

Article

Determinants of receptivity to large-scale offshore wind energy by residence : Focusing on the moderating effects of conflict perception

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Abstract: This study aims to analyze the determinants of the general public's acceptance of large-scale offshore wind power in South Korea. Furthermore, we examine the moderating effect of the perception of conflict in the energy transition on the acceptance of large-scale offshore wind power. Carbon neutrality and energy transition are gaining attention as a global response to climate change, and many countries are increasingly making policy attempts to transition their energy systems. In this trend, public acceptance is a very important factor for the success of carbon neutrality policies and energy transition. In this study, the independent variables are the risk perception paradigm, which is useful for explaining behavior, the new environmental paradigm, which is a perception of the environment, and individual characteristics. The risk perception paradigm consists of perceived benefit, perceived risk, benefit, trust, and knowledge variables. The new environmental paradigm is composed of individuals' ideas about nature and balance, limits to growth, and human domination, and personal characteristics are composed of support for green energy policy, field of work, and health status. The distinction of this study is that we utilize conflict as a moderating variable, instead of the traditional independent variable, to identify the importance of conflict and conflict management. In addition, we focus on the regional characteristics of the individual's residence.

Keywords: large-scale offshore wind energy; residence; conflict perception; Carbon neutrality; energy transition

1. Introduction

Wind energy has been recognized as an environmentally friendly energy source, but it does not guarantee a constant energy production. Because of this, offshore wind farms must be installed in areas where the wind is always blowing. This characteristic has led to the promotion of offshore wind power generation, which has led to various conflicts such as conflicts with fishermen and conflicts between business entities, which inevitably entails conflicts over the location of facilities and conflicts with local residents. Focusing on these conflicts, this study sets the acceptance of large-scale offshore wind power as the dependent variable during the energy transition. Currently, South Korea is debating the issue of building large-scale offshore wind farms in areas other than Jeju Island. In the process, conflicts between various actors such as local residents, the government, and companies are occurring, and the role of conflict is attracting attention.

2. Research Goal

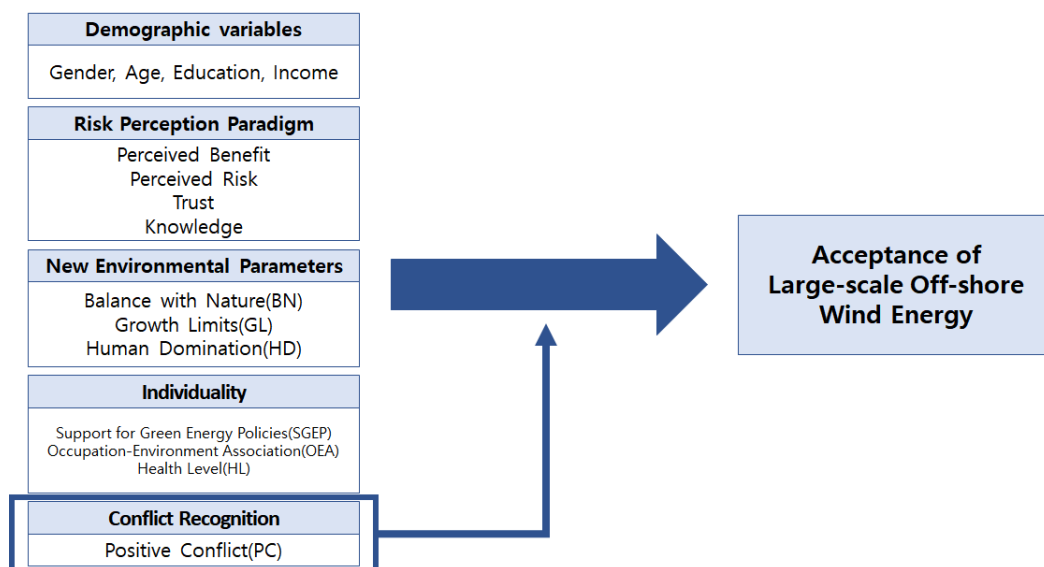
Renewable energy is becoming increasingly important in the energy transition and for achieving carbon neutrality. Wind energy, along with solar energy, is recognized as a major renewable energy source. In Europe, there are already large-scale offshore wind energy-related companies, facilities, and specialized organizations, and they are showing conflict resolution, stable energy supply, and rational operation. As various efforts are being made to produce and operate large-scale offshore wind energy in Korea, this study aims to analyze the factors that determine the public's acceptance of offshore wind energy and to verify the moderating effect of conflict perception on the relationship between the factors and acceptance. In addition, by selecting cases of residents of metropolitan areas and non-metropolitan areas, this study attempts to draw implications by comparing the results of the analysis according to the region of residence.

3. Research Design

The data used in this study is from the "2nd National Opinion Survey on Energy" conducted by Research Center for Energy Transition Policy at Ajou University's Institute of Social Sciences. It was conducted from April 5 to April 7, 2023, using a specialized research company in Korea, and was conducted as a web survey via mobile phone and email, and 1,552 people were surveyed using a proportional sampling method by region, gender, and age.

If we break this down into metropolitan area residents (Seoul, Incheon, Gyeonggi-do) and non-metropolitan area residents, we get 774 metropolitan area residents and 778 non-metropolitan area residents.

Figure 1. Research Model



4. Analysis

Case 1: Regression analysis of respondents living in the Seoul metropolitan area shows that gender, benefit, risk, trust, nature and balance, and green energy policy support variables influence the acceptability of large-scale offshore wind power. In the case of gender, males (=1) are more receptive than females (=2). In the risk perception paradigm, acceptance increased with higher perceived benefits, lower risk, and higher trust. Benefits, trust, and risk are perceived by individuals, with benefits from offshore wind being the

most influential factor for those living in metropolitan areas. The environmental paradigm positively influenced acceptance of offshore wind energy if the respondent believed that balance with nature was important. Among personal characteristics, higher support for green energy policies was associated with higher acceptance of offshore wind.

Case 2: In the analysis of non-metropolitan respondents, perceived benefits and trust, balance with nature, and support for green energy policies were significantly influenced by the same factors as the metropolitan respondents. However, gender, perceived risk, and knowledge differed from the analysis of metropolitan residents. For gender, men were more likely to be receptive to offshore wind than women in the metro area, but gender was not a significant variable for non-metro area residents. Perceived risk was also not a significant variable in the analysis of non-metropolitan respondents, but knowledge was found to be a significant variable in the analysis of non-metropolitan people.

Interpreting the regression results: When analyzing the results by region of residence, it is worth focusing on perceived risk and knowledge. First, for perceived risk, higher risk had a negative effect on acceptability in metropolitan areas, but was not significant in the analysis of non-metropolitan respondents. Since large-scale offshore wind facilities are generally perceived to be located in non-metropolitan areas, one might realistically expect acceptability to be more affected by perceived risk in non-metropolitan areas, but the analysis shows otherwise. As a hypothetical example, in South Korea, there have been recent issues with large-scale offshore wind facilities off the coast of Incheon, the capital city. The results of the metropolitan area/non-metropolitan area analysis for risk perception would be expected to be affected by this phenomenon. In the case of knowledge, there was no effect on the acceptability of residents in the metropolitan area, but there was a significant effect on the acceptability of residents in the non-metropolitan area. Compared to the past, general knowledge in any field is not scarce today due to the development of information and communication technology. Regardless of where you live, if you want to acquire knowledge, you can do so through various means such as the Internet. However, in this study, we found that knowledge has a different impact on acceptability depending on where you live. This suggests that knowledge and other variables affecting acceptance are dependent on other factors.

Table 1. Regression analysis

Category		Case 1: Metropolitan Area			Case 2: Non-Metropolitan Area		
		b	S.E	Beta	b	S.E	Beta
Constant		1.511***	.272		.720*	.294	
Control variable	Gender	-.162**	.052	-.102	.037	.053	.022
	Age	-.011	.018	-.020	.003	.018	.005
	Education	.039	.052	.024	-.027	.053	-.016
	Income	.021	.056	.012	-.017	.067	-.008
Risk Perception Paradigm	Perceived Benefit	.300***	.038	.305	.304***	.040	.293
	Perceived Risk	-.109**	.036	-.106	-.037	.036	-.035
	Trust	.152***	.041	.144	.122**	.045	.101
	Knowledge	.037	.034	.039	.108**	.037	.107
New Environmental Parameters	Balance with Nature(BN)	.125**	.042	.106	.149***	.044	.123
	Growth Limits(GL)	-.042	.033	-.044	-.025	.035	-.026
	Human Domination(HD)	-.037	.028	-.044	-.004	.026	-.005
Individuality	Support for Green Energy Policies(SGEP)	.114**	.036	.112	.234***	.039	.209
	Occupation-Environment Association(OEA)	.027	.029	.033	.011	.030	.013
	Health Level(HL)	-.015	.034	-.015	-.034	.033	-.032
Conflict Recognition	Positive Conflict(PC)	.041	.043	.033	-.050	.040	-.041
F value		17.876***			19.343***		
R^2		.261			.276		
adj. R^2		.247			.262		

* $p < .05$, ** $p < .01$, *** $p < .001$

In this study, we hypothesize that perceptions of conflict will moderate the relationship between these variables. Conflict is a powerful issue, such as the Incheon case mentioned above, and it is an important factor that can affect people. We expected the effects

of the variables to vary depending on how the general public perceives the conflict, and conducted a moderation analysis to confirm this.

We used Baron & Kenny's three-step test to identify the variables and interaction terms, and conducted a simple slope effect test on the results.

First, we found a moderating effect on the relationship between perceived risk of conflict and acceptance among residents of the metropolitan area. For those with low and moderate positive perceptions of conflict, acceptance of large-scale offshore wind power was negatively moderated by increasing perceived risk.

For non-metropolitan residents, we found moderating effects for low, moderate, and high positive perceptions of conflict.

Figure 2. Metropolitan

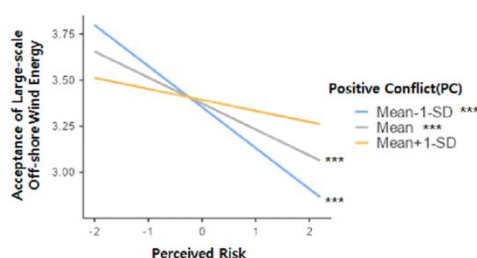
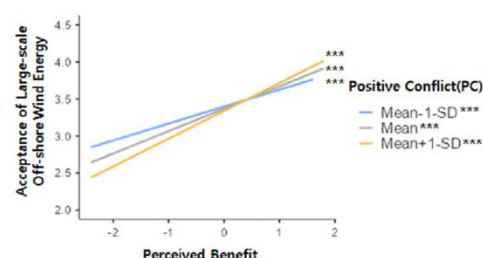


Figure 3. Non-Metropolitan



5. Summary and Conclusion

The summary and conclusions of this study are as follows. First, the regression results show that certain issues can change the acceptance factors regardless of the characteristics of the individual's neighborhood. This suggests that in order to improve acceptance of the energy transition in the future, it is necessary to develop a strategy that considers multiple issues.

Second, conflict can be perceived as either a positive function or an absolute negative, depending on how it is perceived. In our analysis, we found that the positive perception of conflict did not affect acceptability, but had a moderating effect on risks and benefits. This suggests the need for conflict management in energy transition strategies and provides a topic for future research on conflict management.

In the context of the global climate crisis, efforts such as energy transition and carbon neutrality are being attempted. However, these efforts can only be realized if individual and national efforts and goals are aligned. To do this, efforts are made to gain acceptance, which many researchers argue requires "resolving" conflicts. However, for the topics we are discussing, conflicts are too complex to be "resolved". Instead, we need to reorient ourselves toward more productive discussions through conflict, and the study of conflict management is a great place to start.

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