Development Mode Study of Jingdezhen Ceramic Vertical E-commerce Based on Cloud Computing

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Abstract. As a new application service mode, cloud computing has become the focus of the integration between Internet and the traditional industries. It is infiltrating into e-commerce gradually and changing the development mode of e-commerce. This paper analyses the development status and the problems of the Jingdezhen ceramics e-commerce simply, expounds the characteristics of cloud computing and the advantages of vertical e-commerce and the influence of cloud computing on the development mode of Jingdezhen ceramic e-commerce. On the basis, this paper tries to study the development mode of Jingdezhen ceramic vertical e-commerce based on cloud computing. And the overall architecture of Jingdezhen ceramic vertical e-commerce platform based on cloud computing is given in order to promote the further development of Jingdezhen ceramic e-commerce.

1. Introduction
Jingdezhen of Jiangxi province is the world-famous porcelain capital, its kiln fire is not going out for thousands of years. But the new business modes and emerging technologies, such as e-commerce, cloud computing, etc., has made an impact on the development of Jingdezhen ceramic industry. This paper attempts to analyze the impact of cloud computing on the development mode of Jingdezhen ceramic e-commerce and study the development mode of Jingdezhen ceramic vertical e-commerce based on cloud computing through analyzing the current situation and problems of Jingdezhen ceramic e-commerce, the characteristics of cloud computing and the advantages of vertical e-commerce.

2. Current Situation and Problems of Jingdezhen Ceramic E-commerce

2.1. Current Situation of Jingdezhen Ceramic E-commerce
The ceramic industry is the traditional advantageous industry of Jingdezhen. The beginning of ceramic e-commerce in Jingdezhen can be traced back to 2008. Individual businesses of Sanhe Village in Jingdezhen began to carry out e-commerce business in 2008. Jingdezhen ceramic enterprises began to carry out e-commerce business around 2011. According to the evaluation system of Ali Research Institute, Jingdezhen ranked No.79 on the list of China's "Top 100 E-commerce Cities" in 2014. Jingdezhen had about 3800 ceramic e-commerce practitioners on Taobao and about 700 ceramic e-commerce practitioners on Alibaba in 2014[1]. The e-commerce transaction volume of Jingdezhen was about 15 billion Yuan in 2015. Sanhe Village of Jingdezhen was listed on the domestic "Taobao village" list released by Ali Research Institute, and Jingdezhen ranked No.76 on the list of China's "Top 100 E-commerce Cities" in 2016. There were 87 e-commerce platforms in Jingdezhen, most of which sold ceramic products in 2017. There were more than 9800 enterprises or individual businesses
engaged in ceramic e-commerce in Jingdezhen, and most of them had actual trading orders on the major e-commerce platforms in 2018. The total output value of Jingdezhen ceramic industry had exceeded 29 billion Yuan, of which the transaction volume of ceramic e-commerce had exceeded 10 billion Yuan in 2019[2]. The construction task of "Exploring the Construction of Ceramic Vertical E-commerce Platform and Creating Ceramic E-commerce Cluster Area & Incubation Base" was proposed clearly in the opinions of “Implementation Plan of Jingdezhen National Ceramic Culture Inheritance and Innovation Experimental Zone” promulgated by the CPC Jiangxi Provincial Committee and Provincial Government in 2020, which pointed out the direction for the further development of Jingdezhen ceramic e-commerce.

2.2. Problems of Jingdezhen Ceramic E-commerce
At present, Jingdezhen ceramic e-commerce has a good development momentum. However, it has gradually exposed some problems, which are mainly reflected in the following three aspects.

2.2.1. Poor overall business efficiency of ceramic e-commerce. The transaction volume of ceramic e-commerce of Jingdezhen had exceeded 5 billion Yuan in 2015, but the overall business efficiency of ceramic e-commerce was not good. Taking Taobao and Tmall for example, there were only 50 stores were profit-making among the 3000 Taobao stores and 280 Tmall stores selling ceramic products of Jingdezhen in 2015, and only 10 e-commerce enterprises had an annual transaction volume of more than 10 million Yuan[3]. With the development of e-commerce, the competition will be crueler; the stores on e-commerce platforms who actually make profits will be more concentrated; and even 90% of the profits will be earned by 10% of the stores. The transaction volume of Jingdezhen ceramic e-commerce in 2019 had exceeded 10 billion Yuan according to incomplete statistics; it was double that of 2015. But the number of ceramic e-commerce practitioners was also increased by nearly three times in 2019 compared with 2015. Taking Sanhe Village in Jingdezhen for example, there were about 2000 stores selling ceramic products through various online e-commerce platforms; but only more than 20 stores had an annual transaction volume of more than 10 million Yuan in 2019; the proportion of stores which can make profits was low[4]. It can be seen that the overall business efficiency of Jingdezhen Ceramic e-commerce is not good enough.

2.2.2. Lack of leading ceramic e-commerce enterprises and well-known ceramic e-commerce platforms. Jingdezhen ceramic e-commerce started late relatively. The real establishment of unified long-term planning and the important position of ceramic e-commerce are accompanying with the opinions of “Implementation Plan of Jingdezhen National Ceramic Culture Inheritance and Innovation Experimental Zone” promulgated by the CPC Jiangxi Provincial Committee and Provincial Government in 2020. Jingdezhen Ceramic e-commerce enterprises are generally in the situation of "self-development, independent business, small and scattered", which fails to form a good market aggregation effect. The lack of leading ceramic e-commerce enterprises restricts the development of Jingdezhen ceramic e-commerce [5]. Most of Jingdezhen's ceramic e-commerce sellers just move their products to the third-party e-commerce platform for sales directly; a few of them have built their own websites for their own use, but due to various reasons, the operation effect was not good and transformed into a publicity website finally; there are also some e-commerce platform, such as Jingdezhen ceramic network, porcelain mall, porcelain auction network , big vase net and so on, but due to various factors, no well-known ceramic e-commerce platforms had emerged. The lack of leading ceramic e-commerce enterprises and well-known ceramic e-commerce platforms is still one of the urgent problems to be solved in developing Jingdezhen ceramic e-commerce.

2.2.3. Low additional value of Jingdezhen ceramic products. According to “the analysis report on the development and supervision of online transactions in Jiangxi (2018)” issued by Jiangxi Market Supervision and Administration Bureau, the total amount of online commodity transactions in the whole province was more than 130 billion Yuan in 2018. Jingdezhen ceramics, Gannan navel orange, etc. were hot online products. According to the report, products with online transaction price of Jingdezhen ceramics below 30 Yuan account for 44.91%; products with a price of 30-100 Yuan
account for 21.22%; products with a price of 100-300 Yuan account for 17.04%; and those with a price higher than 800 Yuan account for 16.83%. It is not difficult to find that the proportion of ceramic products within 100 Yuan is as high as 66.13%, which shows that the additional value of Jingdezhen ceramic products was low and it can be improved greatly.

3. Characteristics of Cloud Computing

Cloud computing has become a mainstream Internet application mode since 2006. Its advantages are reflected in its strong ability to analyze and process data, and its successful application in fields such as intellectual property protection, e-commerce and other fields. The three main service modes of cloud computing are Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). Cloud computing provides payment services to enterprises on demand through a huge virtual resource pool. It is popular in many fields of life due to its efficient, convenient and low-cost services, as well as abstraction and instant deployment and delivery [6].

Cloud computing is the extension and fusion of parallel computing, distributed computing and grid computing, as well as the comprehensive result of service-oriented architecture, virtualization and utility computing [7]. Cloud computing is a new form of distributed computing, it is mainly divided into three steps based on the Internet: split the data information program to be processed and submit it to the server cluster with a large number of servers; the servers perform computation and analysis; the processing results are returned to the user. Cloud computing can be billed according to actual usage, and users can extract useful information easily from configurable resource pools such as storage and application software, thus reducing intermediate links and improving resource availability [8].

4. Advantages of Vertical E-commerce

Vertical e-commerce refers to the development mode of e-commerce with in-depth operation in a certain industry or market segment, which has three main advantages. Firstly, it can integrate suppliers, sellers and consumers deeply, which are conducive to dig into industry resources and provide high-quality and inexpensive products and services to end consumers. Secondly, vertical e-commerce pursues product differentiation and vertical e-commerce entity can occupy most of the market of a certain industry by striving for 20% of its customer according to the 80-20 law. Finally, vertical e-commerce platforms deal with similar products generally, which is conducive to the platform's use of big data and other technologies for analysis, standardization of services, highlighting the in-depth mining and analysis functions that are difficult to be achieved by other comprehensive platforms, improving user experience effectively, and facilitating users' choice and purchase [9].

5. Impact of Cloud Computing on the Development Mode of Jingdezhen Ceramic E-commerce

5.1. Development Mode of Jingdezhen Ceramic E-commerce

At present, Jingdezhen ceramic e-commerce is the coexistence of various development modes. There are traditional B2B, B2C and C2C development models with the help of third-party e-commerce platforms such as Alibaba, Tmall, Taobao, Paipai and Jingdong; There are also some businesses through wechat business, micro store, Yayao crowd-funding, Taobao live, Douin live and other relatively new development mode; At the same time, some businesses set up the enterprise static website to promote the development mode of transactions through the way of search engine; In addition, some businesses build their own independent ceramic e-commerce website or set up their own development mode through outsourcing; Finally, some enterprises develop their e-commerce business through third-party e-commerce platforms set up by relevant departments, universities or enterprises in Jingdezhen. In short, the development mode of Jingdezhen ceramic e-commerce coexists in various forms, some of which have the shadow of cloud computing application.

5.2. Impact of Cloud Computing on Jingdezhen Ceramic E-commerce Development Mode

As one of the mainstream technologies, cloud computing has a far-reaching impact on the development mode of e-commerce. Cloud computing enables various application systems to obtain storage space or various application software services on demand by distributing computing tasks to a
resource pool composed of a large number of servers[10]. The impact of cloud computing on Jingdezhen ceramic e-commerce development mode is mainly reflected in three aspects to promote the innovation and reform of ceramic e-commerce development mode.

The first impact is the transformation of resource organization mode. The resource utilization rate of traditional e-commerce enterprises is generally low and the configuration is not reasonable. Cloud computing can organize all kinds of resources quickly through resource sharing and distributed storage, and transfer all kinds of hardware and software resources to the cloud. Users can rent infrastructure, platforms and applications on demand, which improves the resource utilization rate.

The second impact is the service application pattern transformation. Cloud computing has a far-reaching impact on data analysis and business decisions of enterprises. It provides a basis for enterprises to make business decisions through in-depth analysis and mining of user service demands. Cloud computing provides a sharing and collaboration platform for all the players in the supply chain outside the enterprise, which improves the sharing and collaboration efficiency of resources and services greatly. For users, the instant delivery of cloud computing services enables the services provided by enterprises to be presented to users in a more personalized and intelligent manner.

The third impact is changing of technology implementation pattern. Traditional e-commerce platforms are built by means of independent research and development, outsourcing or purchase with high cost. Cloud computing enables enterprises to rent IT infrastructure, platforms, etc. on demand, build platform meets the actual needs of enterprises with both extensibility and compatibility, and achieve seamless connection and collaborative operation with other information platforms [11].

The development of cloud computing has brought new opportunities and challenges for Jingdezhen ceramic e-commerce. According to the characteristics of cloud computing and users' analysis of the changing trend of ceramic products, it is found that many advantages of cloud computing can meet the new development and change requirements to a certain extent. Combining the advantages of vertical e-commerce and the development trend of vertical e-commerce in recent years, as well as the unique and rich related resources of the whole industrial chain of Jingdezhen ceramic e-commerce industry, this paper proposes to build a development mode of vertical ceramics e-commerce based on cloud computing.

6. Jingdezhen Ceramic Vertical E-commerce Platform based on Cloud Computing
This paper proposes to build Jingdezhen Ceramic vertical e-commerce platform based on Cloud Computing through the analysis of the characteristics of cloud computing and the advantages of vertical e-commerce, combined with the development status and problems of Jingdezhen Ceramic e-commerce, the current situation of Jingdezhen Ceramic e-commerce development mode, especially the need of building Jingdezhen national ceramic culture inheritance and Innovation Experimental Zone. The overall architecture of Jingdezhen Ceramic vertical e-commerce platform based on cloud computing is shown in Figure 1.

6.1. Network Infrastructure Layer
This layer mainly provides the necessary infrastructure as a service (IaaS) for e-commerce activities, including virtualization/cloud, network, storage and hardware, etc. Ceramic e-commerce entities can operate each module easily and control service costs effectively through scalable cloud computing environment according to their own actual needs.

6.2. Platform as a Service Layer
With the further development of cloud computing and the need of high security and high flexibility, combined with the need of platform, capability and high development, considering the scalability and compatibility of Jingdezhen Ceramic Vertical E-commerce Platform based on cloud computing, the PaaS layer of Jingdezhen Ceramic Vertical E-commerce Platform based on cloud computing is subdivided into Integrated Platform as a Service Layer (I-PaaS, Integrated Platform as a Service) and Application Platform as a Service Layer (A-PaaS, Application Platform as a Service) [12].
Figure 1. The overall architecture of Jingdezhen ceramic vertical e-commerce platform based on cloud computing

6.2.1. Integrated Platform as a Service layer (I-PaaS). This layer mainly includes technical common components and data storage layer. The former mainly includes cache service, message service, file service, log service, search service, distributed service, static page acceleration, load balancing service, data collection and exchange, etc. The latter mainly includes relational database, document database, report and analysis database, etc.

6.2.2. Application Platform as a Service layer (A-PaaS). This layer mainly includes user centers (account information, shop management, etc.), product centers (product classification, product management, etc.), product customization centers (general customization, advanced customization, etc.), order centers (regular orders, customization orders, etc.), marketing operations (promotions, discounts, data analysis, etc.) and monitoring configuration (monitoring management, configuration management, etc.). At the same time, A-PaaS layer can provide shop decoration, product upload, virtual product display, intellectual property protection, image retrieval, product customization design and other services according to the development needs.

6.3. Application Layer
This layer mainly includes logistics system, ceramic e-commerce service (SaaS, Software as a Service) and payment system. Ceramic e-commerce entities can conduct e-commerce activities through the application layer. The applications of this layer are the form of on-demand billing. Ceramic e-commerce entities use the service provided by the platform to provide services for ceramic consumers.
according to their own reality and user needs, and form the unique Ceramic Vertical E-commerce Cloud Platform through the integration with logistics system and payment system, etc.

6.4. Interaction Layer
This layer provides various interactive services for different users of Jingdezhen ceramic vertical e-commerce platform based on cloud computing through multiple terminals such as PC Web, IOS, Android, etc.

7. Conclusions
In this paper, we analyze the current situation of Jingdezhen Ceramic e-commerce, expound the problems of the ceramic e-commerce and propose the Jingdezhen ceramic vertical e-commerce development mode based on cloud computing combined with the characteristics of cloud computing and the advantages of vertical e-commerce and the impact of cloud computing on the development mode of Jingdezhen ceramic e-commerce. Finally, the overall architecture of Jingdezhen Ceramic vertical e-commerce platform based on cloud computing is given.

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