Exploring the Business Model Structure Using Grounded Theory: The Case of a Chinese Platform-based Unicorn Company

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Abstract

Among the platform-based unicorn companies in China, ByteDance is a typical representative. This study uses the grounded theory of Strauss's three-stage coding method to analyze a case and establish a two-dimensional business model structure model of ByteDance. Through the steps of labeling, conceptualization, categorization, and category classification, 134 concepts and 26 categories are formed. On the basis of the open coding category, the main axis coding is carried out, and each element is clustered, then a two-dimensional business model structure model which contains 26 attributes and 6 levels is structured, and code elements is selected to comb the story-line. The study found "algorithm +product" is the core of the ByteDance business model, and that product matrix is the guarantee of value realization, and that user needs are the external driving force for development and innovation, and that technological leadership is the internal driving force, and that external constraints are urgently needed to be resolved in business development problem. The development of a platform-based enterprise needs to establish its own core competitiveness, develop a business model structure around the core elements, and adjust, evaluate and innovate business model in a timely manner based on environmental changes.

Keywords

Platform-Based Unicorn Enterprise; Business Structure Model; Bytedance; Grounded Theory.

1. Introduction

With the development of mobile network technology, Internet companies have grown up. In the Chinese Internet market, the three major industrial giants of Baidu, Alibaba, and Tencent have gradually formed a situation in which the three major industrial giants occupy the market. Under such fierce competition, relying on its own algorithm technology and unique team strength, the ByteDance has developed in a relatively short period of time, occupying a place in the current Chinese Internet market, and has grown into a super unicorn company which can compete with large Internet companies such as BAT (BaiDu, Tencent and ALibaba). How ByteDance has developed into a super unicorn enterprise in a short period of time, where is its development advantage, and how it grows up is the issues that scholars are more concerned about. Based on the grounded theory, this paper researches on the structure model of unicorn enterprise,and adopts the method of qualitative case analysis to conduct a preliminary research on the business model of ByteDance, then explore the structure of the business model, and discuss and analyze its structure. This research can effectively enrich scholars' research on the business model structure model of unicorn companies represented by ByteDance, and provide a certain development reference for new startups.

2. Literature review

In the value creation of an enterprise, the business model is the internal logic supporting value creation and a profit model for enterprise development, which is related to the survival and development of the enterprise. Research on business model boils down to answering two basic questions: what are the elements of business model and what are the basic relations between the elements of business model. Researchers from the perspective of business model structure believe that business model describes the structure between the components, is the business system or structure of the enterprise. Morris (2005) divided the business model into foundation level, proprietary level and rules level, and

each layer contains 6 basic elements [1]. Zott and Amit (2009) emphasized the integrity of the business model, explained the framework of the business model from the perspectives of the content, structure and management of the business model, and determined the novelty, lock-in, complementarity and efficiency of the business model [2]. Zheng Chengde and Xu Ailin et al. (2011) took 75 successful enterprise cases as samples, made a rooted analysis of relevant literature of business model spanning from 1988 to the present, established an integrated two-dimensional framework of business model, and exemplified it with enterprise cases, providing a common model for the study of business model structure model [3]. Cheng Yu and Sun Jianguo (2013) summarized the key elements of the business model by using the grounded analysis method according to the original data of enterprises, clarified the theoretical relations between the elements, and established a basic theoretical model [4]. Feng Hua et al. (2016) discussed the income model, value creation model and factor support system of platform business model innovation process along the thinking of time-space change, and thought that the platform business model innovation process under the Internet environment is to strive to overcome or reduce physical time - space constraints to gain value in infinitely extended economic time - space. In addition, the positive externality of network time spillover promotes the improvement of economic time-space efficiency, and platform business model innovation should pay attention to the positive role of consumption time value increment [5]. Yang Xiaolin (2017) introduced the business model in the evaluation of enterprise value, and quantified the value capabilities of customer value, enterprise value and enterprise profit from the three elements of business model, which reflected the maximization of enterprise value [6].

As one of the mainstream research methods of qualitative research, grounded theory is different from the top-down inertia of empirical research. Therefore, this research method is more suitable for the study of business models in specific industries, and the method meets the diversity of business model research. As an important inductive research method, grounded theory has been widely used in various fields of social science. In terms of methodology, the grounded theory is applicable to the exploration of microscopic, process and interactive research objects. Based on the research method of grounded theory, Gersick (1988) made an in-depth observation on 8 teams in 6 organizations. The researchers researched deep within the team and recorded team data from 1980~1983. Their paper investigated the life cycle of team development and constructs the theory of stage team balance cycle [7]. Browning, Beyer and Shetler (1995) studied the international semiconductor manufacturing alliance and cooperation model with the horizontal construction method of rooted theory, and found that the semiconductor industry presented the characteristics of organization from competition to cooperation, which was consistent with the core viewpoint of complexity theory [8]. Uzzi (1997) made a field survey to visit the managers of 23 women's clothing companies in New York, and identified three elements constituting the embedded relationship of organizations with the method of grounded theory analysis, namely trust, arrangement for solving common problems and information transmission [9]. Zhao Jiaying (2013) made a cross-case analysis of the business model of social e-commerce by using the grounded theory research method, and preliminarily obtained the corresponding business model [10]. Ma Fengling and Chen Jie (2014) studied the evolution mechanism of incubator business model based on the grounded theory, and found that four types of innovative activities of incubators promoted the transformation of business model from single type to compound type, and finally realized the balance of social and economic benefits [11].

The concept of "unicorn" was proposed in 2013 by Aileen Lee, founder of Cowboy Ventures, is scarce, high-speed development of startups by investors sought love at the same time. Its basic characteristics are innovative, high growth, startup type, and high valuations. And it is a company as the representative of the new economic organization form. Unicorns are defined as those that have been around for a decade and are valued at more than $1 billion. Companies valued at more than $10bn are known as super-unicorns [12]. By analyzing the development of enterprises in the new economic era, Liu Cheng, Wang Shengnan et al. (2016) pointed out that unicorns are the biggest goal for entrepreneurs, and analyzed and summarized the characteristics, emerging fields, discovery and cultivation of unicorns [13]. Yuan Xiaohui and Gao Jian (2016) extracted five key characteristics of

identifying potential unicorns from the development process of 216 global unicorns in 2016, namely, exponential growth, rapid development of the industry, location in the innovation and entrepreneurship center, growth years of 4-8 years, and the level of the founding team [14]. Acs et al. (2017) demonstrated the strong correlation between unicorn enterprises and good location ecology through research [15]. According to Chen Hua and Wang Xiao (2018), there are two criteria for unicorns: one is that the enterprise has not been established for more than ten years, has received private investment and has not yet been listed; second, the company is valued at more than $1 billion [16]. Jiang S et al. (2018) studied unicorn companies in 2017 and found that unicorn companies attach great importance to scientific research and innovation, and unicorn companies in different industries and regions have different requirements for technological innovation [17]. Zhao Li (2018) believed that the current unicorn enterprises should first have a high scientific and technological starting point, and the technological innovation of enterprises can obtain commercial value [18]. Wu Yongyi (2018) believed that unicorns have become synonymous with the "Four new" enterprises in the context of the state's support for the listing of innovative and entrepreneurial enterprises [19]. Chen Jing et al. (2019) established a database of 273 unicorn enterprises. Through quantitative research, it is concluded that high valuation and high growth rate have brought successful attributes to unicorn enterprises to a certain extent, but because unicorn enterprises are not listed, there is great uncertainty and ambiguity in the valuation of enterprises as a whole [20]. Song Lifeng et al. (2019) believed that the valuation method of traditional enterprises is not applicable to the value evaluation of unicorn enterprises [21]. Zhou Jiachun et al. (2019) obtained a positive correlation between the number of unicorn enterprises and the quality of financial ecological environment through factor analysis [22].

3. Research design

3.1 Company Profile

Beijing ByteDance Technology Co. Ltd., established in 2012, is one of the first technology companies to apply artificial intelligence to the mobile Internet field. Its independently developed "Toutiao" client, through massive information collection, in-depth data mining and user behavior analysis, intelligently recommends personalized information for users, thus creating a new mode of news reading. In the short video industry, Douyin was launched by ByteDance. With refined operation, precise brand image positioning and precise marketing, Douyin quickly gained huge traffic and became another extraordinary application in ByteDance.

3.2 Research Methods

In this study, the grounded theory method is used as exploratory research method, and ByteDance is selected as a sample of case study. Through interviews, literature research, web search and other channels, the substantive information about ByteDance is searched, and the information is integrated to form a database. The grounded theory Strauss three-stage coding method is applied to encode the information in detail, and the relevant concepts and categories of ByteDance business model are summarized, and finally a structural model about ByteDance business model is established.

3.3 Sample Selection

In the business model structure model of this study, ByteDance was selected as a typical sample in case selection, mainly based on the following considerations.

(1) in the current Internet market in China, ByteDance occupies a certain market share with many star products such as Toutiao and Douyin, and has grown into an enterprise comparable to the three Internet giants BaiDu, Alibaba and Tencent in a short time.

(2) ByteDance develops product lines in short video industry, consulting industry, social industry, education industry and other fields, and establishes a unique ecological layout of ByteDance based on algorithm technology.

(3) While selling in the domestic market, ByteDance actively participates in international deployments. Its overseas products cover a total of 75 languages and rank at the top of the App Store in more than 40 countries and regions.

Among the information apps and short video apps, the Byte App ranks the first in terms of usage time and monthly active number.

3.4 Data Collection

In order to improve the richness and effectiveness of the research data, this study collected data from various sources, including the official website of ByteDance, news reports related to companies in ByteDance, interviews with employees in ByteDance, research reports related to ByteDance, and so on.

At the beginning of data collection, relevant information of the company's official website was sorted out. On the basis of understanding the basic situation of ByteDance, academic literature, news reports, research reports, employee interviews and other contents related to ByteDance were studied and sorted out to enrich the original database.

Based on the analysis of the original database, the obtained first-hand secondary data is confirmed and supplemented, and finally the ByteDance database is formed, which is convenient for later coding.

4. Grounded analysis

4.1 Coding Strategy

In this study, Glaser and Strauss's three-paragraph coding technique was adopted. To ensure the reliability and effectiveness of coding analysis, the following strategies are adopted :

(1) Double-blind coding. In order to avoid the influence of personal prejudice and theoretical restrictions on the coding, the coding was carried out by two graduate students majoring in business management. The two members coded the data in the database in a double-blind way and completed the initial code. Subsequently, the two members tested the code together to ensure the objectivity of the code.

(2) Establish a memorandum. A form was established in Excel as a reminder to record the coded results and the revision process of each step.

(3) Reliability testing of coding. The two coders encode the database data separately, and then perform a reliability test: reliability = the amount of mutual agreement/ (the amount of mutual agreement + the amount of mutual disagreement). The reliability test also includes the internal consistency test of the coder. The coder encodes a part of the data first, then encodes the same data after a period of time, and calculates the internal consistency of the code. There is more consistency within a single coder than between two coders. The initial coding conditions of the two coders in this study are shown in Table 1.

Table 1. Initial coding situation statistics

Number of initial coded entries	Initial consistency of 2 people (%)	Degree of consensus after negotiation between 2 persons (%)	Number of code bars after negotiation
Coder A: 138 Coder B: 129	76.8	97.1	134

Form Source: Personal finishing

(4) Continuous comparison. In the research, general attributes are formed through sampling, and new attributes are used to refine and modify the theory continuously, until no new attributes appear, thus realizing the saturation of theory.

4.2 Open coding

Open coding is divided into three steps: labeling, conceptualization and categorization. In this study, the method of each code is adopted, content is marked sentence by sentence according to the data,

and the native code is used as much as possible to form 134 concepts. The concept classification of similar attributes and dimensions is analyzed, and the similar abstract concept are divided into one category. According to the sampling theory and the idea of constant comparison, concepts and categories are constantly modified and added in the coding process until 26 categories. Examples of open coding labeling and conceptualization are shown in Table 2. The categorization of open coding is shown in Table 3.

Table 2. Examples of open coding labeling and conceptualization

Label	Data record	Conceptualization	number
a1	Toutiao had 165 million active users in December 2018, second only to Tencent News' monthly active users.	User activity	n1
a2	ByteDance division is divided into technology department, user growth department and commercialization Department. ByteDance does not use a business division, but instead builds a middle platform based on user growth, technology, and commercialization, forming an "all in one" network.	Organizational structure	n2
a3	The algorithm platform group provides the most basic recommendation technology needed for every product line, and algorithms are the core of the rise of toutiao products. ByteDance established Artificial Intelligence Lab (AI Lab) in 2016, focusing on cutting-edge technology research in the field of artificial intelligence. The company has developed industry-leading face recognition and voice recognition technologies to achieve accurate delivery and push of content and to be used for artificial intelligence assisted review.	Technical ability	n3
a4	ByteDance built what is by far the country's top and largest growth hacking team during the development of Toutiao, responsible for developing growth strategies for all products across the platform.	The r&d team	n4
a5	The commercialization department is responsible for the realization of the company's app. Nearly 1/3 of the employees belong to the commercialization team.	Team ability	n5
a6	The assembly line organization and setting have contributed to the company's ability of mass production of APP.	Production capacity	n6
a7	When the company develops a subsector of the industry, it launches several products at the same time and changes them quickly. After technical optimization, it retains the best apps to collect resources.	Product strategy	n7
a8	In April 2018, Connotation Duanzi was permanently shut down, and the iterative product PiPixia began to go online.	Product change	n8
a9	In 2018, the total number of AI lab teams exceeded 100.	Team ability	n5
a10	In October 2018, the company was valued at about $75 billion.	Investment value	n9
a11	Led by SoftBank, Alibaba took its first stake in ByteDance with its Cloud Front fund.In March 2012, we obtained angel round investment from Investors including Morningside Capital, Shunwei Capital, Cao Yi, Liu Jun, etc.From July 2012 to December 2017, it obtained round A, Round B, round C, round D, round E and round strategic financing from investors such as SIG, Hainer Asia, DST, Sequoia Capital and CCB International.	Investors	n10
a12	In March 2012, we obtained angel round investment from Investors including Morningside Capital, Shunwei Capital, Cao Yi, Liu Jun, etc.From July 2012 to December 2017, it obtained round A, Round B, round C, round D, round E and round strategic financing from investors such as SIG, Hainer Asia, DST, Sequoia Capital and CCB International.In October 2018, the company completed a $4 billion PreIPO.	Financing ability	n11
a13	ByteDance has launched a variety of apps, including aggregated information, short videos, vertical information and content communities, which are known as "APP factories "in the industry.	Industry status	n12
a14	The total usage time of bytecode apps is higher than that of Baidu and second only to that of Tencent.	User loyalty	n13
a15	Toutiao is one of the first personalized information recommendation engines in China that combine artificial intelligence into mobile application scenarios.	Technical ability	n3
a16	Since its launch in August 2012, Toutiao has become a prominent information APP by	Develop	n14

	virtue of algorithm editing and intelligent distribution.	ment speed	
a17	In December 2018, Toutiao reached 165 million monthly active users, becoming a new gateway to Internet traffic.	The user scale	n15
a18	In the initial stage of Toutiao, for the purpose of user growth, it cooperated with huawei, Xiaomi and other mobile phone manufacturers for pre-loading.	Place strategy	n16
a19	After the initial stage, Toutiao's algorithm matured and began to focus on product functions and optimize user experience. Version iteration speed accelerated, and a large amount of new content began to be presented and distributed.	Product optimizat ion	n17
a20	After entering the growth period, Toutiao did not do a lot of operation activities to attract new users like other apps, but established the largest hacker team in China to increase user activity.	Operatio n mode	n18
a21	With the strategy of the growth team, the headline also started to make revenue and inserted push ads into the information stream. The advertising revenue increased rapidly and the profit model began to mature.	Advertisi ng revenue	n19
… …	……	(total 134 concepts)	

Note: due to the encoding process involves a large number of forms, in order to save space and explain the problem, so part of the process of interception, for example.

Table 3. Example of open coding categorization

Serial number	Categorized	The nature of the category	Nature of the dimension
A1	User (n33, n35, n92, n109, n112, n130)	Specific information about the user	User group, Target customer, Deep learning, User needs, User data, User special needs
A2	Organizational structure (n2, n96, n98)	Internal organizational structure of the enterprise	Organizational structure, Functional structure, Functional Division of labor
A3	Enterprise competence (n3, n5, n6, n11, n133)	Enterprise in the development of the capability advantage	Technical ability, Team ability, Production ability, Financing ability, Marketing ability
A4	Enterprise resources (n4, n45, n132)	Enterprises in the development of the resource advantages	R&d team, Quality content, Staff training
A5	Product (n7, n8, n17, n29, n34, n36, n39, n42, n54, n60, n63, n66, n91, n93, n94, n117, n118)	The specific situation of the product provided by the enterprise	Product strategy, Product replacement, Product optimization, Diversified layout, Product layout, Product development, Product matrix, Product features, Product positioning, Product design, Product mix, Core products, Precise positioning, Internal product competition, Internal product learning, Product pricing, Product content
A6	Corporate finance (n9, n10)	The capital input received by the enterprise	Investment value, Investor
A7	Operating earnings (n12, n14, n67)	The results achieved in the operation of an enterprise	Industry position, Development speed, Overseas market size
A8	User performance (n1, n13, n15, n32, n51, n100)	Performance achieved in terms of users in operation	User activity, User loyalty, User scale, User stickiness, User growth. User growth speed
A9	Marketing (n16, n38, n43, n48, n49, n50, n70, n71)	The measures taken by enterprises in marketing	Place strategy, Promotion strategy, Advertising strategy, Customer development, Brand marketing, Advertising promotion, Advertising marketing, Advertising model
A10	Operation mode (n18, n23, n25, n47, n52, n83, n89, n90, n111)	How is the business run	Operation mode, Application incubation, Operation strategy, Product operation, Operation planning, User attraction, Mode innovation, Mode innovation, Innovation path
A11	Operating income (n19, n20, n31, n69, n73)	Enterprise income	Advertising revenue, Realization way, Profit model, Operating revenue, Flow realization
……	……	……	(total 26 categories)

4.3 Spindle code

The concepts or categories in open coding are linked together to form a principal coding by applying the causal conditions-phenomenon-scenarios-mediating conditions-action-outcome paradigm. This paper studies the relations between concept and category, between category and category, and reifies the relations and boundaries of each category until the relations between concept and category and between category and category conform to the factual logic and do not conflict with each other. According to the motivation, phenomenon, situation, intermediary, action and result, each concept and category is distributed to each level of the model. Examples of spindle coding based on the canonical schema are shown in Table 4.

Table 4. Example of Spindle Encoding Based on Canonical Mode

Causal conditions	Development strategy (Diversification strategy, Ecological layout, Expansion of business, Development strategy, International strategy, Market expansion, Competitive strategy, Overseas strategy, Overseas development strategy, Research and development strategy), Leader (Decision-making ability), Prospects for development (Overseas market outlook, Domestic market prospect, Prospects for development, Industry development trend, Ecological pattern)
Phenomenon	Corporate mission (Company mission)
Scene	Enterprise competence (Technical capability, Team capability, Production capability, Financing capability, Marketing capability), Enterprise resources (R&d team, Quality content, Staff training), Corporate finance (Investment value, Investor), Development constraints (Copyright issues, Policy regulation, Copyright restrictions), Market(International market, Market segmentation, Market size, Industry ecology, Niche market), Background (Social background, Technical background, Technical opportunity), Development conditions (Financial support, Technological environment, Policy support, Development advantage, Competitive advantage, Technological innovation, Policy support), Competitors (Competitors, Core competitors, Competitive situation), Corporate culture (Corporate culture)
Intermediary	User(User group, Target customer, Deep learning, User needs, User data, User special needs), Organizational structure(Organizational structure, Functional structure, Functional division of labor), Product (Product strategy, Product replacement, Product optimization, Diversified layout, Product layout, Product development, Product matrix, Product features, Product positioning, Product design, Product mix, Core products, Precise positioning, Internal product competition, Internal product learning, Product pricing, Product content), Brand (Brand positioning, Corporate image)
Action	Marketing(Place strategy, Promotion strategy, Advertising strategy, Customer development, Brand marketing, Advertising promotion, Advertising marketing, Advertising model), Operation mode(Operation mode, Application incubation, Operation strategy, Product operation, Operation planning, User attraction, Mode innovation, Mode innovation, Innovation path), Partners(Cooperation methods, Cooperation objects, Cooperation benefits, Cooperation partners), Business investment(Investment layout, Content investment, Entertainment investment, Fund investment, Social community investment, Education investment, Heavy asset investment, Original investment, Medical fund), Operating cost(Supplier support, Operating costs, Copyright purchase)
Result	Operating earnings (Industry position, Development speed, Overseas market size), User performance(User activity, User loyalty, User scale, User stickiness, User growth, User growth speed), Operating income(Advertising revenue, Realization way, Profit model, Operating revenue, Flow realization), Social benefits(Social influence, Cultural inheritance, Educational platform, Content review, Content supervision, Social responsibility, Art promotion, Social value, Scientific and technological public welfare, Green development)

4.4 Selective coding and structural modeling

Selective coding is the scope of establishing the relationships between story lines and describing the related behaviors among phenomena. The basic idea of the selective coding stage is shown in Fig. 1.

By choosing the code, you can build a story line about the development of ByteDance: in the fierce competition in the Internet market, the leaders of ByteDance have discovered the development prospects of consulting, short films and other market segments. Under the leadership's decision, they made up their minds to form the initial action team. Based on the personalized recommendation

algorithm, the team developed Toutiao. Toutiao pushed personalized content according to the user's situation, which attracted the attention of investors and won multiple rounds of financing. After the expansion of scale, ByteDance continued to develop. At the same time, it applies its own unique algorithm advantages to many products, tests the applications to be listed with its own unique personnel structure, invests a lot of resources in the products with the most development value, promotes development, and creates a variety of star products such as Douyin, Wukong Q&A, and DongChedi. It uses the fast iteration structure of product matrix to launch explosive products one by one, which is called "Application Factory" in the industry. With ByteDance's organizational structure, team ability, product layout method, etc., supplemented by effective marketing means and operating mode, ByteDance has developed its own blue ocean field in the fierce competition. In the competition with BAT, the Chinese Internet giant, ByteDance gives full play to its own advantages and chooses to compete or cooperate. Under the core competition of traffic entry, it competes with Tencent in the number of users, duration of use, advertising revenue and other dimensions. Cooperating with e-commerceompanies such as Alibaba to achieve wiwin-winesults, ByteDance gets through live broadcasts and other channels, thereby improving the efficiency of realizing e-commerce traffic and reconstructing the industrial ecology of the whole Internet. Based on AI algorithms and product matrix models, ByteDance has achieved good business benefits. While the enterprise is developing well, ByteDance not only pursues economic benefits, but also pays attention to the company's social responsibility, and makes continuous use of the company's technological advantages to achieve higher social benefits in public welfare tracking, art dissemination and cultural inheritance. To a certain extent, ByteDance is gradually achieving its development goal, that is, stimulating creativity and enriching users' lives.
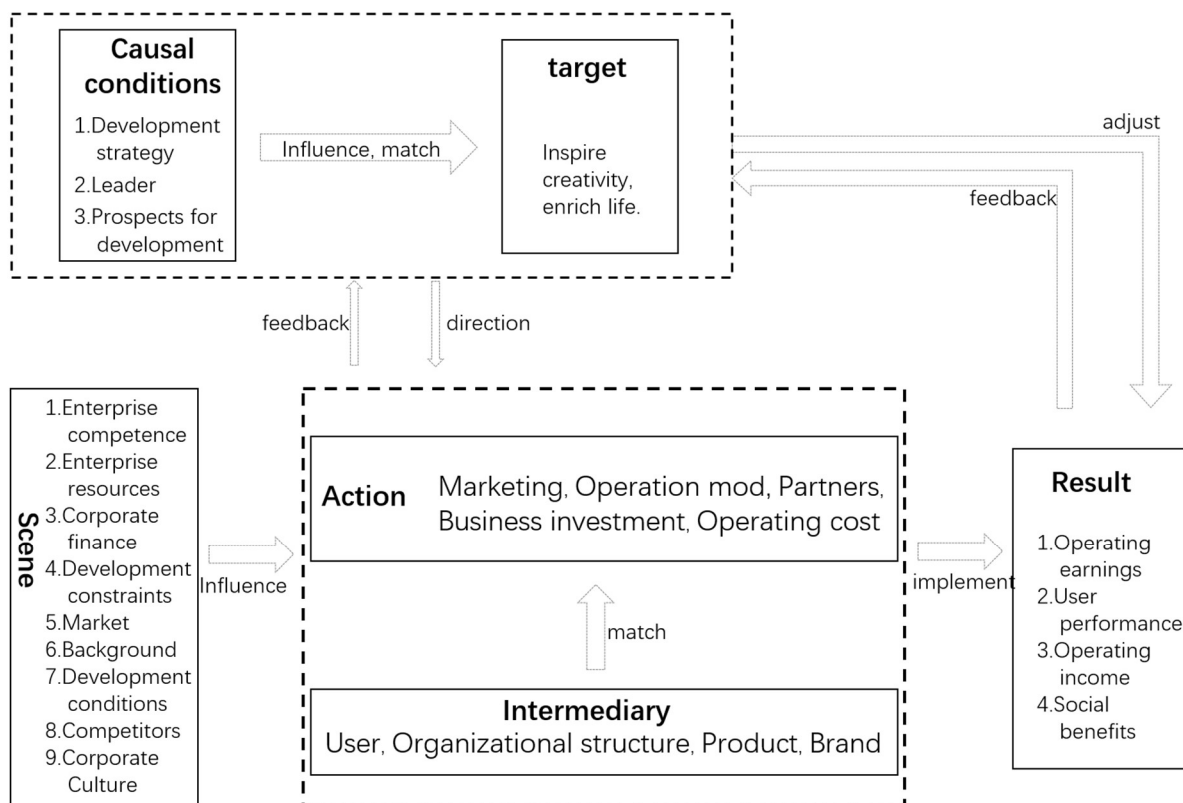

Fig. 1 Select the encoding diagram

A two-dimensional structure model of ByteDance's business model consists of six layers: motive layer, target layer, scene layer, base layer, action layer and result layer, 26 components including development strategy, leader and development prospect, and 134 attributes including diversification strategy, ecological layout and business development, as shown in Table 5.

Table 5. ByteDance business Model two-dimensional structure model

Level	Member	Attributes
Motive layer	Development strategy	**Diversification strategy**: Education, games, finance and other multi-directional layout; **Ecological layout**: Product linkage; **Expansion of business**; **Development strategy**: Clear product positioning, strong marketing; **International strategy**; **Market expansion**; **Competitive strategy**: Follow the leader in the industry in launching products, such as follow VIPKID in the children's education industry; **Overseas strategy**; **Overseas development strategy**: "Self-production + acquisition + investment" three ways to drive; **Research and development strategy**: Try and make mistakes in light measurement, and then make breakthroughs in key areas
	Leader	**Decision-making ability**: The first layout of foreign short video industry
	Prospects for development	**Overseas market outlook**: There are many opportunities in the overseas mobile Internet market, and many regions are still in the mobile Internet depression; **Domestic market prospect**: Growth slowed down, and dividends on the Internet in China basically peaked; **Prospects for development**; **Industry development trend**: New technologies, new products, new models and new forms of business; **Ecological pattern**: AI new ecological
Target layer	Corporate mission	**Company mission**: Inspire creativity, enrich life
Scene layer	Enterprise competence	**Technical capability**: AI technology,Algorithm technology; **Team capability**: Commercial team,growth hacking team; **Production capability**: Mass production of APP; **Financing capability**: PreIPO financing and so on; **Marketing capability**: Integrated multi-product marketing
	Enterprise resources	**R&d team**; **Quality content**: Encourage the creation of high-quality content and improve the original quality; **Staff training**: Provide targeted and differentiated training programs
	Corporate finance	Investment value; Investor
	Development constraints	**Copyright issues**; **Policy regulation**: The State Administration of Radio, Film and Television and the National Network Information Office closely supervise the content of the platform; **Copyright restrictions**
	Market	**International market**; **Market segmentation**: Differentiated positioning; **Market size**: Big, industry leader; **Industry ecology**: Cooperate or compete with BAT; **Niche market**: Make up the market gap
	Background	**Social background**: Time fragmentation,Content needs; **Technical background**: 4G + algorithm,Smart phone; **Technical opportunity**: 5G,AI
	Development conditions	**Financial support**: financing; **Technological environment**: 5G and AI will give rise to new intelligent terminals; **Policy support**: Domestic support for AI technology development; **Development advantage**: Perfect algorithm system, flexible product structure, large scale commercial team; **Competitive advantage**: Supported by the search system, ByteDance constructs an integrated information connection ecological loop of "algorithm recommendation (information seeking) + user search (information seeking)"; **Technological innovation**: Personalized information flow, AI technology innovation; **Policy support**: UNESCO recommends Lark to students around the world
	Competitors	**Competitors**: Baidu, Alibaba, Tencent, Douyu, Huya, etc; **Core competitors**: Traffic entry competition; **Competitive situation**: Office field, game field, social field, information field, etc
	Corporate culture	**Corporate culture**: Byte van (Aim for the Highest; Be Grounded& Courageous; Be Open & Humble; Be Candid & Clear; Always Day 1; Champion Diversity & Inclusion)
Base layer	User	**User group**: Youth, middle and old age; **Target customer**: Douyin (first-tier and second-tier urban youth), etc; **Deep learning**: With the collection of massive data such as clicks, data mining and behavioral analysis will be gradually deepened, each user's data package will be more and more rich, and new content recommendation and advertising push will be more accurate; **User needs**: Personalized, scene, intelligent; **User data**: User characteristics database, customized; **User special needs**: Accessibility version for visually impaired users
	Organizational structure	**Organizational structure**; **Functional structure**: The organizational structure matches the company's product matrix pattern; **Functional division of labor**
	Product	**Product strategy**: Release multiple products at the same time, rapid change; **Product replacement**: Connotation Duanzi was shut down, Pipixia was onlined; **Product optimization**; **Diversified layout**: Diversified layout of education, games and finance; **Product layout**: It covers comprehensive information, long and short video, vertical

	Brand	community and other Internet fields, and have different products in the same field; **Product development**; **Product matrix**: more; **Product features**: Clear positioning and incorporation of technical elements; **Product positioning**; **Product design**; **Product mix**; **Core products**: In the international market, ByteDance provides algorithm technology to provide a unified product experience for global users; **Precise positioning**; **Internal product competition**: Douyin, volcano video, Xigua Video started at the same time; **Internal product learning**: Learn from product error experience; **Product pricing**: Free reading of Changdunovel; **Product content**: A wide range of content is provided **Brand positioning**: Douyin: "Tide", "Cool" and "Fashion"; **Corporate image**: One of the largest unicorn companies in the world, Selected as "2019 Forbes China's Most Innovative Enterprise List"
Action layer	Marketing	**Place strategy**: At the beginning, cooperate with Xiaomi and Huawei to preload; **Promotion strategy**: Star forwarding, H5, brand advertising, offline activities, etc.; **Advertising strategy**: Online star settled in, combination with variety show and so on; **Customer development**: Community challenges, etc; **Brand marketing**; **Advertising promotion**: Sponsor programs, etc.; **Advertising marketing**: Recommend different contents according to different people; **Advertising model**: Open screen advertisement, information flow advertisement, open screen simulcast and video advertisement
	Operation mode	**Operation mode**: Improve user active and adopt product matrix measures; **Application incubation**: Use Toutiao to incubate new applications; **Operation strategy**; **Product operation**: Organize special events, etc; **Operation planning**; **User attraction**: Continuous content innovation; **Mode innovation**: 2020 Spring Festival,ByteDance buys the exclusive broadcasting right of "Lost in Russia" on the whole network; **Mode innovation**: Personalized information distribution; **Innovation path**: Build an algorithm platform with bytes, gather traffic and data with big data and AI, and use product matrix to iterate and explode products
	Partners	**Cooperation methods**: The media settled in,sell the goods online; **Cooperation objects**: Cooperate with Alibaba for e-commerce and so on; **Cooperation benefits**; **Cooperation partners**: Joint cultural institutions launched a nationwide reading plan
	Business investment	Investment layout; Content investment; Entertainment investment; Fund investment; Social community investment; Education investment; Heavy asset investment; Original investment; Medical fund
	Operating cost	Supplier support; Operating costs; Copyright purchase
Result layer	Operating earnings	Industry position: App factory,Third in the industry; Development speed; Overseas market size
	User performance	User activity; User loyalty; User scale; User stickiness; User growth; User growth speed
	Operating income	Advertising revenue; Realization way; Profit model; Operating revenue; Flow realization
	Social benefits	**Social influence**; **Cultural inheritance**: Intangible Cultural Heritage Partner Program,Excavate the culture and value of intangible cultural heritage; **Educational platform**: During the pneumonia epidemic in COVID-19, build a high-quality education resource platform to ensure that school students attend classes; **Content review**: Technical assistance+manual review; **Content supervision**: Anti-vulgarity "spirit dog"; **Social responsibility**; **Art promotion**: The whole people appreciate and contact art; **Social value**; **Scientific and technological public welfare**: Use science and technology to accurately find the help objects of non-profit organizations; **Green development**

5. Model discussion

5.1 "Algorithm + product" is the core of its business model

In the development of ByteDance business model, algorithm mining learning is the core of ByteDance's unique model. In the fierce competition in the Internet market, relying on the frontier development concept of artificial intelligence applied to the mobile Internet scene, ByteDance took the lead in launching the personalized recommendation information application "Toutiao". In operation, "Toutiao" can accurately identify the content that users are interested in and push it, thus achieving good user performance. With the support of effective algorithm technology, ByteDance

started the layout and promotion of other products, deep data mining and user behavior analysis by using algorithm technology, which is particularly typical in the layout of the short video industry. In the layout of the short video industry in ByteDance, vibrato is an algorithm technology based on deep mining and learning, and the content is accurately pushed, which has achieved great success. From the user's point of view, algorithm technology, that is, when the user stays in a video page for a long time or has a little praise behavior, according to the byte algorithm recommendation technology, the user will brush the content similar to the previous video type in the next video, and everything can be completed in a few seconds.

With the help of big data and artificial intelligence, ByteDance provides personalized service for users, builds the underlying platform of complex algorithms with bytes as the basic quantitative unit, collects traffic and data through the way of "algorithm content", and obtains more objective user performance in the core competition of the Internet market-traffic entry competition, which makes ByteDance occupy a place in the Internet competition. In this way, the operation and development mode with technology as the core has become the key to the success of ByteDance's business model.

5.2 Product matrix is the guarantee of enterprise value realization

Based on algorithm technology, ByteDance has collected a large amount of traffic and data from Toutiao, Douyin and other star products, forming a certain user group. On the basis of making full use of these transportation, ByteDance draws lessons from the success or failure experiences of existing domestic products, sums up the successful experiences, avoids the risk of failure, and constructs the product manufacturing operation mode of product matrix, which becomes the guarantee for ByteDance to realize its value. In the short video industry, ByteDance has further subdivided the short video market and differentiated the products. In the field of short video, it concurrently opened Toutiao video (mainly P6C short video content), volcano video (located in the youth of the third and fourth line towns), Douyin short video (focusing on the music and music short video community of young people) and many other product layouts, Douyin stood out and became another phenomenon app in ByteDance. In this successful mode, multiple products are laid out in the same field at the same time to form a product matrix, and then rapid iteration promotes the emergence of star products. The success model is used in ByteDance 's other product lines. Multiple products are laid out at the same time to form a product matrix, and then quickly iterated to promote the appearance of star products, quickly gather traffic, and then promote the realization of traffic, which is the guarantee of realizing ByteDance's value.

5.3 User demand is the external driving force for its development and innovation

Whether it is the national star products such as Toutiao and Douyin, or the products that focus on a certain field such as DongChedi and PiPixia, the recipients of platform information content have their needs. Meeting the needs of users become the external driving force for the development and innovation of ByteDance platform. As far as content is concerned, on the one hand, users have higher and higher requirements for the quality of content provided by the platform, and expect the platform to provide high-quality content for reading and receiving. On the other hand, users will also require the width of content provided by the platform, which will not be limited to a certain aspect of content, but hope that the platform can provide a wider range of content for users to choose from. In terms of products, users want to keep pace with the times, have updating functions of APPs, and have a better experience. On this basis, as the platform operator, the company needs to constantly optimize the platform products, innovate the content, or innovate the platform content, or innovate the marketing means, etc., so as to encourage the platform content providers to improve the content quality. In a word, enterprises need to constantly optimize existing products or launch new generation products to meet the needs of users, which makes the needs of users become an external driving force for the development and innovation of enterprises.

5.4 Leading technology is the internal driving force for its development and innovation

The arrival of the 5G era and the maturity of AI technology will give birth to the rise of new intelligent terminals, which will make the changes in the social field and the emergence of new life patterns.

Under such a social development trend, as an Internet enterprises, whoever has mastered the new technologies can be able to occupy the highland of future development. Therefore, if they can gain technical advantage before the development of the industry, they can gain technical dividends and seize the market in the future development of the Internet market. As early as 2016, in order to redefine the way human beings connect and share information through AI technology, ByteDance established its own AI laboratory, focusing on the development of innovative technologies serving the content platform of ByteDance. ByteDance believes that the application of new technologies in AI research will affect every part of its products and enhance the ways of creating, processing, distributing and finally consuming different types of information content. A large amount of data and its application scenarios on the company platform help ByteDance improve the existing models and develop new applications to improve the user experience. The virtuous circle of the application of AI technology will also make the company dare to explore more machine intelligence in unknown fields, and gain more considerable profits. Therefore, in ByteDance's business model, in the future development plan, the technology-leading has become the direct driving force affecting the company's development and innovation.

5.5 External constraint is an urgent problem for its business development

In the current development of ByteDance, copyright and content supervision are major issues that need to be resolved. As a platform for content creation and operation, ByteDance needs the consent and permission of the original author when reprinting and transmitting content. If the copyright is not obtained, the use of relevant knowledge will cause infringement problems, and then lead to legal disputes. From another point of view, in order to ensure a good network environment, the state needs to supervise the bad contents such as bad information, pornographic short messages, abusive words, etc. As the operator of Toutiao, Douyin and other knowledge platforms, to reduce the impact of external constraints on the operations of enterprise, ByteDance needs to ensure that there is no copyright dispute in the content published by its platform, and verify and supervise the content published by users. ByteDance actively invested in copyright, and invested in the establishment of a content review center and constructed an anti-vulgarity applet "Lingquan". However, because the platform involves a lot of content, AI identification needs to be further improved. At the same time, identifying young users to push healthy and positive content is also an issue that the platform needs to pay attention to. Therefore, ByteDance still has some shortcomings in solving the external constraints, which need to be constantly improved to ensure the normal operation of the business.

6. Conclusion

This research is a case study based on grounded theory. Based on ByteDance, a typical platform-based unicorn enterprise in China, and using Strauss's three-layer coding technology, a two-dimensional business model of ByteDance is established. The two-dimensional business model obtained in this study is the first complete summary of the business model structure of ByteDance. The model consists of six layers: motive layer, target layer, scene layer, base layer, action layer and result layer. There is a clear causal relationship among all the layers of the model, which can effectively explain the business model of ByteDance. "Algorithm+product" as the unique development advantage in ByteDance, runs through the model in the development of enterprises. As the core idea of this model, "Algorithm+product" links all aspects of the model and promotes the realization of ByteDance value.

Therefore, according to the business model structure model, ByteDance should give full play to its advantages, overcome its disadvantages, make better use of its technological advantages and product matrix, improve existing products and new products on the market, and reduce the impact of external constraints on the development of the platform by purchasing copyright and strengthening supervision. For other newly-established platform enterprises, it is necessary to find the core competitiveness of their own development, take the core competitiveness as the center. Then, newly-established platform enterprises should build their own business model closely contact with

environmental changes, etc. and evaluate, improve or innovate the business model according to the development status.

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