



# Influence of Characteristics of Volunteer Service Projects on Assessment from the Perspective of Big Data

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**Abstract.** Since the first China youth volunteer service project contest (CYVSPC) in 2014, a large number of project related data have been accumulated. These data describe the development of volunteer service and are rich in valuable historical experience. Based on the data of the 5th CYVSPC, this study aims to explore the relationship between the external characteristics of volunteer service projects and the comprehensive evaluation of project quality. The multiple linear regression model was used to analyze the relationship between the characteristics of 984 volunteer service projects with high data integrity and comprehensive evaluation. The results show that the external characteristics have a great impact on the evaluation of volunteer service projects. The number of volunteers, the expenditure of volunteer service projects, and the time of project establishment can explain 47.9% of the evaluation results of volunteer service projects. The healthy development of volunteer service projects should pay more attention to the improvement of volunteer recruitment and training, leaders' academic qualifications and external cooperation.

**Keywords:** Multiple linear regression · Volunteer service · Project assessment

## 1 Introduction

Voluntary service is an important force to promote social development, and the actual effect of voluntary service is a barometer of social development [1]. The China youth volunteer service project contest (CYVSPC) is an exhibition and competition platform for excellent volunteer service projects. With the rapid development of society, more and more excellent projects have participated in CYVSPC, and a large number of panel data have been accumulated. The popularity of big data has had a profound impact on many disciplines such as public health, economic development, volunteer service and other social sciences. Almost all disciplines and research fields have deeply participated in this big data computing culture [2]. Social big data was used to support volunteer service across media in emergency [3], Garry Huang used big data methods to study the social and psychological motivation of medical volunteers that participating in volunteer services [4], Ackermann used the five factor personality model to evaluate the psychological basis of different forms of volunteer services, and the logistic regression model was

used to analyze the representative population sample of Switzerland [5], Stukas used linear regression method to study the relationship between volunteers' motivation and welfare [6], and structural equation model was also commonly used to analyze the relationship between volunteers' motivation, mental health, self-efficacy, satisfaction and other potential constructs [7–9]. The existing research focuses on volunteers and volunteer service itself, and the research on volunteer service organizations or teams is less.

The China youth volunteer service project competition is a unique evaluation in Chinese volunteer service field and an important mechanism to promote the development of Chinese volunteer service. Therefore, based on the multiple linear regression model, this study aims to explore the relationship between the external characteristics of volunteer service projects and the evaluation results. This relationship has certain practical significance for the healthy development of voluntary service.

## 2 Method

### 2.1 Data Source and Variables Composition

984 panel data given by leaders of various volunteer service projects of the 5th CYVSPC in 2020 were used in this study. The panel data includes information of project members, external cooperation information, fund situation, leader's academic background, political outlook, number of volunteers and project establishment time.

The evaluation results of volunteer service projects are reflected in the assessment scores. The assessment scores are determined by 50 professors according to the evaluation materials of volunteer service projects. The other variables are the nature of volunteer service organization, project establishment time, financial expenditure, external cooperation, leaders' degree, leader's political outlook, and the number of volunteers.

### 2.2 Variable Measurement and Analysis Method

The dependent variable is comprehensive assessment score, it is the interval measurement, 4 independent variables are the interval measurement, 2 independent variables are the ordinal measurement, and 1 independent variable is the nominal measurement. Regression analysis is a statistical technique used to estimate the relationship between cause and effect [10]. In this study, there is a causal relationship between the independent variable and the dependent variable. Meanwhile, the measurement of independent variables and the dependent variable meet the requirements of the multiple linear regression model. Therefore, it is feasible to use this method to analyze the impact of independent variables on the dependent variable.

## 3 Result

### 3.1 Descriptive Statistics

The lowest score of 984 items is 71.11, and the highest score is 93.44. The average value and standard deviation are 84.83 and 3.08 respectively. The descriptive statistical information of the independent variables is shown in Table 1.

**Table 1.** Descriptive statistics of sample independent variables

| Independent variables      | N   | Minimum | Maximum | Mean   | Std. Deviation |
|----------------------------|-----|---------|---------|--------|----------------|
| Number of partners         | 984 | 0       | 3       | 2.10   | 1.212          |
| Project nature             | 984 | 1       | 9       | 6.03   | 3.029          |
| Project start time         | 984 | 260     | 15564   | 2450   | 1767           |
| Leader's degree            | 984 | 1       | 8       | 6.27   | 0.921          |
| Leader's political outlook | 984 | 1       | 4       | 3.52   | 0.918          |
| Financial expenses         | 984 | 0       | 1483791 | 156983 | 235601         |
| Number of volunteers       | 984 | 8       | 48000   | 1401   | 4474           |

**Table 2.** Summary of multivariate linear regression model

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .692 <sup>a</sup> | .479     | .475              | 2.23450                    | 2.355         |

a. Predictors: (Constant), number of volunteers, leader's political outlook, number of partners, financial expenses, project nature, leader's degree, project start time

b. Dependent Variable: assessment score

The number of cooperative institutions is 3, accounting for 59.3%, and the number of cooperative institutions is 2, accounting for 11.3%. More than 95% of the items are carried out within the range of 880–1500 days. The projects with undergraduate leaders account for 51.5%, and the projects with postgraduate leaders account for 31.8%. Undergraduate and above education is the main education of project leaders. 72.7% of the project leaders are CPC members, and 15% of the project leaders are members of the Communist Youth League. The political outlook of the leaders reflects a certain political color of Chinese volunteer service projects. Nearly 90% of the items had financial expenses of no more than 83000 RMB, and more than 90% of the items involved no more than 1608 volunteers.

### 3.2 The Index of Multiple Linear Regression

Multiple linear regression showed that the regression equation was significant,  $F = 68.094$ ,  $P < 0.001$ . Among them, the number of partners ( $\beta = 0.101$ ,  $P < 0.001$ ), project start time ( $\beta = 0.360$ ,  $P < 0.001$ ), leader's degree ( $\beta = 0.052$ ,  $P = 0.003$ ), financial expenses ( $\beta = 0.403$ ,  $P < 0.001$ ), and number of volunteers ( $\beta = 0.188$ ,  $P < 0.001$ ) significantly positively predict the project assessment score, and the leader's political outlook cannot predict the project assessment score ( $\beta = 0.043$ ,  $P = 0.068$ ). These independent variables explained 47.5% of the variation in the assessment score item.

## 4 Discussion

The adjusted R-square is shown in Table 2. All independent variables explain 47.5% of the variation of the dependent variable, and the DW value is 2.355 less than 2.5. Therefore, the data conform to the independence requirement. In the analysis of variance,  $F = 68.094$ ,  $P < 0.001$ . At least one independent variable explained the variation of dependent variable. The model was successfully constructed. The regression and residual values are shown in Table 3. The regression coefficient is shown in Table 4.

The collinearity statistical results show that the VIF values of all independent variables are greater than 1, and the multicollinearity of the independent variables in this

**Table 3.** The result of variance analysis

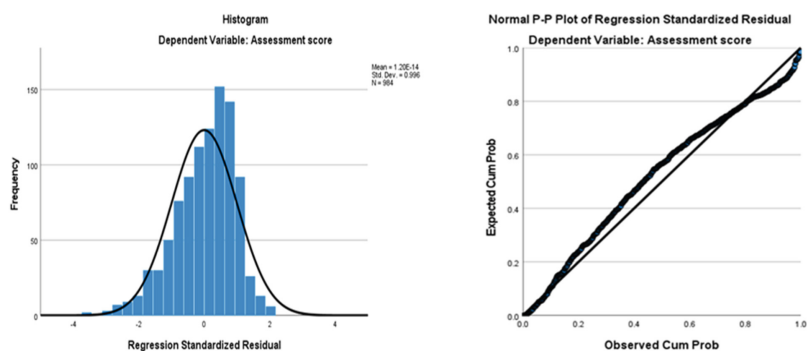
| Model |            | Sum of Squares | df  | Mean Square | F      | Sig.              |
|-------|------------|----------------|-----|-------------|--------|-------------------|
| 1     | Regression | 4477.017       | 7   | 639.574     | 68.094 | .000 <sup>b</sup> |
|       | Residual   | 4873.157       | 976 | 4.993       |        |                   |
|       | Total      | 9350.175       | 983 |             |        |                   |

a. Dependent Variable: assessment score

b. Predictors: (Constant), number of volunteers, leader's political outlook, number of partners, financial expenses, project nature, leader's degree, project start time

**Table 4.** Regression coefficient of independent variable

| Model                      | Unstandardized Coefficients |            | Standardized Coefficients | t       | Sig. | Collinearity Statistics |       |
|----------------------------|-----------------------------|------------|---------------------------|---------|------|-------------------------|-------|
|                            | B                           | Std. Error | Beta                      |         |      | Tolerance               | VIF   |
| (Constant)                 | 80.866                      | .560       |                           | 144.374 | .000 | .964                    | 1.038 |
| Number of partners         | .257                        | .060       | .101                      | 4.286   | .000 | .965                    | 1.036 |
| Project nature             | -.104                       | .024       | -.103                     | -4.358  | .000 | .809                    | 1.235 |
| Project start time         | .021                        | .000       | .360                      | 14.011  | .000 | .954                    | 1.048 |
| Leader's degree            | .173                        | .079       | .052                      | 2.180   | .003 | .943                    | 1.061 |
| Leader's political outlook | .146                        | .080       | .043                      | 1.828   | .068 | .831                    | 1.203 |
| Financial expenses         | .120                        | .000       | .403                      | 15.888  | .000 | .954                    | 1.048 |
| Number of volunteers       | .190                        | .000       | .188                      | 3.731   | .000 | .964                    | 1.038 |



**Fig. 1.** The residual histogram and P-P diagram

study is not serious. The residual histogram and P-P diagram obey normal distribution, the mean is close to 0 and the standard deviation is close to 1. Therefore, the linear regression satisfies the normality condition (Fig. 1).

## 5 Conclusion

The multiple linear regression model constructed in this study can effectively explain the relationship between the assessment score and the characteristics of the volunteer service project. The degree of variation interpretation is more than 30%, which indicates that there is a certain causal relationship between the assessment score and the characteristics of the project. Better project indicators can obtain higher scores in assessment. According to the above analysis, there are mainly three conclusions:

1. The number of partners, project start time, leader's degree, financial expenses, and number of volunteers will all have a positive impact on the assessment score.
2. The influence coefficients of the number of partners, the number of volunteers and leader's degree are 0.257, 0.19 and 0.173, respectively. Compared with the nature of the project, project start time and financial expenses have a greater impact on assessment.
3. The impact coefficient of project start time on assessment score is 0.021. Therefore, it is more favorable for the development of volunteer service projects to pay attention to the improvement of leaders' degree, volunteer recruitment and external cooperation than to carry out volunteer service activities earlier.

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