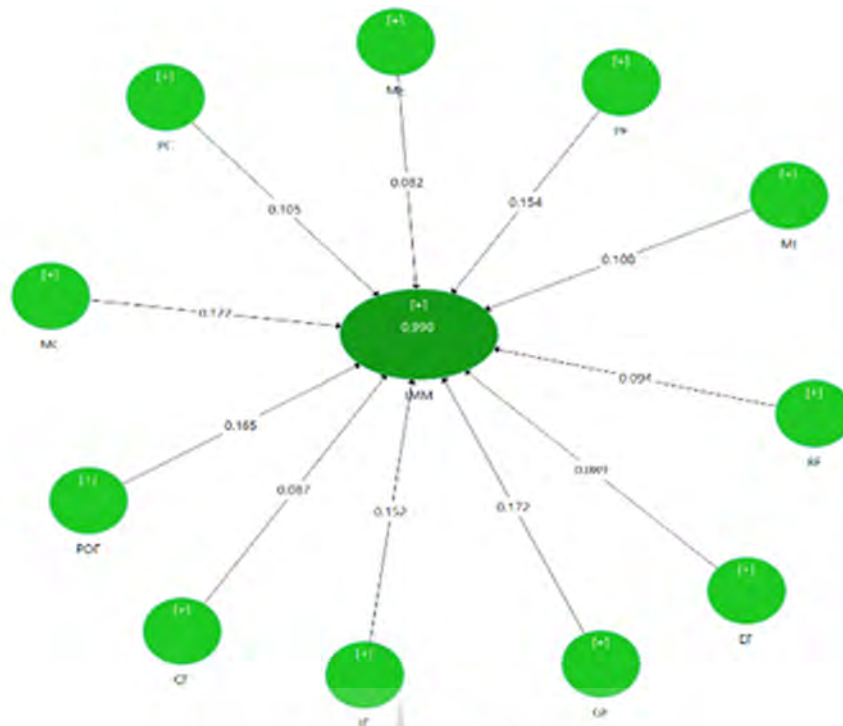
Figure 3. Structural model in the case of estimating the path coefficients
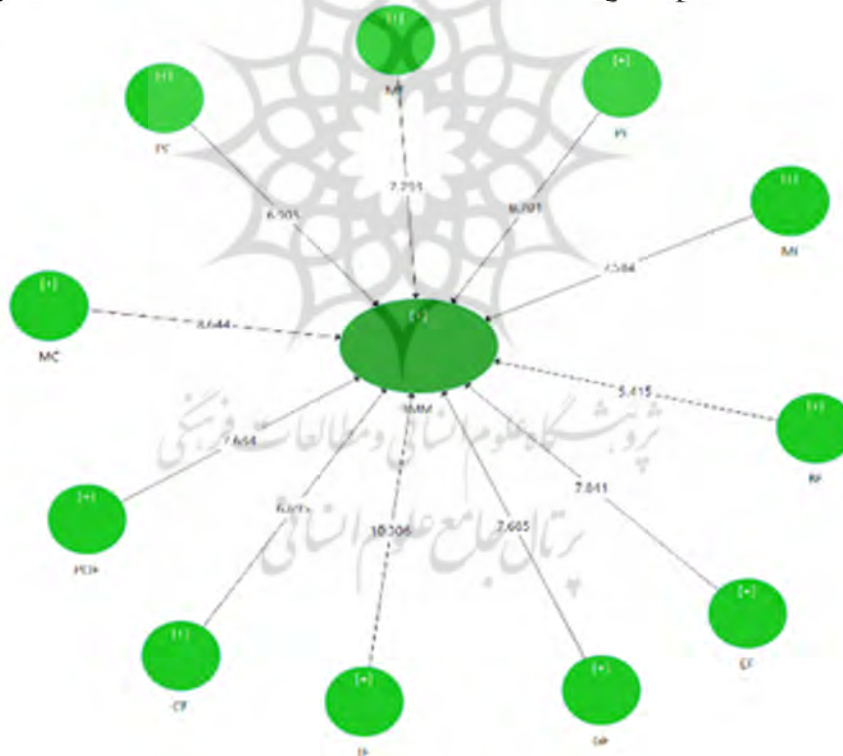

Figure 4. Structural model in the case of significant path coefficients

In all cases, significant coefficients are greater than 1.96. The fit of the structural model using significance coefficients represents that these coefficients should be higher than 1.96 for confirming their significance at a 95% confidence level; this means that the independent variable is significantly related to the dependent variable in figure 4.

The overall fit of the model

The GOF criterion is used for evaluating the fit of the overall model, and three values of 0.01, 0.25, and 0.36 are introduced as a weak, medium, and strong values for GOF (Hair et al., 2018). The results indicate a value of 0.831 for GOF that shows the proper fit of the theoretical model.

Strategic factors ranking

The diagram, international marketing management strategic factors were ranked in renewable wind energy depending on the achieved path coefficients in table 3.

Table 3.

Ranking of Strategic Factors in International Marketing Management based on path coefficients the field of wind renewable energy

| Rate	Coefficients	Relationships	Path coefficients
8	The condition of the origin company	BF -> IMM	0.094
1	The condition of the Geographical environment	GF -> IMM	0.172
9	Internal conditions of the origin country	EF -> IMM	0.089
10	cultural factors	CF -> IMM	0.087
4	Legal factors	LF -> IMM	0.152
5	Target Market Characteristics	MC -> IMM	0.122
11	Entering the Wind Turbine Market	ME -> IMM	0.082
6	Marketing measures	MI -> IMM	0.108
7	Wind Turbine Product Features	PC -> IMM	0,105
3	Political factors	PF -> IMM	0.154
2	Competition status	POF -> IMM	0.165

Design of fuzzy inference system

In order to evaluate and measure the dimensions affecting the international marketing management for new wind renewable energy products, we have designed a main FIS.

International Marketing Management (I.M.M) for new wind renewable energy products has 11 inputs (Sub-FIS) Following Figure 5 shows the designed fuzzy system, the main research component and its inputs.
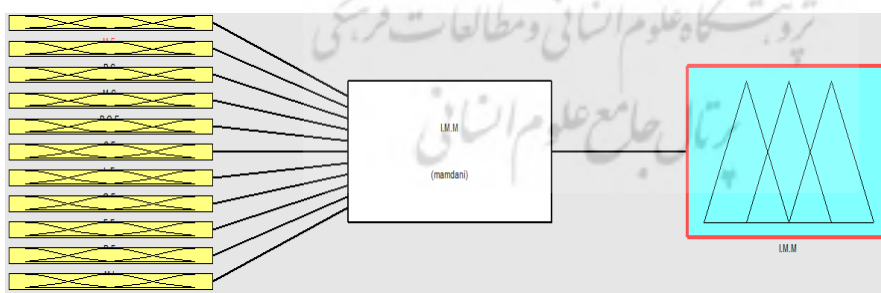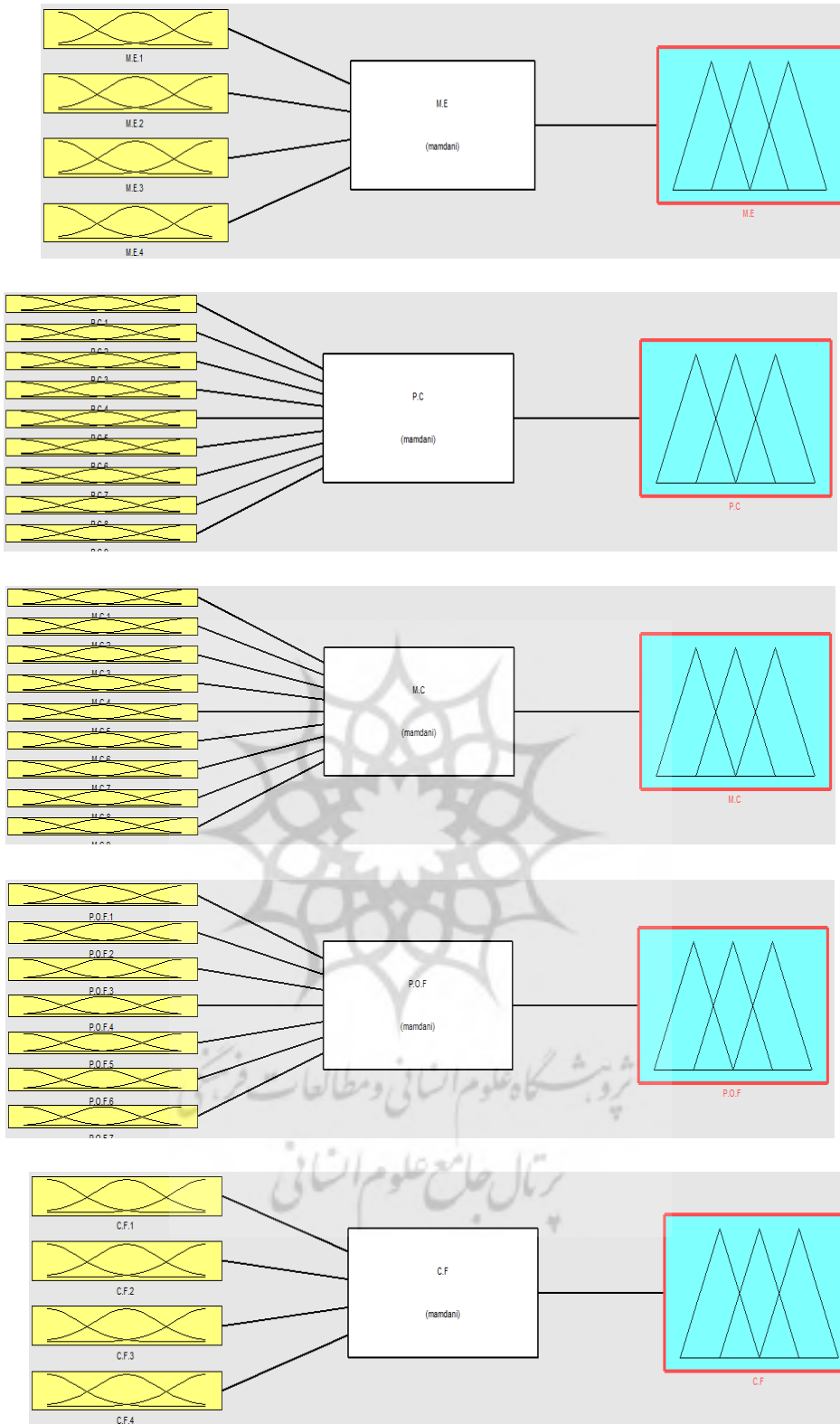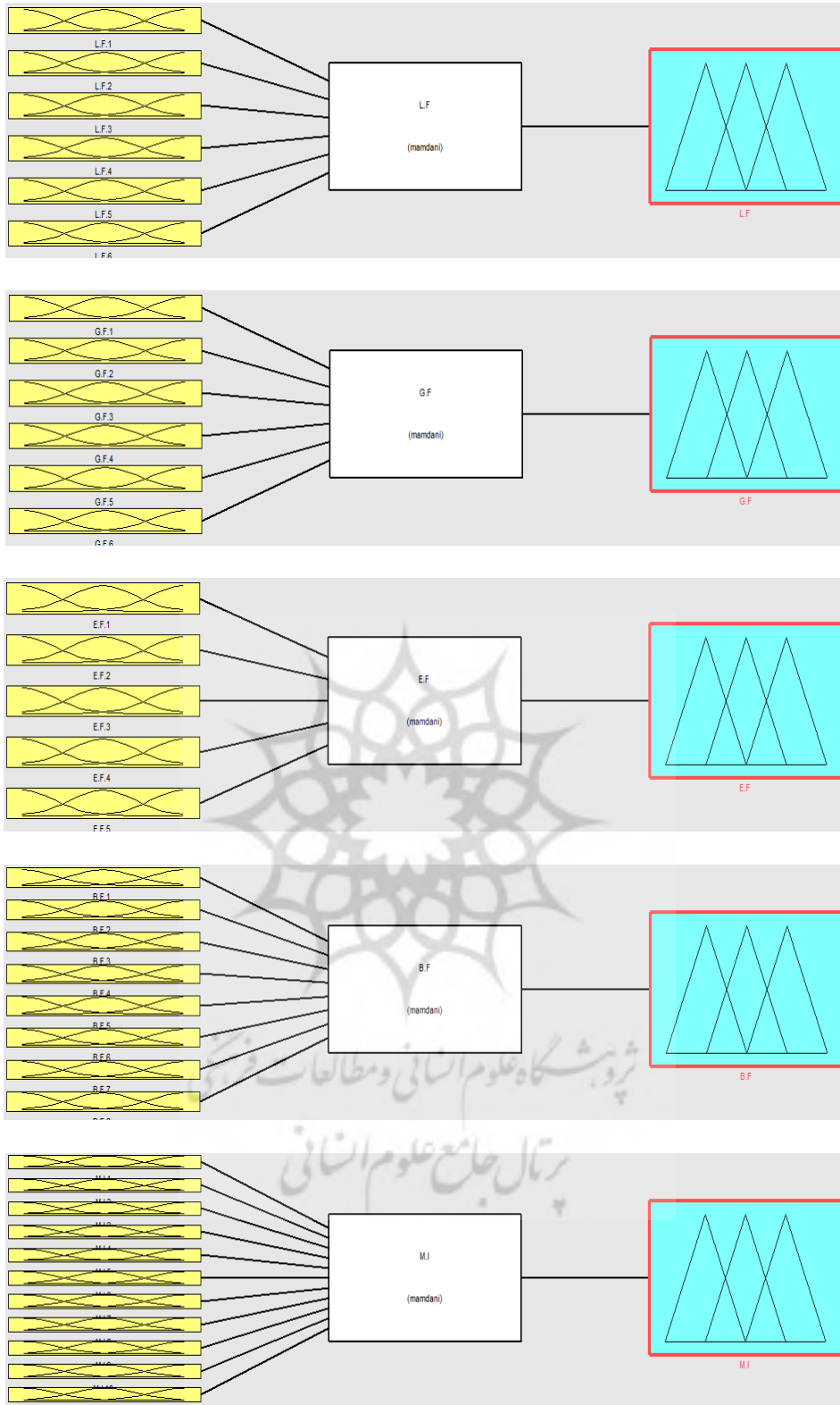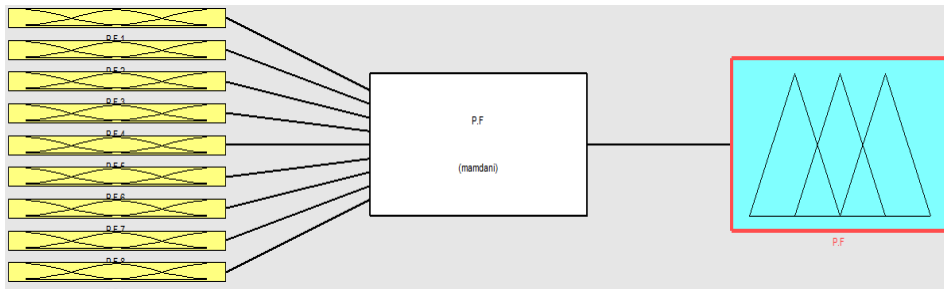
Figure 5. The main fuzzy system of research and its input components (Sub-FISs)

Effect of dimensions on international marketing management

According to the database of rules extracted for this research, the combination of different dimensional states will lead to different outputs of the designed system. Figures 6a-c show the curves of dimensions affecting international marketing management for new renewable wind energy products. Each of these dimensions has been compared with each other in pairs and their effect on the main component of the research has been shown.
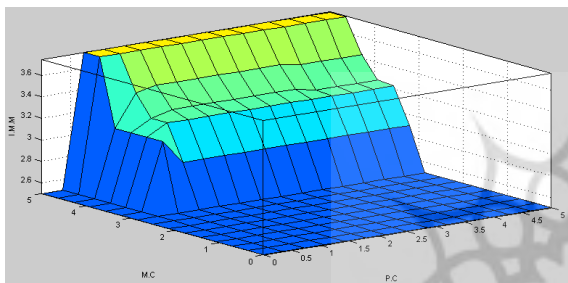
Figure 6 -B Effect curve of "Target Market Characteristics" and "Wind Turbine Product Characteristics" on output
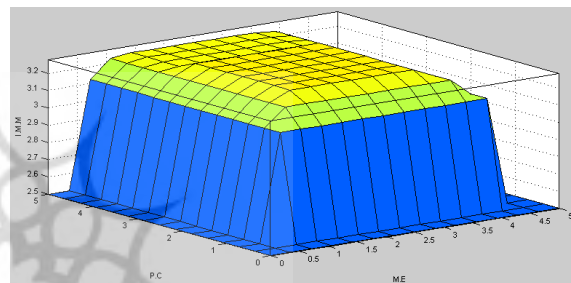

Figure 6- A Effect curve of "wind turbine product characteristics" and "wind turbine market entry" on output
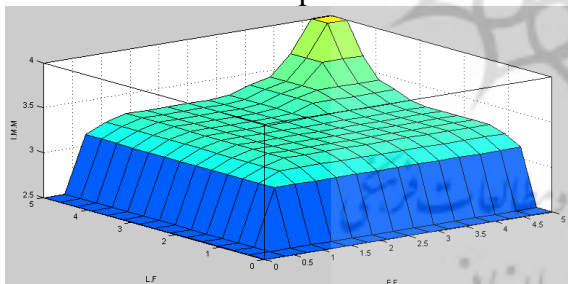

Figure 6- D The effect curve of "legal factors" and "internal conditions of the country of origin" on output
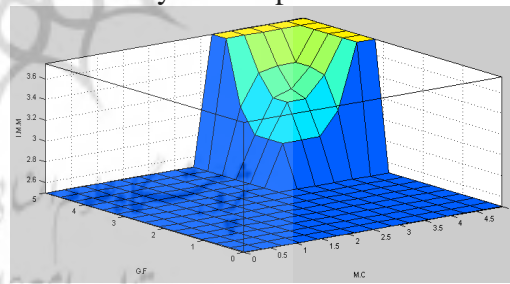

Figure 6 - C curve of the effect of "geographical environment conditions" and "target market characteristics" on output
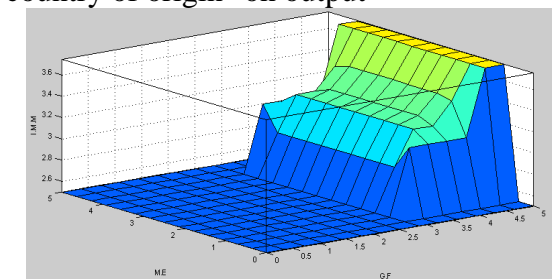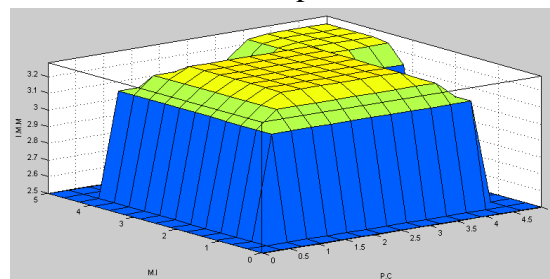

Figure 6 - F What effect curve "into the

Figure 6 - E Curve of the effect of "marketing

wind turbine market" and "geographical environment" on output

measures" and localization and "characteristics of wind turbine products" on output

Validation of mathematical model

After designing the fuzzy inference system, before its implementation in the study, the validity of the mathematical model was assessed. As shown in Table 4, the model presents completely logical behavior against the changes of input variables from weak (1) to good (5).

Table 4.
Effect of Simultaneous Changes on Outputs

FIS outputs	FIS inputs										
I.M.M	M.E	P.C	M.C	P.O.F	C.F	L.F	G.F	E.F	B.F	M.I	P.F
1.53	1	1	1	1	1	1	1	1	1	1	1
4.6	5	5	5	5	5	5	5	5	5	5	5

Conclusion and Suggestion

The aim of conducting this research is to recognize the strategic factors of international marketing management for new wind renewable energy products. In this study, 83 indicators were obtained from reviewing literature and interviewing experts and have created the research model using 11 strategic factors. The fit of the theoretical model was analyzed with structural equations, SMART PLS software, and five indicators with a factor load of less than 0.7 have been eliminated from the initial model. The final model of the research was formed and Finally, the research model was analyzed using fuzzy inference system (FIS) and Matlab software. Accordingly, in renewable wind energy, all eleven strategic factors significantly impact international marketing management. In addition, based on the strategic factor ranking results of the geographical environment in the first place, a strategic element of the competition situation in the second place and the strategic aspect of marketing proceeding is of third importance. The practical suggestions are presented in the following part relevant to ranking these factors and their constituent indicators.

First rank: Strategic factor of geographical environment conditions

The most significant parameter for selecting a wind turbine site is a medium speed of the wind that could be (medium and long term). The higher the wind speed, the higher the production capacity of the wind turbine. However, According to the international standard IEC61400-1, the wind turbine class depends on wind speed. Thus, wind speed could be considered one of the most vital elements in selecting the type of wind turbine. Apart from this, turbine layout type is determined by the prevailing wind direction in a field. Periodic Wind Distribution and continuous distribution (continuity) wind speed are factors influencing the selection of wind turbine type. Environmental conditions, including the slope of the area, are essential parameters in the appropriate functioning of turbines. In addition, the surface topography must provide wind access for all turbines. One of the significant factors in site selection is accessibility for the site's construction, land price, and surface roughness. The height should be a certain amount so that the transfer of equipment does not face any problems.

However, temperature and pressure decrease with increasing altitude, and as the pressure

reduces, the amount of power extracted from the turbine reduces. The existence of transport infrastructure is also required because land or sea routes transport the equipment, and factors including safety, network security, and the feasibility of quick access to equipment installation are influential in locating wind farms. However , the proximity of the target market and the common border or the appropriate water or rail route is a higher priority due to the bulkiness of some wind turbine equipment such as vanes. Because in some cases, the high cost of transportation due to the distance dimension makes the final price non-competitive. Therefore, excellent criteria for prioritizing international target markets can be obtained by examining geographical environment factors, including the wind potential of various countries, particularly neighbors, due to the short distance and common border.

Second place: strategic factor of the competition situation

One of the essential factors in prioritizing target markets is the status of competitors in the host country and internationally. In some nations, the market potential is excellent due to the lack of prominent players in wind turbines. Apart from this, in the presence of competitors, it is feasible to decide on the prioritization of entering international markets by analyzing significant indicators such as competition intensity, the financial strength of competitors, diversification of competitors, and their brand position.

Third place: strategic factor of marketing measures

One of the strategic plans of large companies is the existence of a market development strategy, which requires empowerment and upgrading of international marketing capabilities. Thus, it is feasible to enter the global markets by using global marketing research tools, market segmentation, and intelligent marketing solutions. Stability is

achieved in international markets if this strategy is constantly on the agenda and reviewed and developed international marketing strategies. Of course, in these reviews, more attention should be paid to new approaches, including green marketing and intelligent communication network. , the intensity of advertising and the competitor's needs should be monitored and controlled due to the desire for managing international operations in the management of wind turbine equipment marketing to promote marketing communications. Finally, future researchers are advised to research the following for completing the research:

The effect of new technologies should be investigated in the wind renewable energy industry on the international marketing management of this equipment.

The obtained results in the equipment marketing can also be generalized to the service market and services of the renewable wind energy industry.

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