

Research on influential factors of e-commerce development: Evidence from China

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Abstract: This paper uses the data of e-commerce development in 2008-2017 to construct a multivariate regression model for the influencing factors of e-commerce development and analyze it. The results show that the development of the logistics industry and the increase in Internet penetration rate are conducive to the growth of e-commerce transactions. According to the conclusions of the empirical analysis, This paper believes that in the process of logistics development and Internet promotion, capital investment and policy support should be increased to promote the sustainable development of e-commerce.

1. Introduction

The emergence of e-commerce has brought a brand new change to the traditional consumer market. More and more people choose online shopping as their main way of spending, the development of electronic commerce not only changed the way many people's consumption, to some extent and improve the quality of the customer's consumption. At the same time, the rapid development of e-commerce also provides a large number of jobs, attracting a large number of labor to participate in the process of e-commerce operation, which has promoted the employment rate. In short, the development of e-commerce can enhance people's consumption level, improve local employment quality, and promote the development of social economy. Therefore, research on its influencing factors has important research value.

In recent years, due to the widely used technology, the rapid development of economy and policy support, China's e-commerce development is very rapid, has made remarkable achievements, e-commerce transactions fast steady growth for many years and. For the moment, China as the world's largest e-commerce market, using its data to study the influence factors of e-commerce development, with strong representation. Exploring the reasons for the rapid development of e-commerce in China, and understanding what factors are contributing to or hindering the growth of e-commerce transactions, has important practical value for China to further expand the scale of e-commerce market and improve the quality of e-commerce development. This can also help Other countries and regions are better able to develop local e-commerce industries.

2. Variable and Data

The development of e-commerce is affected by a variety of factors. In order to establish a more appropriate analysis model, it is necessary to make a reasonable selection of variables to be included in the model. Considering the accuracy and availability of data, this paper adopts e-commerce transaction volume as the explained variable to represent the development level of e-commerce. The explanatory variables select six indicators based on four aspects: logistics development, information technology, household income, and road facilities, including express delivery volume, postal industry employees, broadband user access, mobile phone users, urban residents, Dominate income and road mileage. The purpose of this is to be able to conduct a more comprehensive analysis. The data in this paper are from China's National Bureau of Statistics and China's e-commerce development report from 2008 to 2017.

3. Empirical Analysis

3.1. Model construction and regression analysis

This paper uses multiple regression analysis method to construct the following model to analyze the factors affecting e-commerce.

$$Y = \beta + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \varepsilon \quad (1)$$

Y represents the amount of e-commerce transactions, $X_1, X_2, X_3, X_4, X_5, X_6$ respectively represent express delivery volume, postal industry employees, broadband user access, mobile phone users, urban residents' disposable income, road mileage, ε is a random error term. The regression results are shown in the following table:

Table.1. Model (1) estimation result

Variable	Coefficient	Std. Error	Statistics	Prob
X_1	2.362702	0.7617528	3.10	0.053
X_2	-1.214419	0.4895195	-2.48	0.089
X_3	0.7925335	0.2674018	2.96	0.059
X_4	5.855476	2.502055	2.34	0.101
X_5	-10.48197	4.426109	-2.37	0.099
X_6	-6.586439	3.221458	-2.04	0.133
_cons	120.3819	51.0467	2.36	0.100

According to the regression results of model (1), R^2 is 0.999, and the adjusted R^2 is 0.996, indicating that the equation has a higher degree of fit, but the coefficients of the three variables X_2, X_4 and X_5 are negative. Different from the expected results, and the t statistic of all variables is relatively small, failing to pass the significance test. Therefore, using VIF to test whether there is multicollinearity between variables, the test results show that the VIF values of all variables are significantly greater than 10. It shows that there are more serious multicollinearity between variables. Multicollinearity will lead to irrational economic meaning of parameter estimators, loss of significance of variable significance test and failure of prediction function of model. Make the estimation result neither accurate nor meaningful. So we need to modify the model (1). Next, we use the stepwise regression method to filter the variables. The finalized multiple regression model is as follows.

$$Y = \beta + \alpha_1 X_1 + \alpha_3 X_3 + \varepsilon \quad (2)$$

Y represents the e-commerce transaction amount, X_1, X_3 respectively represent express delivery volume, broadband user access number, and ε is a random error term. The regression results of model (2) are shown in the following table:

Table.2. Model (2) estimation result

Variable	Coefficient	Std. Error	Statistics	Prob
X1	0.5488883	0.0343765	15.97	0.000
X3	0.2860113	0.0891958	3.21	0.015
_cons	1.212137	0.425633	2.85	0.025

From the regression results of the model (2), we can know that R^2 is 0.999, and the adjusted R^2 is 0.999, indicating that the model (2) has a very high degree of fit, And the selected variables can explain the growth of e-commerce transaction volume very well. the equation passed the F test, indicating that the overall equation is significant. The X_1, X_3 coefficients are positive, indicating that both the express delivery volume and the number of broadband access users have a positive impact on the development of e-commerce, in line with previous assumptions. At the same time, both variables passed the T test at the 5% level, meeting the statistically significant requirement for correlation. The VIF values of both X_1 and X_3 variables are less than 10, indicating that there is no multicollinearity between the two variables. The residual sequence generated by the model (2)

regression is stable, indicating that the modified model has economic significance and can be used to explain the development of e-commerce.

3.2. Results analysis

From the regression results of model (1), it can be seen that the four variables of the postal industry practitioners, the number of mobile phone users, the per capita disposable income of urban residents, and the road mileage have no significant impact on the growth of e-commerce transaction volume. Therefore, we will not discuss these variables further here.

The results obtained after the second regression using the revised model show that the regression coefficient between the express delivery volume and the number of broadband users accessing the user is positive, and the significance test is passed. It shows that these two variables have a promoting effect on the development of e-commerce.

The regression coefficient of express business volume is 0.55, which indicates that for every 1% increase of express business volume, the e-commerce transaction volume will increase by 0.55%. The increase of express business volume contributes greatly to the increase of transaction volume. The volume of express delivery represents the development level of the logistics industry to a certain extent. The reason is that logistics is the foundation and link of e-commerce development, connecting businesses and consumers. As the scale of logistics expands, scale effects will occur, thereby reducing e-commerce logistics costs and improving logistics efficiency. The reduction of logistics costs is conducive to online merchants to further reduce prices to attract consumers, improve the competitiveness of e-commerce, and attract consumers to make shopping decisions. At the same time, the improvement of logistics efficiency can shorten the time for consumers to wait for goods, optimize the shopping experience of customers, and promote consumers to use online shopping again. Therefore, the level of logistics development is an important factor affecting the development of e-commerce.

The regression coefficient of the number of broadband user access is 0.28, indicating that for every 1% increase in the number of broadband access users, it can bring 0.29% growth to e-commerce transactions. The more broadband users, the higher the penetration rate of the Internet, which increases the opportunity for consumers to use the Internet. On the one hand, consumers can more easily access the rich online product advertisement information on the Internet, increase their purchase choices, and create more shopping needs. On the other hand, the Internet provides technical conditions for users to achieve online shopping. The emergence and improvement of Internet-based shopping systems and payment systems have well met the needs of different e-commerce processes. From this perspective, the popularity of the Internet has strongly promoted the development of the e-commerce industry.

4. Conclusion

Through empirical analysis, we can draw the conclusion that the development of logistics industry and the popularity of the Internet are two important factors to promote the development of e-commerce. Therefore, on the one hand, we need to improve the quality of labor force in logistics industry through more training. At the same time, we can make full use of big data, cloud computing technology to improve the level of intelligent logistics industry. On the other hand, we should improve the Internet penetration rate by reducing the purchase price of Internet equipment and reducing Internet usage fees.

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