Original Paper

Based on Multiple Linear Regression Analysis, this Study Aims to Explore the Impact of Live Streaming on Innovation Paths

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Abstract

With the development of e-commerce, live-streaming sales have become an increasingly important driver of economic. growth. Anchors utilizing innovative pathways for live-streaming sales have shown both positive effects, such as Dong Yuhui's knowledge-based approach, and negative effects, such as attention-seeking tactics. This study aims to investigate the current status and prospects of live-streaming sales using innovative pathways through a questionnaire survey and data analysis using SPSS and Stata software. The following conclusions were drawn: incorporating innovative pathways into live-streaming sales can pique the interest of internet users and increase user stickiness. Internet users' disposable income and educational background are positively correlated with their support for innovative live-streaming sales pathways. The study concludes by suggesting strategies for identifying potential users and nurturing charismatic anchors, as well as acknowledging its limitations.

Keywords

live-streaming sales, innovative pathways, multiple regression analysis, robustness test

1. Introduction

In recent years, with the continuous advancement of internet technology, live streaming e-commerce has experienced rapid development. During the COVID-19 pandemic, the shopping channels provided by various platforms have helped propel live streaming e-commerce to new heights. Live streaming e-commerce has emerged as a new sales model, playing a significant role in expanding social consumption and promoting employment. According to market research data, in 2022, the sales volume of live streaming e-commerce in China will exceed $514 billion USD, growing at a rate of 19%, accounting for over 17% of China's total e-commerce sales. This figure is expected to increase to $720 billion USD by 2023, accounting for nearly 12% of China's e-commerce sales, and by 2025, the market size is projected to reach $850 billion USD.

At the same time, individuals, entities, and platforms are continuously expanding their involvement in live streaming e-commerce. Some live streaming hosts have stood out in the industry with their unique styles. Although the barrier to entry in the live streaming e-commerce industry is relatively low, competition is fierce, and hosts need to possess unique skills to establish themselves. Therefore, this study has selected innovative approaches to live streaming e-commerce for investigation, focusing on the current development status and future market potential of live streaming e-commerce in the e-commerce industry. Based on the research findings, recommendations will be made for the healthy development of the e-commerce industry.

2. Literature Review

2.1 Domestic Literature Review

The academic community in China has already paid attention to the future prospects and existing issues of live streaming e-commerce, and many scholars have published their views after conducting in-depth research. After a thorough review of the literature, our research team has summarized the following key findings. Zhang Yue (2022) focuses on the negative impact of "unhealthy" live streaming e-commerce on society and chooses to analyze customer verbal attack behavior, analyze behavioral motivations, and provide guiding recommendations for the healthy development of the live streaming e-commerce industry. Liu Pingsheng and Shi Yongdong (2020) conducted research on the topic of digital marketing, analyzing the influence mechanism of live streaming e-commerce platform fans' purchase decisions and the impact of live streaming e-commerce marketing methods on sales volume, and then provided management recommendations for the live streaming industry. Liu Dong (2022) analyzed and explained the consumption caused by the innovative live streaming e-commerce method based on the phenomenon of "Dongfang Zhenxuan" becoming popular, conducted empirical research by establishing relevant models, and explored the power of knowledge-triggered consumption. Many scholars have conducted research from different aspects of live streaming e-commerce, expressing their own opinions, which have important theoretical value and reference significance. However, there is relatively little research in the academic community on the innovative development path of live streaming e-commerce. This survey report can serve as a complementary explanation and has value.

2.2 Literature Review on Foreign Sources

he academic community in foreign countries is also quite open and has conducted extensive research in this area. Fletcher, KA and Gbadamosi, A. (2022) explored and summarized the influence of live streaming on consumer decision-making, and demonstrated their conclusions by establishing models, providing recommendations for useful media live marketing strategies. Muhammad Usman Riazetal. (2021) conducted a questionnaire analysis from a social perspective, using structural equation modeling (SEM) to construct a theoretical model to explore factors influencing consumer purchase intention and decision-making, and found that the way products are promoted through live streaming plays an important role in influencing consumer purchase intention. Meisner, C. and Ledbetter, A. M. (2022)

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took a different approach by studying the social media industry and explored the influence of live streaming channels provided by short video platforms on brand shaping.

3. Research Design

3.1 Variable Selection and Data Description

This study used questionnaires as the sample for research, and the data was processed as follows: (1) questionnaires with missing data were excluded; (2) questionnaires completed within 50 seconds were excluded; (3) questionnaires with only one selected option were excluded. Apart from a hundred actual survey reports, all other questionnaires were obtained from an online survey platform, resulting in a total of 423 valid samples.

Table 3-1 Variable Selection

Variable Type	Variable Name	Variable Code	Variable Meaning
Variable Definitions	Innovation path	Ino	The anchor has utilized in novative approaches in live-streaming e-commerce
Independent Variable	Frequency	Y	The frequency at which users watch live-streaming e-commerce
Control Variables	Age	Age	Age
	Sex gender	Sex	Sex gender
	Record of formal schooling	Rofs	Record of formal schooling
	0ccupation	Occu	Occupation
	Disposable Income	DI	The balance of personal income minus personal tax expenses

3.2 Establish a Model

$$Y_i = \beta_0 + \beta_1 Ino_i + \beta_2 Age_i + \beta_3 Sex_i + \beta_4 Rofs_i + \beta_5 Occu_i + \beta_6 DI_i + \varepsilon$$

The specific form of the regression model in this study is as follows:

Where Y represents the dependent variable, β_0 represents the constant term, and β_i represents the regression coefficients.

3.3 Variable Definitions

1) Dependent Variable

Innovation Path of Live-streaming E-commerce (Lno): According to the research of many scholars both domestically and internationally, the innovation path of live-streaming e-commerce can reflect the

vitality of live-streaming.

2) Independent Variable

Frequency of Watching Live-streaming E-commerce (Y): The frequency of watching live-streaming e-commerce was obtained from a questionnaire survey. The questionnaire options were set as four categories: extremely low frequency, rarely watch; low frequency, 2-3 times a month; high frequency, watch every week; extremely high frequency, watch every day. The frequency of watching live-streaming e-commerce is treated as a categorical variable and serves as the dependent variable in this study.

3) Control Variables

Based on the research on the innovation path of live-streaming e-commerce, this study incorporates the following control variables: age (Age), gender (Sex) representing users' inherent characteristics; education level (Rofs), occupation (Occu) representing users' internal characteristics; disposable income (DI) representing users' consumption ability.

3.4 Research Hypotheses

The rise of e-commerce livestreaming in China began in 2016, and in 2018, the trends of short video-driven e-commerce and e-commerce livestreaming gained momentum. By 2019, livestreaming e-commerce experienced explosive growth and was dubbed the "Year of Livestreaming E-commerce." Traditional livestreaming formats such as gaming and entertainment saw slowing growth rates, while e-commerce entered the livestreaming industry, becoming a new frontier for electronic commerce. During the COVID-19 pandemic in 2020, livestreaming capitalized on the surge in user traffic, with television networks and celebrities joining the livestreaming bandwagon, leading to rapid growth in the size of livestreaming e-commerce transactions. However, data from NetEcon Society indicates that over the past three years, the number and amount of investments in the domestic livestreaming e-commerce sector have been consistently declining, reflecting market saturation and intense competition in the e-commerce-driven sales industry.

This article proposes a research hypothesis:

H1: Introducing an innovative approach to livestreamed product sales can pique the interest of internet users and increase user engagement.

H2: There is a positive correlation between internet users' disposable income and educational level and their support for innovative livestreamed product sales approaches.

4. Empirical Analysis

4.1Descriptive Analysis

Table 4-1 Main Variables Descriptive Statistical Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
sex	459	1.680	0.467	1	2
age	459	2.065	0.472	1	5
occu	459	1.688	1.537	1	9
rofs	459	2.011	0.446	1	4
di	459	1.961	1.187	1	5
y	459	2.928	0.963	1	4
ino	459	1.569	1.092	1	5

The data in Table 4-1 shows that the frequency of watching live-streamed shopping (Y) has a small standard deviation and a mean close to 3. This indicates that the majority of the sample data have a frequency of live-streamed shopping that is close to 3, indicating a higher frequency. The development of innovative paths for live-streamed shopping (Ino) has a small standard deviation and a mean of 1.092, indicating that most survey participants chose the innovative shopping method assigned a value of 1. The age variable (Age) has a small standard deviation and a mean close to 2, indicating that the majority of the surveyed population is concentrated in the 18-30 age group. The occupation variable (Occu) has the largest standard deviation, with a minimum value of 1 and a maximum value of 9, indicating a large disparity in the assigned values in the sample data. The education variable (Rofs) has the smallest standard deviation and a mean close to 2, indicating that the majority of the surveyed individuals have a college education, including those currently enrolled. The disposable income variable (DI) has a larger standard deviation and a mean close to 2, indicating that the majority of the surveyed individuals have a per capita disposable income ranging from 1500 to 3000.

Using VIF analysis, the maximum VIF value is 2.1, with a mean of 1.49, indicating that there is no serious multicollinearity among the variables.

4.2 Multiple Regression Analysis

The first column of Table 4-2 presents the regression results between the development of innovative paths for live-streamed shopping and the frequency of watching live-streamed shopping. According to the regression results, the regression coefficient for the development of innovative paths for live-streamed shopping (Ino) is -0.254 (with a value of 1 assigned to innovative paths; the frequency of live-streamed shopping is assigned values from 1 to 4, with higher values indicating higher frequency), and it is significant at the 5% level. This indicates that the development of innovative paths for live-streamed shopping can achieve a 13.5% increase in the frequency of watching live-streamed shopping, supporting the hypothesis H1 of this study that introducing innovative paths into live-streamed shopping can arouse interest among netizens and increase user stickiness. Occupation (Occu), education (Rofs), and Disposable Income (DI) are significantly positively correlated with the

frequency of live-streamed shopping at the 5% level. This can be understood as follows: individuals with higher education and better occupations tend to have higher disposable incomes and are more willing to engage with new things. This motivates individuals to increase their consumption ability and thus increase the frequency of watching live-streamed shopping. This result supports H2: there is a positive correlation between netizens' disposable income and education and their support for innovative paths for live-streamed shopping. On the other hand, age is significantly negatively correlated with the frequency of live-streamed shopping at the 5% level.

Table 4-2 Multiple Regression Results of Main Variables

VARIABLES	y
ino	-0.254***
	(0.0613)
sex	-0.302***
	(0.0893)
age	0.190*
	(0.111)
occu	-0.0921**
	(0.0381)
rofs	-0.166
	(0.107)
di	-0.0987**
	(0.0481)
Constant	4.152***
	(0.295)
Observations	459
R-squared	0.109

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.3 Robustness Test

In this study, the robust command was used to conduct a robustness test for regression analysis. According to Table 4-3, it can be observed that the development of live-streaming e-commerce is significantly positively correlated with innovative paths (Ino), occupation (Occu), education level (Rofs), disposable income (DI), and frequency of watching live-streaming e-commerce (Y) at a 5%

significance level. Age is significantly negatively correlated with the frequency of live-streaming e-commerce at a 5% significance level, which is consistent with the results of the multiple regression analysis. These results indicate the robustness of the regression findings in this study.

Table 4-3 Robustness Test Regression Results

VARIABLES	y
ino	-0.254***
	(0.0769)
sex	-0.302***
	(0.0865)
age	0.190
	(0.118)
occu	-0.0921**
	(0.0375)
rofs	-0.166
	(0.114)
di	-0.0987**
	(0.0462)
Constant	4.152***
	(0.310)
Observations	459
R-squared	0.109

5. Conclusion and Countermeasure Suggestions

5.1 Research Conclusion

The first part of this paper summarizes the relevant literature on the innovative paths of live streaming e-commerce, elucidates and analyzes the theoretical foundations, and proposes two research hypotheses. Through the empirical analysis of the collected questionnaires, it is concluded that introducing innovative paths into live streaming e-commerce can stimulate the interest of netizens and increase user stickiness. This conclusion affirms the positive role of innovative paths in live streaming e-commerce. Furthermore, after describing the control variables, this paper draws the conclusion that netizens' personal disposable income and education level are positively correlated with their support for innovative paths in live streaming e-commerce. This indicates that users have a high demand for innovative paths in live streaming e-commerce, based on their focus on product quality. Therefore, this

also points out the direction for the development of live streaming e-commerce. Live streaming e-commerce with innovative paths has great development prospects, high current attention, and a large number of potential users.

5.2 Strategies and Suggestions

Based on the empirical analysis in this paper, combined with the theoretical foundation of Dongzexiong and the literature on the research of innovative paths in live streaming e-commerce by domestic scholars, several suggestions are proposed for the development of live streaming e-commerce in China.

1) explore potential consumer groups in depth and expand live streaming platforms to attract more traffic

Currently, knowledge-based live streaming hosts like Dong Yuhui have achieved great success on platforms like Douyin, while other platforms such as Kuaishou and Xiaohongshu are relatively scarce. Some netizens (consumers) do not use Douyin and are unwilling to download other apps. Therefore, it is recommended that teams and companies involved in knowledge-based live streaming can showcase their live broadcasts or exciting clips on multiple platforms to attract potential consumers who are willing to pay for knowledge on those platforms, bringing together consumers who are moved by knowledge in live streaming rooms and achieving platform-level homogeneity in knowledge-based live streaming.

2) cultivate live streaming hosts who are "warm and powerful" and explore more styles of live streaming effects

With the development of the economy and society and the improvement of people's living standards, cultural consumption in China has entered a period of rapid growth. People have higher expectations for enriching their spiritual and cultural lives, and knowledgeable hosts with connotation and warmth are increasingly accepted by the public. Netizens are also more willing to pay for knowledge. Given the high requirements for the comprehensive qualities of hosts, there is a shortage of hosts in knowledge-based live streaming, and the live streaming effects mostly follow the style of Dong Yuhui. To address this problem, it is suggested that relevant teams and companies invest more in talent reserves and training. Since each person's live streaming effect and style are different, this can meet the diverse demands of consumers for knowledge and live streaming experiences and avoid aesthetic fatigue.

5.3 Limitations of the Study

The limitations of this paper include the lack of detailed exploration of innovative paths in live streaming e-commerce. This can only prove that innovative paths have a significant motivating effect on live streaming e-commerce, but cannot further investigate the specific effects of different innovative paths in live streaming e-commerce. In addition, there are many factors that affect the effectiveness of live streaming e-commerce, and this paper only considers the more important and easily quantifiable influencing factors. There are many other factors that are difficult to quantify, and not including them in the study can also affect the research process and result in certain errors.

Furthermore, due to limited knowledge of live streaming e-commerce, there is still much room for improvement in research capabilities, and the depth of research on innovative paths in live streaming e-commerce is far from sufficient. In terms of writing this paper, many language expressions need further refinement, the logical relationships are not rigorous enough, the length of the article is relatively short, and the content is not rich enough. There are still many deficiencies that need to be revised, and personal efforts are also needed to improve logical expression abilities and academic writing skills.

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