

# *The Reconstruction of Artificial Intelligence on the Fit of Business Model in E-Commerce Industry*

## *—Case Study of Alibaba*

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**Abstract:** Artificial intelligence has reconstructed the business model of the e-commerce industry and brought about fundamental changes in the industry ecology. However, few studies have comprehensively and clearly exposed the mechanism and impact of this change. In this paper, we decompose the existing business model elements and integrate artificial intelligence with the deconstructed business model elements based on the scenario of a changed e-commerce platform business model. Through the case study of Alibaba, the largest e-commerce platform in China, we constructed the module division of "people", "goods and services," and "scene" for the e-commerce industry based on the business model canvas, and summarized the mechanism of artificial intelligence to reconstruct the business model of e-commerce industry. This paper reveals the mechanism of digital technology transforming the fit of business model in e-commerce industry, and provides theoretical and practical guidance for e-commerce enterprises to make full use of digital technology to achieve business model innovation.

**Keywords:** artificial intelligence, digital technology, the fit of business model, Alibaba, people-goods matching

## 1. Introduction

In modern society, artificial intelligence has a disruptive impact on the production methods and organizational forms of enterprises, and also fundamentally changes the matching of business models [1]. Some studies have been conducted to explore how AI can reconfigure business models, focusing on the following three categories: first, the commercialization of AI in specific industries. For example, some scholars have explored the business models of AI-driven healthcare start-ups based on two dimensions: value creation and value capture [2]; second, the key factors of AI commercialization success. For example, a study of nearly 7,000 digital transformation companies involved in AI technologies around the world summarized the "DIGITAL model" of critical success factors for AI commercialization [3]; third, the impact of AI on business operations and decision making. For example, studies have found that AI can help reduce the complexity of procedures or problem structures when faced with business decision problems that are characterized by high uncertainty and ambiguity. For example, studies have found that AI can help reduce the complexity

of procedures or problem structures when faced with business decision problems that are characterized by high uncertainty and ambiguity [4].

In summary, the existing research on AI commercialization has the following two shortcomings: first, in terms of research content, the existing literature mostly focuses on the impact of AI on enterprise performance, which is relatively macro and one-sided and lacks a systematic analytical framework; second, in terms of research methodology, the existing literature lacks a modular deconstruction of business models based on their constituent elements, so as to explore the impact of AI on the modular deconstruction of the fit of business model. E-commerce is a mode of retailing, and retailing is the "scene" that connects "people" and "goods and services", and the "field" refers to the matching of people and goods. In this paper, we use the grounded theory to explore the inner mechanism of artificial intelligence for the reconstruction of the fit of business model, taking the specific application of artificial intelligence in retail e-commerce personalized recommendation as the object.

## **2. Methodology**

### **2.1. Research Methodology-Grounded Theory**

Grounded theory aims to derive theories by systematically collecting and analyzing data, and then to realize the cognitive process of "from phenomenon to essence". The main steps include conceptualization and categorization, primary and secondary category mining, and core category and network relationship structure construction. In this paper, we follow the grounded theory and abstract from the data to outline the reconfiguration of AI for the fit of business model.

### **2.2. Research Data**

Alibaba, as a typical representative of the development of China's Internet industry, has gained widespread attention and research, providing sufficient material for the study in this paper. Alibaba case materials are derived from the following nine sources: first, transcripts of public interviews with founders and executives (e.g., Jack Ma's interview with China's CCTV in 2017, etc., coded as A); second, collated drafts of high-level external speeches (e.g., Ma's speech at the 20th anniversary of Alibaba's founding in 2019, coded as B); third, the disclosure information of listed companies (such as prospectus, annual insurance, quarterly reports, various announcements, etc., coded as C); fourth, all kinds of official authoritative information (such as official website, WeChat public number, all kinds of information announced by official YouTube account, and official ESG report, coded as D); fifth, the author's and assistant team's personal consumption experience (such as shopping experience and feeling on Taobao, coded as E) (e.g. the experience and feeling of shopping on Taobao, coded as E); sixth, literature (including various research literature on Alibaba, coded as F); seventh, research reports (e.g. brokerage research reports downloaded from Bloomberg, Wind and other financial databases, coded as G); eighth, books (e.g., "Alibaba Management Three Axes" by Wang Jianhe, a former employee of Alibaba, coded as H); ninth, various media (e.g., reports on Alibaba by The Wall Street Journal, The Economist, etc., coded as I). The authors and their assistant team conducted "triangulation" to improve the reliability and validity of the case studies. Based on the information collected, the author of this paper finally established a case file database, which laid the foundation for coding analysis.

### **2.3. Research Design**

Based on the mature business model canvas, this paper classifies the nine business model elements of value proposition, customer segmentation, distribution channel, customer relationship, revenue

source, core resources, key business, key partners, and cost structure into three categories: people, goods and service, and scene [5]. Among them, customer segmentation, value proposition and customer relationship focus on the description of users and can be classified into the module of "people"; distribution channel, cost structure and revenue source focus on the description of products and can be classified into the module of "goods and service"; key partners, core resources and key business focus on the description of matching Core resources and key businesses focus on the description of matching relationships and value networks, and can be classified as "scene". The "people," "goods and service," and "scene" constitute the theoretical dimensions of this paper's case study, and all case studies are coded around this dimension.

In concrete terms, we use structured data analysis methods, refer to procedural case grounded theory, and follow the principle of moving from the "voice of the person (data)" to the "voice of the researcher (theoretical constructs)" [6], coding and refining the case data to form a theoretical interpretation. In the process, to ensure the accuracy of data analysis, for all the data collected by the authors, we took the following approach: firstly, two research assistants conducted a double-blind landing until no new concepts appeared in the data, and a total of 25 initial categories of first-level concepts were obtained; secondly, these 25 initial categories were categorized, and those that responded to the same conceptual dimension were merged, thus 18 second-order themes were refined; finally, the second-order themes are analyzed around the core research questions, and the aggregated concepts of 9 genera are finally formed. For the class ambiguities and other issues that emerged from the over-coding, the two research assistants jointly checked the original data, supplemented and searched, and then finally formed a consensus after several discussions and consultation with external experts. The data structure we finally arrived at for the case coding is shown in Table 1. The logical relationships are described in detail below.

Table 1: Data structure of the case code.

<b>First-order concepts</b>	<b>Second-order themes</b>	<b>Aggregation on concepts</b>	<b>Theoretical dimension</b>
Implementing users' suggestions for the improvement of platform products and services	User Participation	User Centricity	people
Meet the specific needs of different customer groups with outstanding price-to-performance ratio	User requirements		
Depict user characteristics based on core indicators such as gender, age, education, regional distribution, city distribution, etc.	User Characteristics	User Portrait	
Summary of users' consumption preferences based on their previous purchase choices	Consumer Preference		
Make consumers enjoy the services provided by the company and provide emotional value to them	Emotional Interaction	User Interactivity	
Mapping the social and interpersonal networks among users to help service delivery	Social Relationships		

Table 1: (continued)

<b>First-order concepts</b>	<b>Second-order themes</b>	<b>Aggregation concepts</b>	<b>Theoretical dimension</b>
Market and consumer segmentation to bring specific product and service categories	Category Segmentation	High quality products	goods and service
Different kinds of products and services connect different scenarios of consumers' daily life	Connected Living		
Accurate recommendations based on user-level factors such as consumer needs, characteristics, and preferences	Based on user recommendations	Product Customization	
Accurate recommendations based on specific scenarios such as the consumer's location and habits	Scene based recommendations		
Provide incidental products or services on top of the basic product and service offerings	Ancillary Services	Product Experiencing	
Consumer-driven, based on consumer expectations and actual needs, to bring consumers surprises beyond expectations	Expectation-driven		
The same product is suitable for a large number of different consumers as well as meet their needs	The same commodity for thousands of people	People looking for goods	scene
Enhance the richness and diversity of product categories to attract consumers	Diversified product range		
Provide heterogeneous products according to different consumer needs to enhance consumer satisfaction and enrich choice diversity	Thousands of commodities for the same person	Goods Matching People	
People who have the same preference for the same type of product gather together to form a certain consumer group	Various consumer groups		
Provide different products for different time and space, different characteristics of consumers, in order to enhance the pleasant experience and emotional experience of consumers	Thousands of commodities for thousands of people	Dynamic matching of people and goods	
High quality matching between products and consumers in a low cost, efficient and accurate way	Excellent matching efficiency		

### 3. Results Analysis

#### 3.1. The Reconstruction of "People" by Artificial Intelligence

"People" are the users, which is a general term for the concept of customer and consumer. Artificial intelligence is the most important part of "people", which is the precise portrayal of users' characteristics, and deep learning models are used to analyze users' demographics, social networks, website browsing behaviors, etc., to derive the results of user preference analysis and accurate product information delivery. In this paper, through code analysis and an inductive study of the Alibaba case, we found that AI helps an e-commerce platform realize user centrality, portrait and interaction, and its logical relationship is shown in Figure 1.

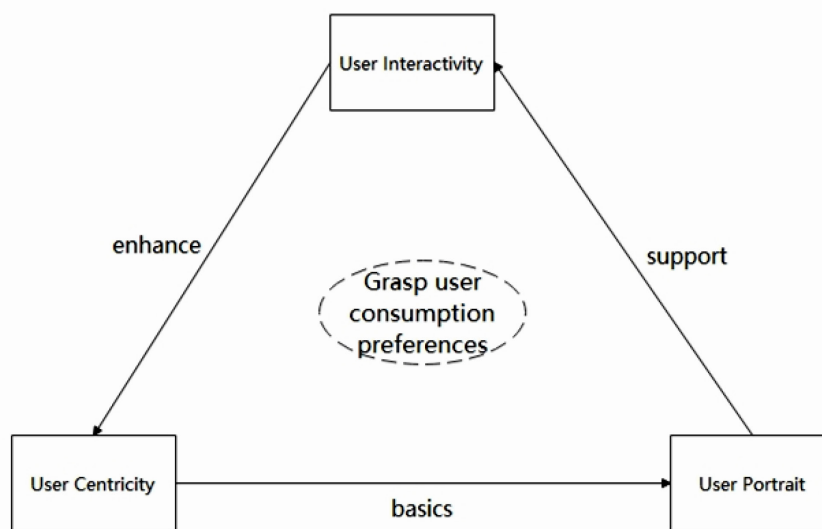


Figure 1: How e-commerce platform reconstructs "people".

##### 3.1.1. User Centrality.

The operation of the e-commerce platform itself is consumer-centric and oriented to serve consumers. Consumers are active participants and even decision makers in the operation of e-commerce platforms, as the platforms set personalized product recommendations based on consumer preferences, and business activities revolve around user needs and user experience. Alibaba's corporate culture values are known as the "Six-Pulse Holy Sword", a unique technique in Chinese martial arts novels. In the latest version of the "Six-Pulse Holy Sword", Alibaba emphasizes "customers first, employees second, and shareholders third" (D/AAA). Alibaba's corporate culture dictates that the company places a high value on its users. For example, Alibaba has launched several "10 billion subsidies" campaigns to reduce the prices of products that are widely popular among consumers (D/BBB). Alibaba's current chairman and CEO, Zhang Yong, has also repeatedly declared that "creating value for customers is the meaning of Alibaba's existence" (B/AAA). On September 10 every year, Alibaba's annual "Customer Day" is a day when Alibaba holds various customer co-creation activities, where management and employees share customer service cases and implement user suggestions for product and service improvement to enhance user engagement (A/AAA). With the support of leading technologies such as "AliCloud", Alibaba is able to provide rich services to customers at lower cost and more efficiently.

### 3.1.2. User Portrait.

Alibaba is an Internet giant with a very wide range of businesses. In addition to its core business of e-commerce, its business covers search, maps, music, lifestyle services, travel, and more (I/AAA). Alibaba's broad business scope gives it the ability to collect massive amounts of data about all kinds of users. At the same time, Alibaba's technological and research strengths are also remarkable. Alibaba's "DAMO Academy" is a leader in the field of financial technology, data computing and other artificial intelligence (G/AAA). According to a research report released by Gartner, AliCloud's IaaS infrastructure capacity had become the world's top in 2021, with the highest scores in computing, storage, network and security, representing the world's most advanced cloud computing (G/BBB).

With the support of massive data and strong technical strength, Alibaba is able to accurately grasp the core characteristics of users based on core indicators such as gender, age, education, and regional distribution. Alibaba's analysis of users' traits and behavioral habits enables it to accurately grasp customers' consumption preferences and finally complete the accurate construction of user portraits.

### 3.1.3. User Interaction.

Alibaba emphasizes the realization of interaction between enterprises and consumers, and between consumers and consumers, which makes consumers become value co-creators (F/AAA). Companies wanting to enhance consumer stickiness in the competitive e-commerce industry need to build user communities to enable user interaction. For example, the Taobao platform not only provides users with shopping services, but also supports users to post personal videos and personal photos and push them to other customers who are interested in them. Many large merchants on Taobao have their own fan groups, where customers can communicate with each other and stores tend to actively interact with each other (I/BBB). Today's popular livestream shopping gives users a more direct way to interact with each other. Through the merchant's live stream, each user can achieve real-time communication with the merchant or other users. It is worth noting that, no matter what the means, as long as the consumer has an experience that exceeds expectations, the consumer is willing to spontaneously help the platform and the company to spread word-of-mouth, further reflecting the social attributes of the shopping platform (F/BBB). Through quality service, consumers like to shop on the platform, thus generating emotional value. Alibaba uses the large amount of data it collects to portray the social and interpersonal networks among users, which further helps to deliver services and products accurately and realize user interaction at the same time.

H1: Artificial intelligence reconstructs "people" through centrality, portraiture and interaction, centrality is the basis of portraiture, portraiture is the support of interaction, and interaction further enhances centrality, and finally grasps users' consumption preferences.

## 3.2. The Reconstruction of "Goods and Service" by Artificial Intelligence

"Goods and service" means products, which is a general term for goods and services. The reconstruction of artificial intelligence for goods and service focuses on enriching product attributes, and calculating a large amount of data, such as basic descriptions, usage scenarios and customer evaluations of products through deep learning and other technologies to obtain key information such as product adaptability. In this paper, through coding analysis and inductive research of Alibaba case, we found that artificial intelligence makes the product high quality and customizable and enhances the customer experience, and its logical relationship is shown in Figure 2.

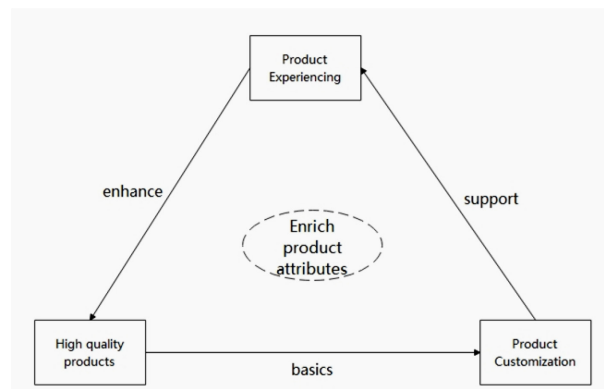


Figure 2: How e-commerce platform reconstructs "goods and service".

### 3.2.1. High-quality products.

Alibaba is the largest e-commerce platform in China with the widest range of products offered (D/AAA). With \$131.2 million in fiscal year 2022, Alibaba Group serves more than 1.3 billion active consumers worldwide (C/AAA). As it continues to grow in size, Alibaba has also increased its selection and oversight of products sold on its platform to continually improve product quality. For example, Alibaba has built on its existing Taobao platform to create a separate platform called Tmall, which aims to integrate brands and manufacturers to provide a one-stop solution between merchants and consumers, offering 100% quality-assured products and a hassle-free return policy (D/AAA). In addition, Taobao and Tmall regularly publish lists of selected products based on their popularity and user reviews to help consumers select higher-quality products. Alibaba's leading technology in artificial intelligence can help the platform better process a large amount of user reviews, product feedback, and other information to better segment the market and consumer groups, bring specific product and service categories, and connect different kinds of products and services to different daily life scenarios of consumers, while appropriately raising the entry threshold of merchants and products and gradually improving the overall quality level of products.

It is worth noting that high-quality product does not equate to high prices. Alibaba's efforts to improve product quality are more about strengthening platform scrutiny, combating counterfeit goods and enriching product categories, rather than denying access to low-priced products. In fact, to better serve the "sinking market", Alibaba launched Taobao Special Edition in 2020, a platform that offers low-priced products focused on lower-income or more frugal customers. In FY2022, Taobao Special Edition will have more than 300 million active consumers per year (C/BBB).

### 3.2.2. Product Customization.

Alibaba's accurate product recommendations often exceed users' expectations and even "know what they like better than the customers themselves" (E/AAA). Alibaba determines what customers like based on two main factors: "user profile" and "scenario characteristics". The "user profile" includes the demographic characteristics of consumers, past consumption habits and other factors, while the "scene characteristics" includes external environmental factors, such as seasons, festivals, regions and so on. By integrating and analyzing these factors, the platform can accurately deliver products based on the user's own characteristics and the user's scenario, and realize product customization.

### 3.2.3. Product Experiencing.

China's e-commerce industry is characterized by a large number of platforms and fierce competition. Even in today's highly mature industry, China's e-commerce market is not completely dominated by



one company. "Alibaba", "JD", "Pinduoduo," "Tiktok E-commerce," "Vipshop," and so on are now in China's mainstream e-commerce platform, because each has different advantages, it is difficult to annex each other. For example, the advantage of "Alibaba" is the richness of the products, the advantage of "JD" is the perfect logistics system and high-quality goods, and the advantage of "Pinduoduo" is the low price. The advantage of "Tiktok E-commerce" lies in its deep integration of e-commerce and "live streaming", a popular industry nowadays, and relying on the huge scale of Tik Tok users to obtain customers (I/BBB). To cope with the fierce competition, e-commerce platforms need to improve not only the quality and quantity of products, but also the service to attract users (A/AAA). Alibaba sometimes provides free "logistics insurance" for users who purchase products to provide protection for possible subsequent returns or exchanges. Based on AI analysis based on a large sample, Alibaba believes that the overall cost in this area is manageable and lower than the resulting benefits in terms of user satisfaction (G/CCC). The platform will also infer the expectations and actual needs of consumers for other products based on their latest purchase behavior, and make accurate and relevant product push to bring consumers surprises beyond their expectations. For example, when we buy coffee beans on the platform, the platform will then recommend coffee machines and other products to us (E/BBB). By providing services and surprises beyond consumers' expectations, "Alibaba" has done a good job of "experiencing" the products.

H2: Artificial intelligence reconstructs "goods" through high quality, customization and experience. High quality is the basis of customization, customization is the support of experience, and experience further enhances high quality, which eventually enriches product attributes.

### **3.3. The Reconstruction of "Scene" by Artificial Intelligence**

The "scene" is the matching of people and goods, which is not only the space-time of consumption, but also the sum of scenarios and their configuration relationships within the space-time of consumption. The purpose of artificial intelligence to reconstruct the "scene" is to realize the precise matching of consumer expectations and product attributes in multiple scenarios, so that the traditional e-commerce supply-side dominance is shifted to the elastic matching of supply-side and demand-side. This relies on personalized recommendation algorithms and input information at the user and product levels, and the matching results are also used as input information for the feedback loop and iterative optimization of the in-depth learning model. In this process, "recommended shopping" replaces "search shopping", and the change of artificial intelligence on "people" and "goods" finally reshapes "scene", and realizes the combination of "diversified product range" and "various consumer groups" in the matching method. In the matching level, it achieved "thousands of commodities for the same person" and "the same commodity for thousands of people", and finally completed the "thousands of commodities for thousands of people" and high matching efficiency, and achieved the innovation of business model.

#### **3.3.1. People looking for goods.**

The core logic of early e-commerce is "people looking for goods", which refers to "goods and service" as the center, users search for products through the search box, and merchants try to enrich the number and variety of products to meet the needs of consumers. The essence of this form of e-commerce is "search engine e-commerce", the main body is the search, the user needs to browse to search for satisfactory products (H/AAA). In traditional e-commerce, according to the logic that the same product is suitable for a large number of different consumers and can be used by many consumers, the platform strives to display a large number of products to a large number of users, aiming to increase the number of products and users at the same time to promote value creation, but the degree of homogeneity of products is high, which can be summarized as "the same commodity for thousands



of people". The diversification and enrichment of product categories can be summarized as "diversified product range", which will attract more users to search and purchase to a certain extent, aiming to achieve value creation through traffic after the scale of users. The traditional e-commerce model is not accurate enough to grasp the personalized preferences of consumers, and browsing a large number of unsatisfactory products will also waste users' time and reduce their goodwill and recognition of the e-commerce platform (H/BBB). Therefore, with the development of artificial intelligence, e-commerce platforms are now paying more and more attention to the precise matching of products based on user characteristics and scene features to achieve "goods matching people". Nevertheless, "people looking for goods" still accounts for more than half of consumers' purchasing behavior (G/DDD). A wide variety and quantity of products is also one of the prerequisites to achieve "goods matching people".

### **3.3.2. Goods Matching People.**

The direction of "goods matching people" is a strong development of today's e-commerce platform, which means replacing the traditional search scene with a matching scene, and personalizing the product recommendation to the users. On the Alibaba shopping platform, the search box does not occupy a prominent position, but is more reserved for personalized product recommendations. These recommendations are often based on big data and deep learning models to understand the scenario-based needs of each user, which can significantly improve the user's shopping experience (I/DDD). In this way, Alibaba is able to provide heterogeneous products to different consumers, enhance consumers' perception and experience of the products, and achieve "thousands of commodities for the same person", which means the same consumer can be accurately pushed to products that meet their current needs in different contexts. In addition, thanks to the platform's e-commerce properties and user interaction, people with the same preference for a certain type of product gather together to form a certain consumer group. For example, Alibaba's "Taobao" and "Idlefish" shopping platforms have a "circle" formed by users spontaneously. The users in the same circle will share and recommend a specific type of product with each other. For example, members of the "perfume circle" will exchange and recommend different perfumes to each other, and members of the "camera circle" will recommend different models of cameras to each other (D/CCC). Different "circles" meet consumers' preferences for certain types of products, so that quality products can be better approached by consumers and "various consumer groups".

### **3.3.3. Dynamic matching of people and goods.**

Thanks to the underlying technology support provided by artificial intelligence, "people looking for goods" and "goods matching people" can be deeply integrated. "The same commodity for thousands of people" makes the same product applicable to a large number of different consumers and can be used by many consumers, and the "thousands of commodities for the same person" allows the platform to provide heterogeneous products according to different consumers and improve consumers' perception and experience of the product. The combination of the two can achieve "thousands of commodities for thousands of people", which means consumers can obtain a large number of product choices through active search, and also enjoy the platform's accurate recommendation of heterogeneous products. The former is applicable when consumers have clear consumption goals, aiming to provide consumers with as much choice as possible; the latter aims to explore the potential needs of consumers. In addition, "diversified product range" allows the platform to enhance the richness and diversity of product categories to attract users, and "various consumer groups" allows people with the same preference for a certain type of product to gather together to form a certain consumer group, ultimately achieving low-cost, efficient and accurate The final result

is a low-cost, efficient and precise matching between products and consumers, which improves the efficiency of matching between products and consumers. The effects of "thousands of commodities for thousands of people" are achieved and the matching efficiency are greatly improved, which finally allows the platform to realize the dynamic matching of people and goods and meet the needs of users accurately, efficiently and comprehensively.

H3: Based on the reconstruction of "people" and "goods and service" by artificial intelligence, "scene" highlights the accurate matching of user characteristics and product attributes in diversified scenes, which makes the matching of "people" and "goods and service" realizes both "diversified product range" and "various consumer groups", and finally greatly improves matching efficiency. At the same time, the matching level of "people" and "goods and service" can realize "the same commodity for thousands of people" and "thousands of commodities for the same person" at the same time, which makes "thousands of commodities for thousands of people" possible. The overall improvement of the matching method and level of matching makes the business model of the e-commerce platform undergo an essential innovation.

### 3.4. Theoretical Model

Based on the specific application scenario of artificial intelligence in personalized recommendation of e-commerce platform, this paper makes a detailed interpretation of business model matching and its reconfiguration mechanism through the modular structure based on the perspective of human-goods matching, and finally constructs a theoretical model as shown in Figure 3. The theoretical model mainly reports two layers of meaning. First, in the technical way, AI takes big data as raw material and grasps users' consumption preferences through a deep learning model based on the synergy of centrality, portrait and interaction of "people". AI also enriches product attributes based on customization, high quality and experiential co-reconstruction of "goods and service". AI is also based on the "scene" in the matching method and matching level of change to achieve accurate matching of users and products. Second, to achieve the mechanism, artificial intelligence reconstructs the fit of business models as the "scene" realizes the deep integration of "diversified product range" and "various consumer groups", while the matching level of "scene" realizes "the same commodity for thousands of people" and "thousands of commodities for the same person", which finally achieves "thousands of commodities for thousands of people" and excellent matching efficiency to complete the business model innovation.

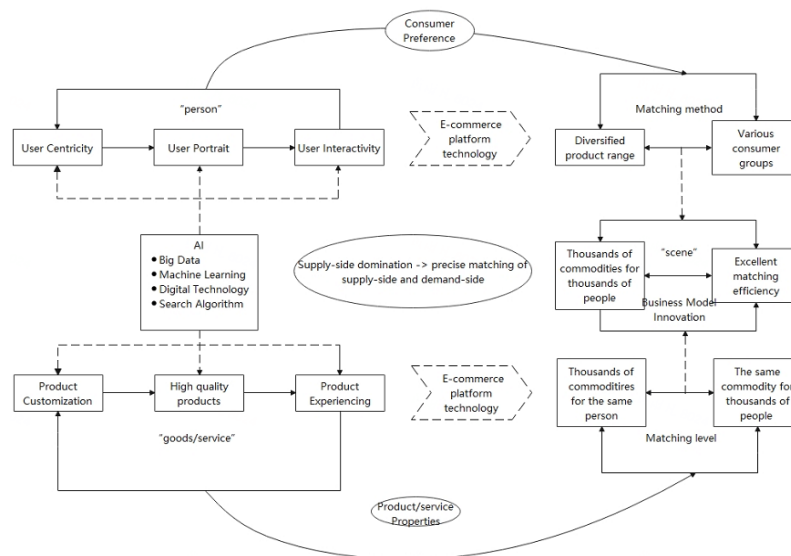


Figure 3: Theoretical model.

## 4. Conclusion

In the era of intelligent business, "people" carves out users' consumption preferences and is reconstructed by AI through centrality, portraiture and interaction. Centrality is the basis of portraiture, while portraiture is the support of interaction, and interaction further strengthens centrality. "Goods and service" enriches product attributes and is reconstructed by AI through high quality, customization and interaction. High quality is the basis of customization, and customization enhances experience, while experience enhances high quality. Based on the reconstruction of "people" and "goods and service" by artificial intelligence, "scene" highlights the precise matching of users' consumption preferences and product attributes in diversified scenes, so that the matching method of people and products achieves the combination of "diversified product range" and "various consumer groups", and the matching level achieves the combination of "the same commodity for thousands of people" and "thousands of commodities for the same person", which finally helps to realize the substantial improvement of "thousands of commodities for thousands of people" and excellent matching efficiency, and achieve the innovation of business model.

This paper is only based on the specific application scenario of personalized recommendation for retail and e-commerce, but other application scenarios can also be explored about the influence of AI in the future. This paper only explores from the perspective of people-goods matching, but the driving factors of matching are not only technical factors, but also other pre-factors (such as enterprise strategy, market environment, organizational structure, etc.). Future studies can further explore these factors. Finally, value creation is the core issue in the field of business model research. This paper focuses on the mechanism of AI reconstruction of the fit of business model. Although value creation is mentioned sporadically, it is not considered as a key factor in the constructed business model module. In the future, researchers can further explore the impact of artificial intelligence on value creation.

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