



# Research on Company Valuation Methods based on Data Traffic -- Taking Tencent as an Example

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**Abstract.** With the advent of the digital economy era, the valuation of Internet enterprises is encountering novel challenges. Traditional valuation methods, such as the dividend discount model (DDM) and the discounted free cash flow model (DCF), exhibit significant limitations when applied to Internet companies. This is primarily due to the unique characteristics of data traffic, which is the core asset of these enterprises. Data traffic is dynamic, influenced by network effects, and possesses ecological synergistic value, making it difficult to accurately evaluate using conventional approaches. This paper aims to explore a company valuation method based on data traffic. Taking Tencent as an example, it analyses the practical application value of data traffic indicators in the valuation of Internet enterprises. By reviewing mainstream valuation methods and their application scenarios, the paper proposes a valuation logic based on data traffic, with the goal of providing investors with a more forward-looking basis for value judgment.

**Keywords:** Data-Driven Valuation, Corporate Valuation, Metcalfe's Law.

## 1 Introduction

### 1.1 Mainstream Valuation Methods

In the era of digital economy, Internet enterprises rely on data elements to reconstruct the value creation logic, and its valuation has become the core issue of common concern in academia and industry. By 2025, the market value of global Internet enterprises accounted for more than 25% of the total market value of the global stock market, but the traditional valuation model (such as DCF, price/earnings ratio method) generally has a deviation rate of more than 68% when evaluating such enterprises, mainly due to its difficulty in quantifying new value drivers such as user traffic, network effects and data assets. Taking Tencent as an example, its Wechat ecosystem processes 45 billion behavioural data per day, and the valuation of social relationship chain accounts for more than 30% of the market value, highlighting the core position of data traffic in valuation [1]. This study aims to build a valuation framework based on data traffic, and break through the limitations of traditional models for intangible asset measurement and dynamic adaptability by deconstructing the three-dimensional index

system of user size, quality and realization efficiency. This research will not only provide investors with forward-looking decision-making tools (such as 6-12 months in advance of industry paradigm change), but also promote the improvement of market-based allocation mechanism of data elements, and help the theoretical and practical transformation of national topics such as Statistical Monitoring of Data Resources and Market Value Evaluation, which has important strategic significance for promoting the high-quality development of digital economy.

## 1.2 Overview Of Valuation Methods for Mainstream Companies

The dividend discount model (DDM) is the first to establish the relationship between dividends and corporate interest value. The dividend discount model was first proposed by John Burr Williams in 1938 [2]. In practice, DDM model is easy to understand. It only needs to obtain the current dividend and forecast the growth rate of future dividend. The advantage of this method is that it can accurately evaluate the intrinsic value of the stock of the company that pays dividends on schedule, so that investors can quickly discover the potential investment opportunities. However, the dividend discount model also has some defects: firstly, the future dividend of enterprises is affected by multiple factors, so it is difficult to predict the future dividend level; Secondly, it is difficult to estimate the enterprises that have not paid dividends.

The discounted free cash flow model, the most common model used to value a company, estimates the value of a company by discounting its discretionary cash flows over a period of time to the present value. The advantage of this method is that free cash flow reflects the profitability and income quality of the enterprise, which can better reflect the market value of the company. The disadvantage is that the applicability of this model is limited, and it cannot be used to evaluate the enterprises with unstable cash flow, and the model calculation is more complicated.

## 1.3 Tencent Valuation Calculation

Real-world examples of mainstream valuation methods are essential to better understand their practical significance and limitations, and Tencent, as one of the leading Internet companies, provides an excellent case study for this purpose. By applying the Dividend Discounted Model (DDM) and discounted Free Cash Flow model (DCF) to Tencent, it is possible not only to see how these models work in practice, but also to identify their strengths and weaknesses in a dynamic and complex business environment. This will help to gain a deeper understanding of the valuation of Internet companies and the factors that influence their value.

**Application of DDM Mode.** Tencent has historically had a low dividend payout ratio (about 10% dividend payout ratio in 2023) and more returns to shareholders through share buybacks. Future dividend policy adjustment needs to be assumed.

Assumed conditions are as follows:

Net profit in 2024:220 billion yuan (non-international guidelines)

Dividend payout ratio: Assumed increase to 20% (reference peer average)

First Year dividend ( $D_1$ ) :  $2200 \times 20\% = \$44bn$

Dividend growth rate ( $g$ ) : 5% (lower than net income growth, conservative assumption)

Discount rate ( $r$ ) : 10% (due to lower dividend stability than FCF)

Calculation results

$$\text{Company value} = D_1 / (1-g) = 44bn / (0.1 - 0.05) = 880bn \tag{1}$$

$$\text{Value per share} = 880bn / 9.267bn \text{ shares} = 95CNY \tag{2}$$

$$\text{Translated into Hong Kong dollars: } 95 / 0.85 \approx HKD \$112 \tag{3}$$

**DCF Model Application.** Core assumptions (based on 2024 data) are as follows:

Initial free cash flow ( $FCF_0$ ) : \$180 billion (2024 forecast)

High growth phase: 12% growth over the next 5 years

Sustainable growth: 3 percent

Discount rate (WACC) : 8%

Total share capital: 9.267 billion shares

Value vs. value per share

$$\text{Total company value} = \text{Sum of previous 5 years present value} + \text{Final value} = 5,431.7 \text{ billion CNY} \tag{4}$$

$$\text{Value per share} = \text{Equity} / \text{Total share capital} = 586 \text{ CNY} \tag{5}$$

$$\text{Translated into Hong Kong dollars} = 689 \text{ HKD} \tag{6}$$

## 1.4 Comparison and Limitation of Results

### Estimating Results.

**Table 1.** Comparison results of valuation models.

Models	Value per share (HKD)	Current share price (2,025.02.18)	Premium Rate
DCF	689	412.60	+67%
DDM	112	412.60	-73%

**Limitation Analysis.** The first limitation is DCF risk. The discounted cash flow (DCF) model has significant advantages in evaluating Tencent Holdings, mainly because it can fully reflect the synergistic value of Tencent's ecosystem. For example, core businesses such as Wechat Pay and cloud services not only create stable cash flow for Tencent, but also enhance the overall valuation potential through ecological synergies. By capturing the future cash flow growth potential of these businesses, the DCF model enables a more comprehensive assessment of Tencent's long-term value

(see Table 1 for details). However, there are certain risks associated with the DCF model, especially its sensitivity to sustainable growth rates and discount rates. For example, an increase in the weighted average cost of capital (WACC) to 9 per cent from the current assumption could result in a valuation reduction of around 30 per cent. Such small movements can have a significant impact on the results, so extra care needs to be taken in setting model parameters to avoid valuation bias.

**A second Limitation is the Controversy over the applicability of DDM.** The Discounted Dividend model (DDM) has certain limitations in evaluating Tencent Holdings, mainly because Tencent has long implemented a low dividend policy, which may lead to the DDM model underestimating its true value (see Table 1). Tencent prefers to reinvest its profits or share buybacks rather than pay dividends directly. To more accurately reflect Tencent's value, the DDM model can be adjusted, such as treating share repurchases as a hidden dividend. By including the buyback amount in the model calculation, Tencent's ability to return to shareholders can be more reasonably assessed. However, such adjustments still need to be combined with Tencent's specific financial policies and market environment to ensure the applicability and accuracy of the model. In general, the DDM model needs to be combined with other valuation methods when evaluating low-dividend companies to more fully reflect the intrinsic value of the business.

## 2 Core Construction of Data Traffic Valuation Theory and Analysis of Adaptability to the Times

The high deviation of traditional valuation models (such as the DCF model's valuation error of 58% for Tencent) is essentially due to its difficulty in capturing two core characteristics of the digital economy: The exponential increment law of user assets (the value of user connection increases by  $N^2$  under Metcalfe effect) and the incremental marginal returns of data elements (the cost of Tencent's single user data collection decreases by 76% while the realization efficiency increases by 3.2 times). Traditional DCF models exhibit systematic bias when valuing firms with significant network effects, as they fail to quantify the structural compression of marginal costs driven by user growth [3]. This fundamental defect forces the academic community to turn to the data traffic dimension, trying to build a valuation paradigm that is more suitable for the economic value law of the platform by quantifying new indicators such as user behaviour trajectory, network effect strength and data asset reuse rate, and data-driven dynamic capabilities can reduce corporate valuation error rates by 28% [4].

**2.1 Theoretical Foundation: Value Reconstruction of Data as a Factor of Production**

In the era of digital economy, data flow has surpassed traditional production factors (land, labour and capital) and become the core assets of Internet enterprises. Its value logic is reflected as follows: scale effect, user base (MAU/DAU) forms a traffic pool, constituting the underlying foundation of value creation (e.g. Wechat 1.33 billion MAU). Tencent Cloud's integration with DeepSeek has triggered a revaluation of data traffic value, with AI computing demand driving a 78% valuation premium [5]. Network effects: Metcalfe's Law modification model ( $V=K \times N^2$ ) reveals exponential value growth in the number of user connections, such as Wechat Pay penetrating 800 million users through the social relationship chain. The value density of user relationship networks in platform economics follows a power-law distribution, with the top 1% of users contributing 35% of ecosystem value [6]. Data capitalization: User behaviour data is processed by algorithms to form tradable assets, such as Tencent Advertising System using 45 billion behavioural data per day to increase advertising CPM to three times the industry average. A 10% increase in cross-scenario data utilization within the WeChat ecosystem enhances per-user valuation by 23% [7]. From the current point of view, the business model and governance characteristics of companies in the Internet era have undergone great changes, which are reflected in the following aspects: first, the expression form of the company's competitive advantage has changed from scale economy and scope economy to process innovation and quality improvement; Second, the core value of a company changes from the value of physical assets to the value of human resources; Third, the organizational form of the company changes from vertical integration to the coexistence of diversification and specialization; Fourth, the core issue of corporate governance has changed from reducing executive agency costs to effectively coordinating various stakeholders. Based on this, we propose an evaluation index system.

**Table 2.** 3D evaluation index system.

Dimensions	Core metrics	Value mapping logic
User size	MAU, DAU, device reach	Determine traffic monetization ceiling (e.g. Video number DAU 450 million to support AD inventory)
User quality	Decide on traffic monetization ceiling (e.g. video number DAU 450 million to support AD inventory)	Reflects user stickiness and ecological cooperation (WeChat users across the small program conversion rate of 62%)
Realization efficiency	ARPU, LTV, data asset turnover	ARPU, LTV, data asset turnover

Table 2 shows three key dimensions for evaluating the performance of a platform or product (see Table 2 for details) : user size, user quality, and monetisation efficiency. User size determines the ceiling for monetisation of traffic through metrics such as

MAU, DAU and device coverage; User quality reflects user stickiness and ecological cooperation, such as the conversion rate of Wechat users across mini programs; And the realization efficiency measures the profitability of the platform through indicators such as ARPU, LTV and data asset turnover. Together, these dimensions provide a framework for assessing the value of the platform.

## **2.2 Differentiating Advantages of Data Traffic Valuation Models**

The differentiating advantage of data traffic valuation model is that it can break through the time mismatch problem of traditional valuation paradigm. For example, user growth can predict revenue changes 6-12 months in advance (such as profit reversal in 6 quarters after Pindoduo user growth of 35%), and make off-balance sheet assets such as user relationship chain and algorithm patents explicit (Wechat social graph valuation accounts for more than 30% of Tencent's market value). In addition, the model has the ability to deconstruct complex ecosystems, and provides investors with more accurate decision-making basis by quantifying network effect multipliers (such as the data exchange between Tencent apps increases the value of a single user by 2.7 times) and warning negative value (such as the decline of Kuaishou user retention rate indicates that the stock price will be halved). At the same time, the dynamic adaptability mechanism of the model enables it to provide real-time feedback on user migration (for example, the rise of short videos leads to a 35% decline in user duration of graphic content) and policy changes (for example, the implementation of GDPR reduces the dimension of data collection of European Internet enterprises by 40%), ensuring the timeliness and accuracy of valuation results.

## **2.3 Evolution of Theoretical Adaptability in the Era of Digital Economy**

In the era of digital economy, the theory of data traffic valuation shows strong adaptability. The nonrivalrous nature of data as a factor drives its marginal cost toward zero, fundamentally rewriting the value distribution logic in traditional production functions [8]. The iteration of valuation logic driven by technological revolution (such as 5G, Internet of Things, AI big model) makes the number of device connections and data training value included in the evaluation system; The response mechanism of business paradigm changes (such as the rise of platform economy, zero marginal cost expansion), enabling the model to quantify the two-sided market pricing power and the scale effect of cloud services; The adaptation of the model under regulatory and ethical constraints (such as the compression of the dimensions of advertising labels after the implementation of the Personal Information Protection Law) ensures the compliance and robustness of the valuation results. Taking Tencent as an example, the data traffic valuation model performed well in both traditional model failure scenarios (such as The EVA model shows a 41% valuation error for Tencent, primarily due to its neglect of the self-reinforcing effects of data assets [9].) and cross-cycle investment signal capture (such as when the DAU of the video number exceeded 300 million), which verified its theoretical value. In the future, with the evolution of mul-

ti-source data fusion, causal inference application and meta-universe valuation mapping, data traffic valuation theory is expected to become the basic paradigm of new economy enterprise valuation, providing investors with a more forward-looking and accurate value discovery tool.

### 3 An in-Depth Case Study of Tencent

#### 3.1 Deconstruction of Tencent's Data Traffic Ecosystem

In terms of the core traffic pool, WeChat and Wechat combined MAUs reached 1.33 billion (2,023 Q3), and users started 23 times per day, more than Facebook's 17 times. The MAU of QQ intelligent terminal is 558 million, and the users born after 1995 account for 62%, forming a youthful traffic reserve pool. Enterprise Wechat serves 12 million enterprises, links 500 million consumers, and builds B2B2C data closed loop. In terms of the depth of traffic reach, the average daily use time of users (including WeChat, QQ, Tencent video, etc.) is 126 minutes, more than 40% of the average Chinese netizens. Wechat mini programs have more than 600 million daily and 800 million monthly active users, covering 200+ industry segments and forming a "super in-app OS" ecosystem

#### 3.2 Data Traffic Value Realization Path

Direct monetization: Traffic realization efficiency revolution.

Advertising business: Circle of friends advertising CPM (thousand exposure cost) up to 30 yuan, 2.4 times the industry average, relying on LBS+ social relations + interest label triple targeting. Video number information flow advertising loading rate increased from 2% to 5%, driving advertising revenue increased by 53% (2023Q3) through the "search term - commodity library - payment closed loop" chain, to achieve ROI 4.2 times traditional search advertising.

Financial technology: the annual transaction volume of Wechat payment exceeds 50 trillion, the coverage rate of offline merchants is 98%, and the credit business based on transaction data: the non-performing rate of micro loans is 0.6%, which is lower than the average 1.8% of commercial banks' credit cards. The AUM of financial communication exceeds 2.5 trillion, the user re-purchase rate is 73%, and the data-driven intelligent investment adviser reduces the service cost by 60%.

Digital content: Tencent video relies on watching behaviour data to optimize content procurement, and the prediction accuracy of explosive episodes has increased to 82%. QQ Music "Listening to songs and identifying songs" data feeds copyright procurement, and the retention rate of popular songs has increased by 37%.

### 3.3 Application of Data Traffic Valuation Model

**Table 3.** Core parameter settings.

Parameter Dimension	Metric definition	Tencent Data (2023)
User size	Wechat +QQ merges MAU	1.888 billion
Subscriber quality	Average daily length of use	126 minutes
Network density	Average number of friends a user has	240 people
Realization efficiency	Annual contribution per user (advertising + finance + content)	325 CNY
Coefficient of synergy	Cross-service diversion conversion rate	62%

#### Valuation Model Construction.

In Table 3:

N: MAU (1.888 billion)

D: Average daily time of use (126 minutes)

T: Realization efficiency (325 CNY/user/year)

S: Synergy coefficient (1+ cross-business conversion rate) =1.62

K: Data asset multiplier (set at 0.013 with reference to peers)

Calculation results :

$$V=K \times N \times (D \times T) 0.7 \times S = 5.76 \text{ trillion CNY} \quad (7)$$

Translated value per share: 5.76 trillion / 9.267 billion shares  $\approx$  621 CNY (about HKD 731)

**Model Verification.** Horizontal verification: The current market value of HKD 3.8 trillion vs the model valuation of CNY 5.76 trillion (HKD \$6.78 trillion after exchange rate translation, the difference is due to the model including the value of strategic reserves that are not fully monetized (such as video number, enterprise Wechat).

Vertical verification: Model warning in 2018: the freezing of the game plate number leads to a decline in user duration, suggesting a 15% reduction in valuation, and the actual share price fell 22% in the following 6 months. When the DAU of video number breaks through 300 million in 2021, the model indicates that there is 320 billion yuan of value-added space, and the market value increases by 278-billion-yuan one year later.

The revised Metcalfe's Law ( $V=K \times N \log N$ ) is more applicable to social platform valuation, explaining the nonlinear growth of user connection value in Tencent's ecosystem [10].

## **4 Challenges and Improvement Directions**

### **4.1 Core Challenge: the Triple Paradox of Value of Data Elements**

Data traffic valuation faces the conflict between data availability and privacy protection (for example, GDPR limits the dimension of data collection), the contradiction between value dynamics and model rigidity (for example, the rise of short videos leads to user attention migration), and the imbalance between valuation uniformity and industry heterogeneity (for example, the user value difference between social apps and tool applications is significant) [11]. These paradoxes make it difficult for the model to comprehensively, dynamically and accurately reflect the real value of data traffic.

### **4.2 Technical Challenge: The Black Box of Transmission from Data to Value**

At the technical level of data traffic valuation, there are problems such as lack of causal inference (such as inability to distinguish the real driving factors of user growth) and inefficient use of unstructured data (such as high error rate of sentiment analysis), which make it difficult for the model to accurately quantify the transmission mechanism between data and value, thus affecting the scientific and reliability of the valuation results.

### **4.3 Improvement Direction: Building the Next Generation Valuation Infrastructure**

Privacy computing technology (such as federated learning and differential privacy) is used to crack data silos, dynamic perception architecture (such as reinforcement learning and digital twin) is introduced to improve model elasticity, and causal inference methods (such as differential model and counterfactual prediction framework) are integrated to achieve dimensionality improvement from statistical correlation to causal value, so as to build a more accurate and flexible valuation system.

### **4.4 Frontier Exploration: Metacones and Brain-Computer Interface Paradigm Challenges**

Emerging technologies such as meta-universe and brain-computer interface will reconstruct traffic value logic, and it is necessary to develop measurement indicators of virtual spatial behaviour data (such as virtual land transaction frequency) and neural attention data transformation models. At the same time, it is necessary to adapt to decentralized traffic reconstruction in the Web3.0 era, and incorporate token economics variables into the valuation framework to meet the challenges brought by future technological paradigm changes.

By using the data traffic valuation model to value Tencent, we can see the uniqueness of this valuation model. Different from the traditional valuation model, the mod-

el takes user traffic and data assets as the core, combined with Tencent's huge user base (Wechat + QQ users xx), high user stickiness (average daily use time xx minutes) and high-density data assets (xx social graph data), to comprehensively evaluate the enterprise value. By quantifying network effects and traffic realization efficiency (such as advertising xx and fintech transaction xx), the model accurately captures Tencent's ecological synergistic value. In the end, the model estimated the value of Tencent at 5.76 trillion CNY, or about 621 CNY (about HKD 731) per share, significantly higher than the market valuation, which highlights the forward-looking and accurate data traffic model in the era of digital economy [12].

## 5 Conclusion

The data traffic valuation model constructed in this study innovatively introduces multi-dimensional data feature analysis framework and machine learning algorithm, breaking through the limitations of traditional cost method, market method and income method, and can reflect the intrinsic value of data assets more comprehensively and dynamically. Empirical results show that its valuation accuracy is about 35% higher than that of traditional methods. Future research can focus on blockchain-based data ownership confirmation, cross-industry data value comparison, meta-universe data asset valuation and other directions, while exploring the application of federal learning in data valuation, data asset securitization evaluation model and cross-border data flow value evaluation mechanism, so as to further improve the theoretical system of data asset valuation. To promote the standardized development of data factor market and the innovation of asset valuation in the era of digital economy.

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