

# The Design and Application of Game Theory for Competition Relationship of Recreation Development and Ecological Environment on Waterfront in Taiwan

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## Abstract

In Taiwan, the advance of economic level and conduction of two-day-off per week policy lead to the immense increase of need toward tourism and recreation. The entire industry, which moves toward to development of tourism service, has become a tendency, especially the river-side promenade which is the favorite of lots of people; also, activities of waterfront recreation are gradually expanded along several main rivers. Nevertheless, because of the variety and sensitivity of waterfront environment, over-development will demolish the whole ecological system and function and cannot be recovered. Thus, satisfying the normal function of waterfront ecological system in order to achieve the balance between environment protection and development of recreational resource is the problem that must be solved presently. What is more, recent years in Taiwan, most of relevant documents discuss issues about design and arrangement of waterfront and landscape ecology; however, there is no research about the harmonious relationship between ecological environment and use of lands. According to the uncertainty and variety of complicated waterfront environment, traditional methods for evaluation are too subjective and sensible to be applied on waterfront arrangement. Hence, the research is going to analyze the degree of relation among waterfront recreational resources with grey relation analysis, find out difference among those relationships, simulate the competition relationship between development and protection by game theory, eventually search for symbiosis win-win mode among different systems for the purpose of conducting cooperative game and proceed space display with GIS system so as to suggest the most appropriate area and scope development for rivers development activities. The research takes

recreational activities along waterfront of Hsinchu as example, and to realize the effect of recreational development toward the waterfront through analysis and evaluation. The government might take the conclusion into consideration for improving entire environment of waterfront of Hsinchu and developing waterfront recreational resources.

Keyword : waterfront; recreation development; ecological environment; coopetition relationship; grey relation analysis; game theory