Construction of E-commerce Management Performance Model based on Artificial Intelligence Technology

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Abstract
With the rapid development of Internet, e-commerce has become an important way of business contact among enterprises. In this paper, the author analyses the construction of E-commerce management performance model based on artificial intelligence technology. Through the application of distributed computing technology and modern artificial intelligence method, intelligent e-commerce realizes the automation and intelligence of information processing. In the application of e-commerce platform, artificial intelligence can provide product recommendation for customers according to the user's interest and characteristics, and optimize the logistics distribution process. So the artificial intelligence could ultimately improve the performance of e-commerce enterprises.

Key words: Artificial intelligence, Electronic Commerce, Knowledge sharing, Intelligent payment

1. INTRODUCTION

With the rapid development of Internet, e-commerce has become one of the most important ways of business contact between enterprises. The first e-commerce is just to build a web site on the Internet, the Internet as a window to release information. At present, the e-commerce mode can be realized through the network has some or most of transactions. Customers can find the required products online, and online orders suppliers can publish product catalogs online, accept orders, delivery, etc.. In this way, the supplier can deal directly with any clients all over the world, improve supplier product's competitiveness in the world on the other hand, online ordering, electronic payment, and the logistics distribution system of electronic management, greatly shorten the transaction time, reduce transaction costs. But the pattern of electronic commerce are still not very good to meet the needs of our customers and suppliers. First, this e-commerce model is based on the supplier, while the customer is suffering from the flooding of information, affecting the efficiency of e-commerce. Second, artificial resource discovery brings low efficiency and high cost of the problem. Third, this e-commerce model only provides static services, the degree of automation in the business process is low, active service capacity is insufficient, function is thin. Fourth, this e-commerce model can not provide the ability of the supplier and the customer to negotiate for a certain commodity. Automatic negotiation will become the next generation of electronic commerce application mark of workers”, so the intelligent electronic commerce must be able to realize the automatic negotiation between suppliers and customers, automated negotiation is an important aspect of intelligent electronic commerce. Negotiation is an important step, a ring is also crucial. Negotiation refers to the process of communication and consensus between the parties or parties on some topics of common interest. In electronic commerce, a negotiation is facing in the virtual environment a large number of strangers negotiation opponent, negotiation problem with high complexity and uncertainty, the negotiation time may be at any time in hours, so simply rely on people to carry out negotiation is very difficult and difficult to achieve.

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. APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN ELECTRONIC COMMERCE

2.1. Artificial intelligence

Since 1956, the discipline of artificial intelligence has been formally put forward. Over the past 50 years, the subject of artificial intelligence has made great progress, and has become a wide range of interdisciplinary and cutting-edge science. In general, the goal of artificial intelligence is to make computers think like a human being. If you want to make a machine that can think, you have to know what to think, and what to say is wisdom. What kind of machine is intelligent? Scientists have made a car, train, plane, radio and so on, they imitate our body functions, but can mimic the human brain function, so far, we only know this in our crown inside is composed of billions of nerve cells in the organ, we know very little about this thing imitation, it is perhaps the most difficult things in the world. After the advent of the computer, humans began to really have a tool that could simulate human thinking, and in the years to come, countless scientists worked for this goal. Now artificial intelligence is no longer a few scientists patent, almost all the university computer department there are people in the study of this subject, computer learning students must also learn a course like this, in our unremitting efforts, now seems to have become very computer smart.

Data warehouse integrates data distributed in different information islands of a network and stores them in a single integrated relational database. Using this integrated information, users can access the information conveniently, and also make the decision makers analyze and study the historical data for a period of time, in order to get the trend of things development. In most disciplines, there are several different research areas, each of which has its own unique research topics, research techniques and terminology. In artificial intelligence, such fields include language processing, automated theorem proving, intelligent data retrieval systems, visual systems, problem solving, artificial intelligence methods and programming languages, and automatic programming. In the past 30 years, have been established with artificial intelligence computer system; for example, to solve differential equations, chess, integrated circuit design analysis and synthesis of human natural language, information retrieval, disease diagnosis and control of space vehicles and underwater robots with different degrees of artificial intelligence computer system.

Figure 1. Artificial intelligence
2.2. Operation mechanism of e-commerce platform

Electronic commerce makes the transaction demand and supply information of both parties can communicate and exchange, so the exchange requirements for construction of intelligent e-commerce system is the primary transaction information can be fully used and mutual. However, as the parties to the transaction using a computer system and some other aspects of the different, will produce especially through interoperability issues, commercial activities. The problems existing in the interaction of computer systems can be roughly divided into the following four types: system heterogeneity, grammatical layer heterogeneity, structural layer heterogeneity and semantic layer heterogeneity. The system includes hardware and operating system between heterogeneous incompatible syntax layer heterogeneous refers to different languages and different representations of the data structure of heterogeneous layer refers to the use of different semantic data model layer refers to the exchange of information between heterogeneous systems in terms of different meanings, such as synonyms. Among them, with the development of technology, the first three types of problems have been gradually resolved, such as the use of, and different middleware products. To some extent, it solves the last kind of problem, that is, semantic layer heterogeneity. However, although it provides a standard syntax for defining data structures and semantics, it does not provide data structures and terms that describe the standards of business processes and commodity exchanges.

![Diagram of Data Warehouse](image1)

**Figure 2. Data warehouse**

Therefore, when using data exchange between trading parties, we must first agree on the vocabulary, usage and semantics, which, to some extent, inhibits the expansion of e-commerce. In electronic commerce, how to kinds of commercial information for effective organization and management, so that users can efficiently search for the information they want to solve on the same or related information, using different understanding and expression, namely the semantic heterogeneous problem and, on behalf of the user in the electronic commerce activity is an independent different processing entities. It is not necessary to collaborate and reason with knowledge only to deal with complex business activities, and it needs to acquire relevant professional knowledge and other knowledge. Therefore, information sharing and exchange, especially the sharing and reuse of commodity knowledge between suppliers and customers, has become a difficult problem in the foundation of e-commerce system. In order to solve the problem of knowledge sharing in e-commerce, the technology of artificial intelligence is introduced. It is a representation that can be shared and understood between different

![Diagram of E-Business Platform](image2)

**Figure 3. E-business platform**
domains and different application systems. This protocol helps to communicate precisely and efficiently to the content meaning, and in turn makes the system interactive operation, reuse and sharing a series of performance improvements. But in the actual business activities, negotiation is one of the most important, if can realize the automatic negotiation, will greatly improve the degree of automation of electronic commerce system, auto negotiation technology has become the key technology to realize the application of intelligent electronic commerce.

3. 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.

In addition to providing products and services for home customers, suppliers should also actively release product information and find customers who need products, and sell their products. Supplier sales process and customer purchasing business process is generally similar, only the first few steps, the customer is the commodity demand definition and merchandise search, and the supplier is the commodity information release and for customers. A successful business process including product search, negotiation, contract signing,
payment and delivery, customer service and service evaluation and a series of process, the parties involved in
the business activities such as customers, suppliers, banks, third party logistics trade entity to complete its
trading and joint cooperation. Intelligent e-commerce is the use of distributed computing technology and
modern artificial intelligence method to realize the automation and intelligent information processing business,
including how to realize the automation of business processes, is a big problem in intelligent electronic
commerce. The workflow technology is the best solution to this problem. Workflow technology is a business
process modeling, business process management and integration, and ultimately the core business process
automation technology, in recent years in the field of computer application in the development of new
technology is one of the most rapidly, the main goal is to coordinate the activities of the business process
through the reasonable distribution of related information and resources.

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.

In order to promote the efficient implementation of business objectives, The workflow is a description of
an enterprise or organization of the business process model, through the work activities into well-defined tasks,
roles, rules and processes to complete execution and monitoring, to improve the level and efficiency of
production organization objective. The bottom is the technical basis and social environment of the intelligent e-
commerce system, such as software and hardware foundation, law, electronic banking and logistics. The second
layer is the database layer, wherein the user information database for user authentication, real information
products supply a database to record the user save out of sync with the supplier product resource of product
information, and in accordance with the classification of certain principles are stored, the convenience of
customers to search product demand saved in the database synchronization and customer demand of product
resource products information, and in accordance with the classification of certain principles are stored,
convenient search by supplier negotiation history database for recording the information consultation transaction
history database negotiation for recording transaction information transactions, transactions for future reference.
The contents of product supply database and product requirement database are determined by the concepts and
instances in the knowledge ontology database.
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 multi-dimensional 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</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing cost</td>
<td>0.714</td>
<td>0.265</td>
<td>0.202</td>
<td></td>
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<tr>
<td>Market response</td>
<td>0.705</td>
<td>0.217</td>
<td>0.135</td>
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<tr>
<td>production cycle</td>
<td>0.751</td>
<td>0.198</td>
<td>0.246</td>
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<tr>
<td>Inventory capacity</td>
<td>0.735</td>
<td>0.243</td>
<td>0.278</td>
<td></td>
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<tr>
<td>Operating costs</td>
<td>0.694</td>
<td>0.305</td>
<td>0.338</td>
<td></td>
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<tr>
<td>Staff recommendations</td>
<td>0.392</td>
<td>0.702</td>
<td>0.168</td>
<td></td>
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<tr>
<td>Internal coordination</td>
<td>0.201</td>
<td>0.798</td>
<td>0.293</td>
<td></td>
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<tr>
<td>Quality Assurance</td>
<td>0.278</td>
<td>0.779</td>
<td>0.264</td>
<td></td>
</tr>
<tr>
<td>Customer interaction</td>
<td>0.153</td>
<td>0.103</td>
<td>0.757</td>
<td></td>
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<tr>
<td>External coordination</td>
<td>0.229</td>
<td>0.195</td>
<td>0.802</td>
<td></td>
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<tr>
<td>customer satisfaction</td>
<td>0.169</td>
<td>0.207</td>
<td>0.832</td>
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</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.

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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>
</tr>
</thead>
<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>
</tr>
</tbody>
</table>

Table 3. Index weight

<table>
<thead>
<tr>
<th>Main factor</th>
<th>Index variable</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Purchasing cost</td>
<td>0.2426</td>
</tr>
<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>
</tr>
<tr>
<td></td>
<td>Inventory capacity</td>
<td>0.1908</td>
</tr>
<tr>
<td></td>
<td>Operating costs</td>
<td>0.2409</td>
</tr>
<tr>
<td>F2</td>
<td>Staff recommendations</td>
<td>0.2163</td>
</tr>
<tr>
<td></td>
<td>Internal coordination</td>
<td>0.2305</td>
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<td></td>
<td>Quality Assurance</td>
<td>0.2207</td>
</tr>
<tr>
<td>F3</td>
<td>Customer interaction ability</td>
<td>0.2154</td>
</tr>
<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

In e-commerce activities, workflow systems exist in each stage in the whole process of a transaction from the customer to search for goods, the parties, customers submit orders, payment and delivery and evaluation is a big work process, and each part is a relatively independent sub workflow process. All of these processes can be used to realize the management of workflow technology. In the practical application of electronic commerce platform, according to the user's intention, interest and characteristics adaptively and intelligently from existing customer information, inventory information such as large amounts of data on the correlation information arrangement, adjustment mechanism, in order to obtain satisfying retrieval output, become a technical problem of e-commerce application in the future facing. From the application development, artificial intelligence technology and electronic commerce at home and abroad of artificial intelligence technology in electronic commerce, and the application of data mining in Web the Summarized Discussion on the application of artificial intelligence technology in electronic commerce. With the continuous development of e-commerce and the continuous improvement of artificial intelligence technology, the integration of the two will be more closely in all fields and levels. As a successful factor, the integration of e-commerce and artificial intelligence technology will become a key technology.

References


