# Pinduoduo Evolves Through Change and Discernment

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**Abstract.** Online shopping has become one of the main shopping methods for most households and is closely associated with our lives. E-commerce platforms and related industries are growing rapidly and becoming indispensable economic players, creating strong ties with people's livelihoods, society and the country. In this highly competitive e-commerce market, Jindo, a dark horse, has created a new model that combines social and shopping in a market already monopolised by e-commerce giants such as Taobao, Jingdong and Alibaba. This paper will focus on the analysis of this model and analyse the corresponding corporate culture of Jindo.

**Keywords:** Pinduoduo · Smart Finance · Contemporary Trade · Discernment

## 1 Introduction

Pinduoduo is a social e-commerce platform that was initially launched in 2015 as a way of grouping together to buy quality fruit, winning the love of users with its transparent origin, simple operation and after-sales guarantee. However, the Pound Good app only sells agricultural products, so it was officially launched in September 2015 to break the single category situation. Against the backdrop of a highly competitive e-commerce market, Pinduoduo adopted an operational model that combined social networking with e-commerce, attracting users and gaining a firm foothold through the introduction of group shopping innovations [1]. Relying on this new social e-commerce mindset, Pinduoduo grew rapidly, breaking through 100 million users in July 2016, securing US$110 million in financing and listing in the US. Since then, Pinduoduo has launched a $10 billion subsidy scheme to attract users and further expand its market share by subsidising high-priced digital products and enhancing its brand image. Keeping up with the changes of the times, Pinduoduo cooperated with Crypto for short video live-streaming of goods to further boost sales. Pinduoduo has successfully emerged in the highly competitive e-commerce market and has won the hearts of users and investors by constantly updating its ideas through innovative strategies.

During the epidemic, Pinduoduo took advantage of its own platform to quickly respond to national policy by launching DuoDuo buy food and Fast Group Mission to

help supply ingredients and capture market share. Pinduoduo's online grocery shopping business has grown significantly, especially in second and third tier cities, and through the Fast Missions platform, merchants are able to collect community demand online and provide contactless delivery services, meeting the shopping needs of residents. However, as the epidemic eased, Pinduoduo's grocery buying business gradually waned. Despite the $1 billion invested in promoting the Duoduo grocery shopping app, the likes of Cainiao Network, Jingdong Logistics and Meituan have taken market share and are troubled by gaps in their delivery networks. Despite the massive publicity, the impact of Duoduo Buy groceries is not as good as it could be.

In terms of poverty alleviation, Pinduoduo has shown great passion and impact by helping agriculture. From its inception to 2018, Pinduoduo has helped 139,600 poor families with file cards, generating more than 2.1 billion sales orders and 10.9 billion pounds of agricultural products sold, with a total transaction value of 51 billion yuan. Hundreds of millions of farmers sold 65.3 billion yuan of agricultural products through Pinduoduo in 2018, an increase of 233% year-on-year, while driving more than 62,000 new farmers to return to their hometowns. During the epidemic, Pindo launched a special section for "helping farmers fight the epidemic", and helped farmers escape poverty and increase their income through live-streaming. Pinduoduo's farming live broadcast not only solved the problem of unsold agricultural products, but also provided consumers with good quality and inexpensive origin goods. Pinduoduo's farming initiative has been supported by the government, the platform and consumers, achieving a win-win situation for all parties [3].

## 2    Marketing Dimension Analysis

### 2.1    Digging Deeper into the Sunken Market

Pinduoduo focuses on the sunken market and quickly locates target users. According to survey data, Pinduoduo's users are mainly from third and fourth-tier cities, and most of them are low- and middle-income groups with consumption desires and needs. The tail-end market has huge potential and Pinduoduo has successfully attracted this group by connecting user groups through low-priced discounted products and social circles. The survey shows that 77.11% of the student group and 31–50 year olds with pragmatic family needs are using or have used the Pinduoduo platform to shop.

The platform uses a low-price strategy, targeting the low and middle income groups and the elderly, in contrast to the pricing strategies of Jingdong and Taobao [2] Pinduoduo fights other platforms by lowering product prices through its marketing strategy and relying on the Taobao platform for product recommendations. Since 2018, Pinduoduo has surpassed Jingdong as the leading e-commerce platform in terms of annual active users, and as of Q4 2020, Pinduoduo has surpassed both Jingdong and Taobao in terms of annual active users [5].

### 2.2    Application of the "Social E-commerce" Model

Pinduoduo is a social e-commerce platform that uses C2B grouping as its main marketing method, targeting low and middle-income people and the elderly through a low-price

strategy. Its users use group shopping invitations to promote Pinduoduo's product features and attract potential users. In addition, by sharing links to initiate group spinning, Pinduoduo quickly taps into its target users and achieves rapid user growth. According to the Q4 2020 earnings data, Pinduoduo already has nearly 800 million annual active users, making it one of the key platforms for connecting supply and demand in China. At the same time, the number of active merchants on the platform is also growing. Pinduoduo's success is due to its unique social e-commerce mindset and differentiation strategy from other platforms, making it one of the most popular shopping platforms.

### 2.3 Application of the "Acquaintance Economy" Model

Pinduoduo uses the group-pooling model to shorten consumers' purchase decision time. Users invite their acquaintances to join them in a group, using social network expansion to quickly attract target users. Consumers make quick purchase decisions based on trust, reducing shopping time. Recommendations from acquaintances and followers increase product exposure and motivate users to buy. Pinduoduo's unique model simplifies the purchase decision process and quickly drives users to buy products.

## 3  Analysing PDD Log-Return Series with Promotional Activities

To investigate the relationship between the log-return series of PDD stock and promotional activities, we employed a dataset consisting of observations from the previous four years (from 02/01/2019 to 30/12/2022). Our objective was to create an Ordinary Least Squares (OLS) model and examine whether the promotional activities conducted by PDD could effectively stimulate their business growth. We chose to analyze the stock return as it provides the most reliable criterion for reflecting a business's future growth potential (Fig. 1).

In our analysis, we introduced a dummy variable, DS (Deal at Special Promotional Activities), which takes a value of 1 if the observation falls on a special promotional activities date and 0 if it does not. The results indicate a statistically significant positive relationship between the log-return series of PDD stock and its promotional activities at a 5% level of significance. This finding suggests that PDD's promotional strategy, as observed in the historical data, has been successful.

Secondly, we also examined the feature of this return-promotional model by focusing on the persistence of the log-return series. We chose to use four years of data for several reasons. Firstly, an excessively small number of observations would be insufficient to draw meaningful conclusions regarding persistence. On the other hand, using a model with too many observations would capture excessive external shocks, potentially leading to erroneous conclusions in our analysis (Fig. 2).

a. The persistence of portfolio returns can be analyzed by observing the autocorrelation of the series. To examine the stationarity of the portfolio return series, an Augmented Dickey-Fuller (ADF) test was conducted:

$$(\text{ADF Test}) : \Delta_{y_t} = c_t + \phi_{c_1} y_{t-1} + \sum_{i=1}^{p-1} \beta_i \Delta_{y_{t-i}} + \varepsilon_t, \, t \geq 1$$

| Dependent Variable: RET_PDD | | | | |
|---|---|---|---|---|
| Method: Least Squares | | | | |
| Date: 06/30/23   Time: 20:23 | | | | |
| Sample (adjusted): 1/03/2019 12/30/2022 | | | | |
| Included observations: 1006 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.000786 | 0.001741 | -0.451775 | 0.6515 |
| DS | 0.008981 | 0.003586 | 2.504411 | 0.0124 |
| R-squared | 0.006208 | Mean dependent var | | 0.001329 |
| Adjusted R-squared | 0.005218 | S.D. dependent var | | 0.048393 |
| S.E. of regression | 0.048267 | Akaike info criterion | | -3.222151 |
| Sum squared resid | 2.339022 | Schwarz criterion | | -3.212382 |
| Log likelihood | 1622.742 | Hannan-Quinn criter. | | -3.218439 |
| F-statistic | 6.272075 | Durbin-Watson stat | | 2.019628 |
| Prob(F-statistic) | 0.012423 | | | |

**Fig. 1.** Use of the app by Pinduoduo's target users & DS simulation

| Null Hypothesis: RET_PDD has a unit root | | |
|---|---|---|
| Exogenous: None | | |
| Lag Length: 0 (Automatic - based on SIC, maxlag=21) | | |
| | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | -31.79644 | 0.0000 |
| Test critical values:      1% level | -2.567263 | |
| 5% level | -1.941138 | |
| 10% level | -1.616488 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RET_PDD)
Method: Least Squares
Date: 06/30/23   Time: 20:17
Sample (adjusted): 1/04/2019 12/30/2022
Included observations: 1006 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| RET_PDD(-1) | -1.002795 | 0.031538 | -31.79644 | 0.0000 |
| R-squared | 0.501491 | Mean dependent var | | 2.09E-05 |
| Adjusted R-squared | 0.501491 | S.D. dependent var | | 0.068572 |
| S.E. of regression | 0.048415 | Akaike info criterion | | -3.217014 |
| Sum squared resid | 2.355747 | Schwarz criterion | | -3.212130 |
| Log likelihood | 1619.158 | Hannan-Quinn criter. | | -3.215158 |
| Durbin-Watson stat | 1.997488 | | | |

**Fig. 2.** The output of ADF test shows the log return of stock price is stationary.

Moreover, once we have confirmed the stationarity of the portfolio return series using the ADF test, we can proceed to investigate the persistence in returns through their respective correlogram. The correlogram allows us to analyze the Autocorrelation Function (ACF) and the Partial Autocorrelation Function (PACF) of the portfolio's daily return series. Upon examining the graph, we observe that the third lag in both ACF and PACF exhibits significant autocorrelation. This finding suggests the presence of a persistent feature in the series, indicating that the series relies on past data to make future predictions of returns.

To address the issue of persistence, we can address it by incorporating AR, MA, or ARMA specifications, depending on their suitability, and selecting an appropriate number of lags to enhance the model's ability to predict future returns. Based on the reported correlogram, we have determined that adopting an ARMA(3,1) specification would be appropriate to mitigate the issue of serial correlation in log returns (Fig. 3).

Based on the previous analysis and tests, the optimal forecasting methodology for predicting portfolio returns is determined to be the ARMA (3,1) model. The ARMA (3,1) model effectively addresses the autocorrelation present in the returns. This combined approach serves as a highly effective tool for predicting financial time series data that
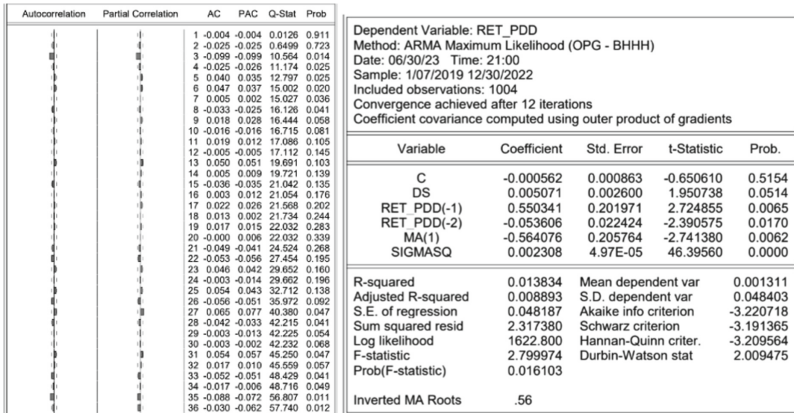
| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.004 | -0.004 | 0.0126 | 0.911 |
| | | 2 | -0.025 | -0.025 | 0.6499 | 0.723 |
| | | 3 | -0.099 | -0.099 | 10.564 | 0.014 |
| | | 4 | -0.025 | -0.026 | 11.174 | 0.025 |
| | | 5 | 0.040 | 0.035 | 12.797 | 0.025 |
| | | 6 | 0.047 | 0.037 | 15.002 | 0.020 |
| | | 7 | 0.005 | 0.002 | 15.027 | 0.036 |
| | | 8 | -0.033 | -0.025 | 16.126 | 0.041 |
| | | 9 | 0.018 | 0.028 | 16.444 | 0.058 |
| | | 10 | -0.016 | -0.016 | 16.715 | 0.081 |
| | | 11 | 0.019 | 0.012 | 17.086 | 0.105 |
| | | 12 | -0.005 | -0.005 | 17.112 | 0.145 |
| | | 13 | 0.050 | 0.051 | 19.691 | 0.103 |
| | | 14 | 0.005 | 0.009 | 19.721 | 0.139 |
| | | 15 | -0.036 | -0.035 | 21.042 | 0.135 |
| | | 16 | 0.003 | 0.012 | 21.054 | 0.176 |
| | | 17 | 0.022 | 0.026 | 21.568 | 0.202 |
| | | 18 | 0.013 | 0.002 | 21.734 | 0.244 |
| | | 19 | 0.017 | 0.015 | 22.032 | 0.283 |
| | | 20 | -0.000 | 0.006 | 22.032 | 0.339 |
| | | 21 | -0.049 | -0.041 | 24.524 | 0.268 |
| | | 22 | -0.053 | -0.056 | 27.454 | 0.195 |
| | | 23 | 0.046 | 0.042 | 29.652 | 0.160 |
| | | 24 | -0.003 | -0.014 | 29.662 | 0.196 |
| | | 25 | 0.054 | 0.043 | 32.712 | 0.138 |
| | | 26 | -0.056 | -0.051 | 35.972 | 0.092 |
| | | 27 | 0.065 | 0.077 | 40.380 | 0.047 |
| | | 28 | -0.042 | -0.033 | 42.215 | 0.041 |
| | | 29 | -0.003 | -0.013 | 42.225 | 0.054 |
| | | 30 | -0.003 | -0.002 | 42.232 | 0.068 |
| | | 31 | 0.054 | 0.057 | 45.250 | 0.047 |
| | | 32 | 0.017 | 0.010 | 45.559 | 0.057 |
| | | 33 | -0.052 | -0.051 | 48.429 | 0.041 |
| | | 34 | -0.017 | -0.006 | 48.716 | 0.049 |
| | | 35 | -0.088 | -0.072 | 56.807 | 0.011 |
| | | 36 | -0.030 | -0.062 | 57.740 | 0.012 |

Dependent Variable: RET_PDD
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 06/30/23   Time: 21:00
Sample: 1/07/2019 12/30/2022
Included observations: 1004
Convergence achieved after 12 iterations
Coefficient covariance computed using outer product of gradients

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.000562 | 0.000863 | -0.650610 | 0.5154 |
| DS | 0.005071 | 0.002600 | 1.950738 | 0.0514 |
| RET_PDD(-1) | 0.550341 | 0.201971 | 2.724855 | 0.0065 |
| RET_PDD(-2) | -0.053606 | 0.022424 | -2.390575 | 0.0170 |
| MA(1) | -0.564076 | 0.205764 | -2.741380 | 0.0062 |
| SIGMASQ | 0.002308 | 4.97E-05 | 46.39560 | 0.0000 |

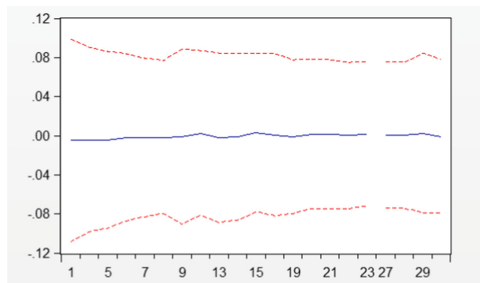| | | | |
|---|---|---|---|
| R-squared | 0.013834 | Mean dependent var | 0.001311 |
| Adjusted R-squared | 0.008893 | S.D. dependent var | 0.048403 |
| S.E. of regression | 0.048187 | Akaike info criterion | -3.220718 |
| Sum squared resid | 2.317380 | Schwarz criterion | -3.191365 |
| Log likelihood | 1622.800 | Hannan-Quinn criter. | -3.209564 |
| F-statistic | 2.799974 | Durbin-Watson stat | 2.009475 |
| Prob(F-statistic) | 0.016103 | | |
| | | | |
| Inverted MA Roots | .56 | | |

**Fig. 3.** Variable Analysis

**Fig. 4.** Results Simulation

exhibit autoregressive properties. Therefore, when considering the promotional activities, this model is expected to be highly accurate and reliable for making predictions (Fig. 4).

## 4 Marketing Methods: The Impact of Chop One Off

Pinduoduo stands out in a saturated e-commerce market through its unique marketing approach and corporate culture. Its group-pooling model combines social networking and marketing to shorten consumers' purchase decision time. Pinduoduo's "cut-a-deuce" culture has successfully influenced other e-commerce platforms, driving the integration of sales and social. This culture has enabled Pinduoduo to move from smaller cities to first-tier cities, attracting a middle- to upper-class and younger consumer base. Pinduoduo overcame early word-of-mouth issues and attracted users of all classes and ages through publicity and the addition of new users. Surveys show that Pinduoduo's users are concentrated among young people aged 18–25, accounting for more than half of the total number of users. The Pinduoduo culture has become a shopping trend for the younger generation [4].

Pinduoduo uses low prices to recommend quality and practical products to young users, attracting consumption and creating a new consumer culture. Buying consumables such as daily necessities and accessories on Pinduoduo has become the ideal choice for money-saving shopping, with data showing that these products account for the highest percentage of sales on the platform.

Pinduoduo's "Chop-a-Block" attracts users by inviting friends to get red packets, but it is also deceptive in nature. Initially participants enjoy a discount and quickly spread the word about Pinduoduo, but then the cash is reduced and replaced with virtual vouchers. This marketing technique quickly attracts users, but can also damage trust, leading to departures and reputational damage.

## 5   Conclusion

Pinduoduo faces consumer concerns and improvements to its attraction model. Improving the quality of the brand and introducing high-quality products could break consumer concerns about the quality of the products. Changing the single diversion model, e.g. borrowing from Xiaohongshu's goodies sharing model, can increase the trust of users to buy high quality products. Build a good trusting relationship with existing users and maintain active users by offering practical and universal offers. Strengthen offline logistics infrastructure and shorten delivery times to meet user demand and improve competitiveness.

Pinduoduo has been successful in the highly competitive e-commerce market with its unique social e-commerce mindset and differentiation strategy. However, as the market continues to change and user needs evolve, Pinduoduo needs to innovate and improve in order to maintain its competitive advantage and continue to grow. It is believed that through sound marketing strategies and optimised user experience, Pinduoduo will continue to play an important role in the e-commerce industry and bring a better shopping experience to its users.

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