

ANALYSIS OF FACTORS AFFECTING THE AESTHETIC ECONOMIC VALUE OF THE NATIONAL PARK (IN THE CASE OF “ALISHER NAVOI CENTRAL NATIONAL PARK” IN SAMARKAND REGION)

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Abstract: This article examines the interaction of factors that serve to increase the aesthetic economic value of the Alisher Navoi Central National Park, located in the heart of Samarkand region. As green areas play an increasingly important role in people's social and cultural life, it becomes imperative to understand the specific dynamics that affect their aesthetic appeal. In addition, the paper explores the economic implications of these aesthetic attributes, elucidating how the beauty and cultural richness of the park can bring significant economic benefits to the region. We used the regression analysis method to determine the relationship between the aesthetic attributes of trees in the park and the willingness to pay of visitors for them. Based on empirical data and case studies, the study seeks to create a framework for the park administration, conservationists, and local communities to utilize and enhance the aesthetic economic value of Alisher Navoi Central National Park.

Key words: national parks, aesthetic value, survey, contingent valuation method,

INTRODUCTION

The Alisher Navoi Central Recreation Park is one of the scenic and tree-rich areas of Samarkand city. The area of the garden is 12.6 hectares, and there are more than 2000 trees of different sizes, such as juniper, cypress, tianshan juniper, Japanese paper tree, maple, and pine. The park has recreational value for the city residents. People's visits to the garden area require consideration of several factors underlying their aesthetic views. For example, the trees in the park, the proximity of the park to the surrounding universities, the location of food and service facilities around the park, the number of routes passing through the park, etc. In this study, we use contingent valuation methods to evaluate the factors affecting the aesthetic economic value of trees in the park. In the economic evaluation of the aesthetic value of trees in the garden, we consider the relationship between ecosystem services and how much people are willing to pay for the ecosystem services provided by trees in the garden.

LITERATURE REVIEW

Income level is a fundamental determinant of WTP for environmental amenities. Studies have consistently shown that individuals with higher incomes are more willing to pay for the preservation and enhancement of urban green spaces. Brander and Koetse (2011) conducted a meta-analysis of contingent valuation and hedonic pricing results, revealing a positive correlation between income and WTP for urban open spaces. Similarly, Sander, Polasky, and Haight (2010) found that higher property values in Minnesota were associated with greater tree cover, indicating that people are willing to invest more in properties with better green amenities. Ecological characteristics of trees, such as their shading and cooling properties, play a crucial role in their perceived aesthetic value. Shashua-Bar, Pearlmutter, and Erell (2009) demonstrated that trees providing ample shade and cooling effects are highly valued by urban residents, particularly in hot climates. Their study highlighted the significant impact of these ecological services on the overall attractiveness of urban parks. McPherson (2007) emphasized the importance of trees in mitigating urban heat islands and

enhancing the comfort of park visitors. Wolf (2004) and Tyrväinen and Väänänen (1998) highlighted the positive impact of visual quality on public appreciation of urban green spaces. Another important ecological factor is the role of trees in supporting biodiversity, particularly by providing habitats for birds. Research by Jim and Chen (2006) in Guangzhou, China, found that residents valued trees that supported bird populations, as these trees enhanced the ecological richness and aesthetic appeal of the parks. Social and cultural factors also significantly influence WTP for the aesthetic benefits of urban trees. Kaplan (2001) argued that aesthetically pleasing green spaces contribute to a sense of community and improve the overall well-being of urban residents. Public awareness and education about the environmental benefits of trees can further enhance appreciation and WTP for urban green spaces. Lo and Jim (2012) found that public attitudes towards greenspace provision were shaped by cultural values and community engagement. Empirical studies have utilized various econometric models to quantify the relationship between different factors and WTP. For instance, Tyrväinen and Väänänen (1998) used a contingent valuation method to assess WTP for urban forest amenities in Finland. Their results indicated a significant positive relationship between income levels, tree coverage, and WTP. Similarly, Jim and Chen (2006) found strong correlations between ecological benefits provided by trees, such as shading and cooling, and WTP in Guangzhou, China.

METHODOLOGY

We conducted a contingent valuation survey among 163 residents to evaluate the economic value of trees in the park. The socio-demographic, economic and preferences of the residents who participated in the survey are as follows: 61.5% of the residents who participated in the survey are men and 38.5% are women. These indicators need to be numerically represented in order to be reflected in the model. For this we can use binary numbers consisting of 0 - female and 1 - male. The general age range of residents is 17-66, and most of them are in the age range of 19-28. 53.4% of residents have a bachelor's degree, 30.4% a master's degree, 5.6% an academic lyceum or vocational college, 1.9% a school, and 8.7% other educational levels. Most of the residents belong to civil servants and students, and their share in relation to the total is 42.2 and 35.4, respectively. In the private sector, 5.6 percent of employees, 0.6 percent of pensioners, 4.3 percent of unemployed, and 11.8 percent of others. The correlation between the income of survey respondents and the amount they are willing to pay for ecosystem services can be significant. However, since it is somewhat difficult to get information from the respondents about their monthly income, it is appropriate to ask them what is the range of their income.

Based on the results of this survey, it was determined that 32.5% of respondents have an income of 3.5-5 million UZS, 19.5% have less than 1 million UZS, 14.3% have 2-3.5 million UZS, 14.3% have 1-2 million UZS, 8.4% have 5-7.5 million UZS, 5.8% have more than 10 million UZS, and 5.2% have 7.5-10 million UZS. We will rate people's income on a scale from 1 to 7: for example, less than 1 million UZS – 1, ..., more than 10 million UZS – 7. Using the conditional valuation method, we need to convert the aesthetic enjoyment that trees provide to people into monetary value for the economic valuation of the trees in the park. To do this, we asked respondents, "If a fund were established to preserve the existing trees and increase the number of new ornamental tree species in the park, how much additional money would you pay annually to support the park development project?" According to the survey results, 42.5% of respondents are willing to pay 50-100 thousand UZS, 16.2% are willing to pay 100-250 thousand UZS, 14.4% are willing to pay 0 UZS, 10.6% are willing to pay more than 1 million UZS, 10% are willing to pay 250-500 thousand UZS, 3.1% are willing to pay 500-750 thousand UZS, and 2.5% are willing to pay 750 thousand to 1 million UZS to preserve and improve the quality of trees in the park. Additionally, respondents were asked to rate on a scale of 1 to 10 how important the shading and cooling properties of the trees, the improvement of the visual quality of the area by the trees, the

provision of habitat for certain types of birds by the trees, and the cleanliness of the park area are to them, as well as how many times on average they visit Alisher Navoiy Central Park per month. We will use a multiple regression model to analyze the survey data collected from respondents. The general form of the model is as follows

$$y = a_0 + a_1x_1 + a_2x_2 + \dots + a_n x_n + e$$

Here y is the dependent variable, i.e. the amount that people are willing to pay for the aesthetic pleasure that trees in the garden provide to them.

x_1, x_2, \dots, x_n are the factors affecting people's willingness to pay for the services provided by trees in the park.

Factors affecting the aesthetic value of trees in the central recreation park named after Alisher Navoi

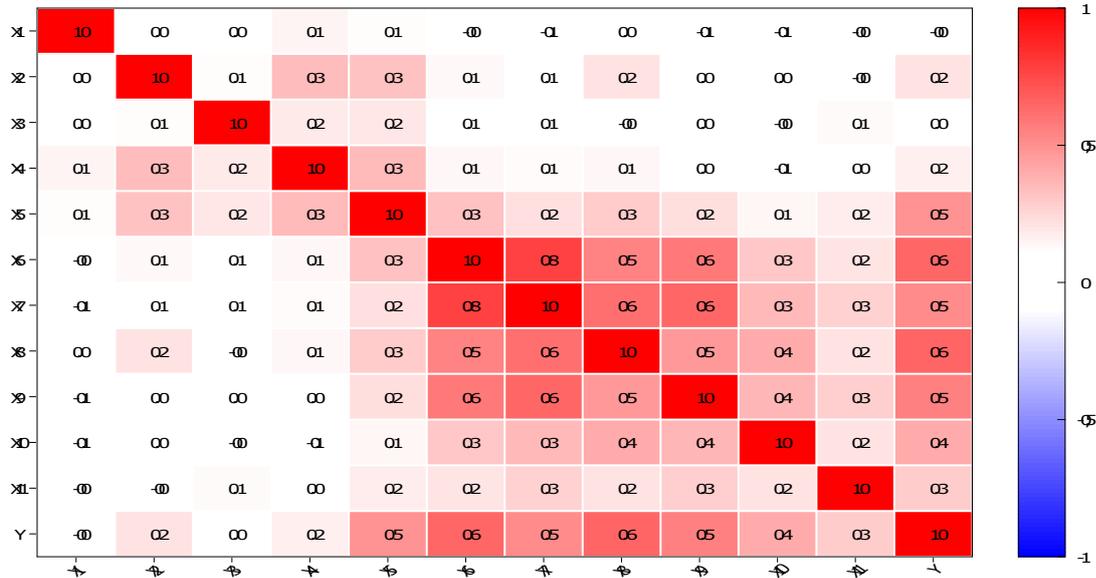
Table 1

Dependent variable	Y
Gender of respondents	X1
Age of respondents	X2
Level of education of the respondents	X3
Occupation of respondents	X4
Income of respondents	X5
Shade and cooling properties of trees in the garden area	X6
Trees in the park improve air quality in the surrounding area	X7
Improvement of the visual quality of the area by the trees in the park	X8
The trees in the park provide a habitat for some types of birds	X9
Cleanliness of the garden	X10
Average number of visits of respondents to the garden per month	X11

RESULT

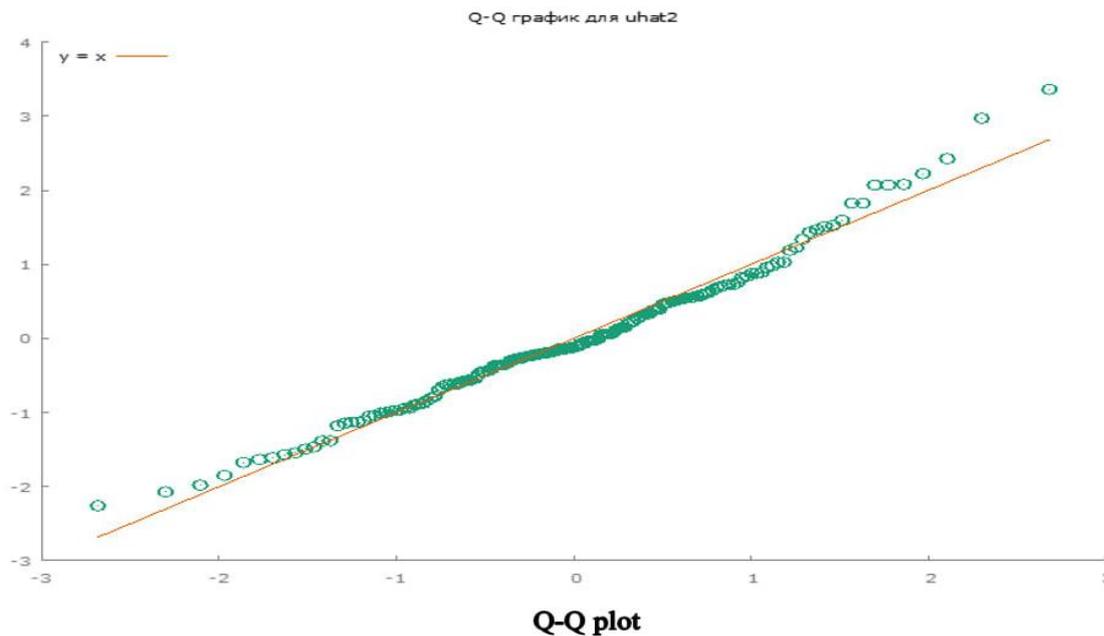
To determine the correlation between the above willingness to pay and the factors affecting it, it is necessary to perform a correlation analysis, because if we include two interrelated factors in the model, our model does not correspond to the real process.

Picture 1



Judging from the above correlation matrix, factors X1, X2, X3, X4 and X11 are weakly related to the amount people are willing to pay for the aesthetic pleasure they get from trees in the park. Therefore, their inclusion in the model does not significantly affect the final result. There is a relationship between the factors X5, X6, X7, X8, X9, X10 and the resulting factors, and we include these factors in the model. However, since factors X6 and X7 are strongly correlated, we do not include factor X7 in the model. Because factor X6 is strongly associated with the resulting factor compared to X7. We determine the coefficients of the mathematical model reflecting the influence of factors X5, X6, X8, X9, X10 on the resulting factor using the least squares method in the Gretl program. For this, the collected data should be normally distributed. To test whether the data is normally distributed, we can use the quantile-quantile normal distribution plot or the Jarque-Bera distribution. A quantile-quantile normal distribution plot for our observed data looks like this:

Graph 1



The data on the graph lie close to a straight line, indicating that the data follow a normal distribution.

Table 2

	Coefficients	Std.Err	t-stat	P-value	
const	-1,92086	0,288466	-6,659	5,22599E-10	***
X5	0,243756	0,0499427	4,881	2,73795E-06	***
X6	0,145932	0,0372109	3,922	0,000134822	***
X8	0,173641	0,0359903	4,825	3,49197E-06	***
X9	0,0903419	0,0367387	2,459	0,015099627	**
X10	0,0776179	0,0430727	1,802	0,073605487	*

Based on the data in the table, we can express the mathematical model in the following form.

$$Y = -1,920 + 0,243X5 + 0,145X6 + 0,173X8 + 0,09X9 + 0,078X10 + e$$

This equation helps us to understand the interaction of the factors affecting the aesthetic value of the trees in the Alisher Navoi central park. As we can see above, increasing X5 (income) by one unit increases the aesthetic value of trees by 0.243. Increasing X6 (shading and cooling properties of trees in a garden area) by one unit increases the aesthetic value of trees in a garden area by 0.145. Increasing the shade and cooling properties of trees in the garden can be understood as planting trees that mainly provide shade to the garden. Increasing X8 (improvement of the visual quality of the area by trees in the park area) by one unit increases the aesthetic value of trees by 0.173. This feature can be understood as the presence of large trees in the area or the planting of willows, Japanese maples and lilacs and other ornamental trees in the garden. Increasing the index of X9 (the provision of habitat for certain types of birds by trees in the park) by one unit increases the aesthetic value of trees by 0.09 and has a moderately dependent effect on aesthetic value. Garden cleanliness (X10) has little effect on the aesthetic value of trees. The cleanliness of the garden can have a strong influence on the aesthetic value of the garden, but according to the results of the regression analysis, it has little effect on the aesthetic value of trees.

We use the Fisher criterion to check the reliability and significance of the constructed mathematical model:

Table 3

Correlation coefficient	R ²	Normalized R2	Std.Err	F	F significance
0,791717	0,62682	0,614035	1,00433	49,045	1,36E-29

The value of F is equal to 1.36E-29, which means that the probability of the null hypothesis is true. The null hypothesis is an initial hypothesis based on the assumption that the observed values of the model are not statistically significant. And since this result is very small, we conclude that the model fits the observed data well, and that the independent variables are significantly related to the outcome variable. And the value of R², we conclude that the random variable of the model explains 62.7% of the real phenomenon.

The study on the willingness to pay (WTP) for the aesthetic benefits of trees in Alisher Navoiy Central Park offers insightful revelations into the multifaceted factors influencing public investment in urban green spaces. Through a detailed examination of economic, ecological, and social determinants, the research underscores the significant role these factors play in shaping individuals' appreciation and financial support for urban forestry. Economic factors, particularly income levels, emerged as strong predictors of WTP, highlighting that higher disposable income enables greater value green areas. This finding aligns with broader economic theories and empirical evidence, emphasizing the importance of economic prosperity in enhancing public commitment to environmental quality. Ecological benefits provided by trees, such as their shading, cooling properties, and visual appeal, were also identified as crucial determinants of their aesthetic value. These characteristics not only enhance the attractiveness of urban parks but also contribute to essential environmental services, reinforcing the dual benefits of urban greenery. Additionally, the role of trees in supporting biodiversity by providing habitats for birds further increases their perceived value, demonstrating the intertwined nature of ecological and aesthetic benefits. Social and cultural influences significantly shape WTP, with community values, public awareness, and cultural attitudes towards nature playing pivotal roles. Engaging the community and raising awareness about the benefits of urban trees can foster greater appreciation and financial support for green space initiatives, suggesting that public education and community involvement are critical components of successful urban green space management. The robustness of the regression model developed in the study, which explains a substantial portion of the variability in WTP, underscores the reliability of these findings. However, the study acknowledges limitations such as sample representativeness, geographic specificity, reliance on self-reported data, and the cross-sectional design.

In conclusion, the willingness to pay for the aesthetic benefits of urban trees is influenced by a complex interplay of economic, ecological, and social factors. The findings from Alisher Navoiy Central Park reinforce the significance of these determinants and provide actionable insights for urban planners and policymakers. By leveraging these insights, cities can enhance the quality of urban life through informed and sustainable development of urban green spaces.

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