Research on the E-commerce Operation Performance of SMEs based on Cloud Computing Service Platform

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Abstract
Cloud computing as a new network technology is gradually penetrated into all aspects of e-commerce, it provides a new way for the construction of e-commerce service platform. In this paper, the author analyzes the e-commerce marketing and enterprise performance based on cloud service platform. The construction of e-commerce service platform provides enterprises with a more diverse service channels and more flexible service mode, which can help enterprises to improve service efficiency and user experience. At the same time, enterprise marketing mode has changed under the background of e-commerce; the most significant is the network interactive marketing. By analyzing the impact of e-commerce on marketing, the author constructs the performance evaluation system of e-commerce, and find out the main factors influencing the e-business enterprise performance.

Keywords: E-commerce marketing, Enterprise performance, Cloud platform, Factor analysis

1. INTRODUCTION

With the wide application of Internet and the improvement of network transaction mode, e-commerce has penetrated into people's daily life, and promoted the rapid development of social economy. E-commerce service quality has been the most concerned issue of e-commerce enterpises and users, which directly affects the operation efficiency and user experience of e-commerce. However, due to the lack of effective service model and advanced information technology, the current situation of e-commerce services in China is not ideal, which hinders the rapid development of e-commerce industry. The cloud computing technology, provides the computing ability of cooperative resource distributed storage, flexible and efficient data analysis method for electronic commerce enterprises, from the resource organization and service application and technical support in many aspects to promote the reform and innovation of e-commerce service model. Cloud computing technology has brought the new opportunity to the electronic commerce industry, to promote e-commerce services intelligent, personalized, collaborative innovation and development of transformation, is the traditional service concept and application mode. Relying on the core technology of cloud computing, cloud services to build e-commerce platform for the user needs, can help the electronic commerce enterprise to improve service performance, deepen the user experience, adapt to changes in the information service mode of the dynamic evolution of the network environment, and promote the rapid development of electronic commerce industry.

Electronic commerce is the inevitable outcome of the development of human economy, science and technology, culture, e-commerce is not limited by time and space, to a large extent changed the traditional marketing patterns and formats. E-commerce for enterprises, improve work efficiency, reduce costs, expand the market, to bring social and economic benefits. Compared with the traditional e-commerce business, it will give consumers to meet, in many small and medium enterprises in the supply chain business opportunities, at the same time will be balanced, the risk is still outweigh the costs, this is the electronic commerce of the emergence and development of inexhaustible power and inevitable trend. The positive effect of e-commerce on small and medium enterprises is obvious, and the influence of marketing has been recognized by many traditional enterprises. The construction of information of traditional enterprises, and actively explore the market, not only to understand the development trend of the world economy, change the traditional marketing idea, to actively explore the objective law of electronic commerce, has developed for the psychological needs of consumers personalized, differentiated products into network marketing management, strengthen knowledge management and customer management, logistics management, strengthening to cultivate the talent of electronic commerce, but also to fully understand the risks brought by e-commerce in the new market environment, improve the level of marketing management. However, traditional enterprise e-commerce activities is not easy, to develop the electronic commerce itself is a system engineering, must be gradual, so the traditional enterprise needs to solve an important problem: focus on some business activities, enterprises follow from easy to difficult, gradually reduce the proportion of e-commerce to improve the traditional business proportion. In short, the risk of understanding the change of global economic environment, the importance of e-commerce, respect the objective laws to develop the electronic commerce and avoid electronic commerce, have very
important theoretical and practical significance for the enterprise marketing and business development strategy.

2. E-COMMERCE SERVICE PLATFORM BASED ON CLOUD COMPUTING

2.1. Cloud service platform

Under the cloud computing environment, the transformation of e-commerce service model, promote the improvement and optimization of e-commerce service platform. This paper from the electronic commerce service operation mechanism of cloud computing will be the key technology in the electronic commerce and the service sectors were integrated, construct an abstraction of the underlying infrastructure, e-commerce cloud services platform based on elastic expansion. The platform consists of four parts: the interactive layer, the application layer, the platform layer and the network infrastructure layer.

- Network infrastructure layer: Network infrastructure layer is the carrier of e-commerce service platform. It provides the virtual host, operating system and related hardware facilities for the enterprise in the form of service. The implementation of network infrastructure is usually based on Linux tools and Web technology to reduce the complexity of system installation and maintenance. At the same time, using REST and simple object access protocol and other standard interfaces, the system operator can quickly access to the corresponding storage services. Enterprises can operate on the basis of the platform through the flexible cloud network interface to operate the various instances of the platform (Instance), on-demand pay, effectively saving the cost of corporate services.

- Platform layer: The platform layer mainly includes three parts: one is the e-commerce service resource storage platform; the other is the resource scheduling platform; the three is the service function platform. Based on the high reliability and economy, the resource distribution and storage platform is deployed, combined and utilized by the loosely coupled coarse-grained resource application components through the network. The resource scheduling platform uses virtualization technology to realize the unified deployment and integrated management of the system's service resources, and reduce the system redundancy. Service platform is the core part of the service system, to provide a unified service interface for users, automatic deployment of the service functions, billing, authentication, registration, communication and content distribution services integration platform, improve the operation efficiency of the parallel task.

![Cloud service platform](image_url)

**Figure 1.** Cloud service platform

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Service application layer: Application layer is the window of e-commerce enterprises to carry out various services. The cloud service provider to measure the form of services to provide various services for enterprise applications, such as customer relationship management software, project management software, ERP system, network advertisement management system, display system, products and services. According to the conditions of enterprise customer service demand and its service function, service form and customization in their service platform using the software module of the cloud service provider, flexible service organization. At the same time, it is necessary to realize the seamless connection with the original logistics system and payment system of the enterprise, and form an integrated e-commerce service application system.

Service interaction layer: The interaction layer is the direct communication between the electronic commerce enterprise and the user directly affects the user experience. For enterprises, it is necessary to achieve effective interaction with individual users, but also to achieve good interaction with business partners. Therefore, need to use instant communication and information sharing methods, improve services and transactions in the process of real-time response speed and efficiency of collaboration, mining and forecast of customer service needs and preferences, to provide personalized information service for users of diversification. In addition, according to the enterprise strategy adjustment and demand change, the service function expansion, to achieve the sustainable operation of the service platform.

2.2. Operation mechanism of e-commerce cloud service platform

The construction of e-commerce service platform based on cloud computing technology provides a more diversified service channel and a more flexible service mode for e-commerce enterprises. The effective operation of the service platform needs to rely on the scientific and reasonable operation mechanism, to achieve efficient operation from the service resources, service subjects, service interaction model and security. Cloud computing is the further development of distributed computing and grid computing. For cloud service providers, its core technology is how to dynamically allocate and manage the user's service resources. The distribution of resources of cloud storage system consists of the following modules.
Figure 3. Web3.0 cloud computing platform

Based on resource access interface to provide diversified resource access channels to Web Services for business users; service directory provides service for the user can access the resource list; system management module is responsible for the management and distribution of all available resources, to ensure the system load balancing configuration tool; responsible for the distribution of node configuration task environment; running state monitoring and statistics module is responsible for monitoring nodes, and complete the statistics using node users. Each module works as follows: enterprise users through the resource access interface is selected from the service directory and call a service resource, then the request is passed to the system management module, the system will allocate the appropriate resources for the user, and then call the configuration tool for users to build service platform running environment.

In the cloud server, the data are stored in a clustered server with multiple backups and fixed size formats, and are distributed in different nodes, and all the data blocks are stored in the form of files in the Linux environment. System administrators use some management software and configuration tools to manage these resources, improve the efficiency of resource development and utilization. The storage resource distribution mechanism based on e-commerce enterprises can be stored in a plurality of cyber source distribution server, once the network transaction peak, the server can dynamically allocate resources, not because of a server paralysis caused by the shopping website. While in the low demand for resources, can provide external performance calculation and server rental services.

The collaborative operation of e-commerce service subject, is to market and customer demand, to the quality of service as the core, in order to improve the competitiveness of enterprises, customer satisfaction and maximize profits as the goal, through the cloud computing technology, collaborative technology and management technology of organic integration, effective planning and control of the entire supply chain. Information flow, logistics, capital flow, service flow, and promote the collaborative operation between suppliers and manufacturers, e-commerce enterprises, network service providers, cloud service providers. Synchronization technology, cloud computing in cooperative control technology, application sharing technology for collaborative operation of e-commerce service subject provides infrastructure and strong technical support, provides a collaborative platform with timing and integrated work environment and services for the construction of service alliance. Specifically, under the cloud computing environment, the main body of e-commerce service collaboration includes the following three aspects.
1) Based on the Web method: Web provides an effective way for remote cooperation between service providers, which can help enterprises to break the constraints of space and geography, and integrate and integrate resources across the system through the cloud service platform. E-commerce enterprise and its partners can simplify the Web interface and open API connection cloud service platform, with strategic cooperation as the goal, to provide services to provide users with integrated service support.

2) Process collaboration as the dominant: The service main body carries on the coordinated management through the process, realizes the service flow effective operation. Collaborative process is flexible, the main service can be within the purview of their responsible aspects of flexible operation, at the same time, to develop efficient and feasible service decision by reference in the process of up and down links, comprehensive coverage of knowledge management, financial management, supply chain management and customer relationship management at all levels, forming a comprehensive network service system coordination.

3) User centric: Cloud computing environment, the user centered thinking to be more fully reflected. Cloud services simplify the interaction interface between businesses and users, optimizing the interactive model. Consumers do not need to open a variety of complex service window can be one-stop access to information services. At the same time, service providers can also establish a good linkage between the cloud service platform, through a unified interface to provide users with service resources, effectively improve the user experience.

2. E-COMMERCE MARKETING

3.1. Electronic Commerce

E-commerce refers to the realization of the entire trade activities of the electronic. From the coverage area can be defined as the parties to electronic transactions rather than through face-to-face interviews or direct way to exchange any form of commercial transactions; from the technical aspects can be defined as: e-commerce is a combination of multiple technologies, including the exchange of data (such as electronic data interchange, e-mail), data (e.g. sharing data, electronic bulletin board) and automatic data capture (such as barcode). In the broad sense, e-commerce is a modern business method. This method can improve the quality of products and services, improve service delivery speed, meet the needs of government organizations, manufacturers and consumers at low cost.
With the development of electronic commerce, public network information makes the market competition more fair, industry boundaries will become more and more fuzzy, large enterprises not only face the competition of small and medium-sized enterprises peer, peer enterprises are also faced with other enterprises in the competition, therefore, how to adapt to the tide and take corresponding strategies to create competitive advantage, has is a major challenge facing business. E-commerce provides a huge market potential and new sales mode for the enterprise, the enterprise production is primarily for the information network, then the network products and customer interaction. Under the impact of the network, if the enterprises do not have the sense of innovation, not timely update products and services it is difficult to survive in the Internet era.

- **Commercial character:** E-commerce is the most basic characteristics of the business, that is to provide trading services, means and opportunities. Online shopping provides a convenient way for customers. As a result, e-commerce is an opportunity for any enterprise of any size. Business, e-commerce can expand the market, increase the number of customers; through the Internet information to the database, the enterprise can record every visit, sales, purchase forms and dynamic purchases and customer preference, what is that enterprise can through these statistics to know customers want to buy the most products.

- **Service nature:** In the e-commerce environment, the customer is no longer subject to geographical constraints, nor is it only focused on the lowest price, therefore, the quality of service in a sense the key to business activities. Technological innovation brings new results, Internet applications enable companies to automatically deal with the business process, and no longer as before to emphasize the division of labor within the company. Now many companies on the Internet can provide a complete service for customers, and the Internet in this service as a catalyst to improve the role of. The enterprise through the customer service process to the Internet, so that customers can in a simple manner than in the past to get past them more trouble in service. It is obvious that the customer service provided by E-commerce has an obvious characteristic.

- **Integration:** E-commerce is a new product, which uses a lot of new technology, but it does not mean that the emergence of new technologies must lead to the death of the old equipment. The real value of the Internet is to coordinate the old and new technology, so that users can more effectively use their existing resources and technology, more effective to complete their tasks. The integration of electronic commerce, but also in transaction integrity and uniformity, it can regulate business workflow, manual and electronic information processing integrated into an inseparable whole, can not only raise the exploitation of manpower and material resources, but also improve the tightness of the system is running.

- **Coordination:** Business activity is a coordinated process, it needs employees and customers, production coordinator, suppliers and business partners. In order to improve the efficiency, many organizations provide interactive protocols, which can be carried out on the basis of these agreements. Traditional e-commerce solutions can strengthen the company's internal interaction, e-mail is one of. But that is only a small part of the coordination of employee cooperation. The use of the Internet will be connected to the management system, and then connect to the customer order processing, and processed by a delivery channels, such companies save time and eliminate the paper the trouble and improve efficiency.
3.2. The influence of e-commerce on enterprise marketing

Technological progress plays a key role in the process of modern economic growth and economic development. According to the research of economics, modern economic growth has experienced a series of long cycle, each cycle lasts about 50 years, the beginning is always accompanied by the diffusion of major technological progress and production, distribution, organization, system and other aspects of innovation activities. In fact, information technology, biotechnology, materials technology, energy technology and space technology have begun to vigorously promote the development of social economy, and shows great potential. At this stage, the impact of information technology is the most extensive, the strongest penetration. All the research results show that the new business model based on information technology is making a profound change in the business environment, which has a huge impact on business operations. In fact, the electronic commerce is to bring great changes in Global trade, the global e-commerce transaction volume has exceeded 1 trillion USD, and the future of more than 70% of total global trade through e-commerce to complete. It is not difficult to understand why more than 95% of the world's top 500 enterprises to join the ranks of e-commerce. E-commerce has the advantages of globalization, convenience, low cost, high efficiency, strong selectivity and so on.

![Figure 6. Global e-commerce transaction volume](image)

In the traditional market conditions, according to the characteristics and implementation of enterprise marketing is the marketing strategy of 4P, the upcoming Product, Price, Place, Promotion as four variables as the four factors of enterprise marketing strategy. In the electronic commerce, the theory is not suitable for the new market conditions and consumer demand. The involvement of e-commerce, the evolution of the traditional market, from a higher level to a more effective way to establish a new relationship between the enterprise and the customer is different from the traditional initiative. 4Rs theory came into being: related, reaction, relation, repay. Compared with the previous marketing theory, 4Rs marketing theory has advantages: 4Rs marketing theory is characterized by the most competitive oriented, in a new level on the marketing of a new framework. According to the 4Rs market continues to mature and increasingly fierce competition situation, focusing on the enterprise and customer interaction and win-win, not only actively adapt to the needs of customers, and actively create demand, and to optimize the use of system theory to integrated marketing, through the association, relationship, response form and customers formed a unique relationship between the enterprises and customer together, create competitive advantage. It can be said that 4Rs is the innovation and development of marketing theory in the new century.

4. EMPIRICAL ANALYSIS

4.1. Model design

Some activity performance is the company's ongoing or completed certain activities. Enterprise e-commerce performance evaluation is the basis for the unified evaluation criteria, in accordance with certain procedures, through a set of quantitative and qualitative indicators, to develop e-commerce enterprises in all aspects (including the survival ability and development ability as well as learning and innovation ability etc.) for scientific evaluation, can reflect the status quo of enterprise e-commerce. Overall, the enterprise performance evaluation index has gone from a single financial index to include
comprehensive index, non-financial indicators of the single index to the development process of multidimensional index.

Factor analysis is the study of the correlation matrix of the internal dependency relation, its basic idea is based on the grouping variable correlation between the size of the same group of variables have high correlation with low correlation of different groups. Each variable represents a basic structure, factor analysis method is called public factor. Analysis is the study of how to minimize the loss of information, many original variables concentrated into a few variables, as well as how to make the variables with a multivariate statistical analysis method. According to the strong explanatory factor analysis method, comprehensive scientific development of enterprise e-commerce performance evaluation system, based on the literature at home and abroad the enterprise performance evaluation index system of a large number of literature, the research on the opportunity, through the different e-commerce enterprise level leadership consulting. And to seek the views of relevant experts, after selection, set 15 indicators to evaluate the e-commerce performance of enterprises (specific indicators are shown in Table 1). The changes of each index in the enterprise after the implementation of e-commerce, is divided into 5 grades: 1= was significantly worse, 2= has deteriorated, 3= basically unchanged, 4= has improved, 5= significantly improved.

4.2. factor analysis

In this paper, SPSS software is used to analyze the data obtained from the survey:

1) Using the SPSS software to carry on the KMO statistics and the Bartlett’s spherical test to the sample data, the data show that the KMO value is 0.918 (>0.9), the significant probability is 0.012 (<0.05), which indicates that the sample data is suitable for the factor analysis

2) to solve the initial factor, according to the initial value of the 15 indicators, using SPSS software to do descriptive statistical analysis, according to the characteristics of the standard value is greater than 1 and the maximum variance rotation factor extraction, can be extracted from the 3 factors. The eigenvalues of these three factors were 9.425, 3.152 and 2.493, respectively, the contribution rate was 46.512%, 19.641% and 12.097%, the cumulative contribution rate was 78.240%.

<table>
<thead>
<tr>
<th>Index variable</th>
<th>Main factor F1</th>
<th>Main factor F2</th>
<th>Main factor F3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing cost</td>
<td>0.714</td>
<td>0.265</td>
<td>0.202</td>
</tr>
<tr>
<td>Market response capability</td>
<td>0.705</td>
<td>0.217</td>
<td>0.135</td>
</tr>
<tr>
<td>Production cycle</td>
<td>0.751</td>
<td>0.198</td>
<td>0.246</td>
</tr>
<tr>
<td>Inventory capacity</td>
<td>0.735</td>
<td>0.243</td>
<td>0.278</td>
</tr>
<tr>
<td>Operating costs</td>
<td>0.694</td>
<td>0.305</td>
<td>0.338</td>
</tr>
<tr>
<td>Staff recommendations</td>
<td>0.392</td>
<td>0.702</td>
<td>0.168</td>
</tr>
<tr>
<td>Internal coordination</td>
<td>0.201</td>
<td>0.798</td>
<td>0.293</td>
</tr>
<tr>
<td>Quality Assurance</td>
<td>0.278</td>
<td>0.779</td>
<td>0.264</td>
</tr>
<tr>
<td>Customer interaction ability</td>
<td>0.153</td>
<td>0.103</td>
<td>0.757</td>
</tr>
<tr>
<td>External coordination ability</td>
<td>0.229</td>
<td>0.195</td>
<td>0.802</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>0.169</td>
<td>0.207</td>
<td>0.832</td>
</tr>
</tbody>
</table>

From Table 1 can be found, the main factor of F1 mainly reflects the index system of operating costs and sales etc., can put the main factor F1 is defined as the enterprise survival ability; the main factor F2 mainly reflects the index system of internal management, the main factor is defined as F2 management capabilities within the enterprise; the main factor F3 the index system reflects the external coordination, this paper defines it as external coordination. Then, can be normalized to the three factor contribution rate, the specific method is: make Fi in the total weight of the target layer is Ai, the contribution rate is αi.

\[ A_i = \frac{\alpha_i}{\sum_{i=1}^{n} \alpha_i} \]

In this paper, n= 3 can therefore be used to obtain the weight of the 3 principal factors at the target level and the meaning of the representation, as shown in Table 2.
Table 2. Extracting main factor and its contents

<table>
<thead>
<tr>
<th>Main factor</th>
<th>Content</th>
<th>Weight</th>
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<tbody>
<tr>
<td>F1</td>
<td>Enterprise survival ability</td>
<td>0.720</td>
</tr>
<tr>
<td>F2</td>
<td>Enterprise internal management ability</td>
<td>0.516</td>
</tr>
<tr>
<td>F3</td>
<td>External coordination ability</td>
<td>0.329</td>
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</table>

Table 3. Index weight

<table>
<thead>
<tr>
<th>Main factor</th>
<th>Index variable</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>F1</td>
<td>Purchasing cost</td>
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<tr>
<td></td>
<td>Market response capability</td>
<td>0.1850</td>
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<td></td>
<td>production cycle</td>
<td>0.2312</td>
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<td></td>
<td>Inventory capacity</td>
<td>0.1908</td>
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<tr>
<td></td>
<td>Operating costs</td>
<td>0.2409</td>
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<tr>
<td>F2</td>
<td>Staff recommendations</td>
<td>0.2163</td>
</tr>
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<td></td>
<td>Internal coordination</td>
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<tr>
<td></td>
<td>Quality Assurance</td>
<td>0.2207</td>
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<tr>
<td>F3</td>
<td>Customer interaction ability</td>
<td>0.2154</td>
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<tr>
<td></td>
<td>External coordination ability</td>
<td>0.2680</td>
</tr>
<tr>
<td></td>
<td>customer satisfaction</td>
<td>0.3027</td>
</tr>
</tbody>
</table>

Provides a detailed index system of quantitative evaluation method for enterprise e-business performance evaluation. The evaluation process for the analysis, not only considers the influence of all the main indicators of e-commerce performance of enterprises, but also the scientific assessment of the performance of the business performance of the degree of influence, intuitive description of the source of the enterprise by electronic commerce to obtain the competitive advantage and the main factors, at the same time, but also through the comprehensive evaluation formula, provides scientific basis for the leading enterprises in the investment of e-commerce.

5. CONCLUSION

Cloud computing as a new network technology is gradually penetrated into all aspects of e-commerce, e-commerce service platform for the construction of a new way and means. There are many problems in traditional e-commerce enterprises, such as low efficiency, poor management and unreasonable allocation of service resources. Make full use of cloud computing resource sharing and dynamic allocation technology, through the smooth expansion and distributed storage, so that enterprises can quickly acquire, organize and manage all kinds of service resources, and the corresponding hardware and software by the cloud server management and maintenance, so as to make e-commerce enterprises concentrate more on core business development. With the development of the Internet and the practice of e-commerce in various countries, all countries have reached a consensus in the electronic commerce conference. In business, e-commerce not only change the original management mode and order, but also greatly changed the original marketing strategy, marketing model and marketing activities. To sum up, has the important influence of electronic commerce and the development and change of e-commerce of enterprise, has the important practical significance and theoretical value to study the environmental impact of electronic commerce enterprises to the enterprise marketing strategy.

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