Research on Construction of Intelligent Public Service Platform of Modern Equipment Manufacturing Industry

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Abstract. By means of internet information technology build the public service platform of modern equipment manufacturing industry, that maybe help to integrate different resources, and eventually real transformation of scientific and technological achievements, applications of e-commerce and online transactions as well as public research and training services, to improve the scientific and technological innovation and market competition ability, to improve the scientific and technological innovation and development. In this paper, we discuss the constructing objective and contents, and then analyze the e-commerce process of modern equipment manufacturing industry. Based on this, we put forward the system structure and design of e-commerce platform of modern equipment manufacturing industry.

Introduction

Modern equipment manufacturing industry is a country or region for sustained international competitiveness of strategic industry, representing the level of scientific and technological progress of a country or region and the degree of social progress. With the rapid development and accelerate the pace of transformation and upgrading of modern equipment manufacturing industry, modern equipment manufacturing industry need to match the increasingly urgent demand for public services, Internet applications of science and technology as the foundation, build a modern equipment manufacturing industry public service platform to provide comprehensive technology service system of support for the equipment manufacturing industry, It has an important practical significance [1].

Modern equipment manufacturing industry public service platform for enterprises must be able to provide scientific and technological achievements, technology transfer and technology promotion channel, scientific research institutions, research institutions and enterprise applications combine rich enterprise technology innovation pipeline, and reduce the cost of technological innovation, improve the efficiency of scientific and technological achievements, increase the technology promotion efforts.

Building Scientific and Technological Achievements, Technology Transfer and Technology Promotion Channel

Modern equipment manufacturing industry public service platform is to provide services based on modern equipment manufacturing. The first is to strengthen the scientific and technological innovation and equipment manufacturing enterprises, technology incubators and technology promotion capabilities. Construction of public service platform requires scientific and technological achievements, technology transfer and technology promotion channel, scientific research institutions, research institutions and enterprise applications combine rich enterprise technology innovation pipeline, and reduce the cost of technological innovation, improve the efficiency of scientific and technological achievements, increase the technology promotion efforts.

Establishing the E-Commerce Application Channels

Market share is an important measure of the level of modern equipment manufacturing industry. We must find ways to increase the market share of modern equipment manufacturing industry. Public service platform equipment manufacturing enterprises need to provide e-commerce
application channels to help businesses through e-commerce expansion of marketing channels, increase market share [2, 3].

**Providing Talent Introduction and Training Services**

Modern equipment manufacturing industry cannot develop without a strong pool of talent. Companies in the development process to firmly establish the concept of talent are the first resource. Public service platform needs to provide talent introduction and training services, modern equipment manufacturing industry to build a knowledge-based, technology-based, innovative, high-quality, three-dimensional talents, through scientific and technological progress and enhance the quality of talent, and strive to become "equipment manufacturing "to “talent-made equipment. "

**Construction Analysis of Modern Equipment Manufacturing Industry Platform**

**Construction Objective**

Modern equipment manufacturing industry public service platform take "innovative modern equipment manufacturing public services to enhance the overall development of modern equipment manufacturing" as the main objective, through technological innovation and application of Internet technology, providing modern equipment manufacturing more sophisticated and modern information technology services, improve the modern equipment manufacturing information management and e-commerce application level, to enhance the modern equipment manufacturing capacity of public services, an effective combination, collaborative operation and maintenance mechanisms for e-commerce, information technology, personnel training, training and other services [4, 5].

Modern equipment manufacturing industry platform will follow the principle of public service, "the pooling of resources, innovative services," to use the Internet as a means of information technology, through innovative technologies and services, integration of social science and technology innovation and development of modern equipment manufacturing resources involved, and ultimately build a set scientific and technological achievements, e-commerce applications, online transactions, public research and development, personnel training and training services for the integration of public service platform, expand service areas and projects, building service brand, providing public services mature systematic, improve technology equipment manufacturing enterprises innovation capacity and market competitiveness, and promote modern equipment manufacturing overall scientific and technological innovation and development [6].

**Promoting Transformation and Trading of Scientific and Technological Achievements**

Modern equipment manufacturing industry technology achievements transformation platform with modern equipment manufacturing industry technological innovation and development needs, through the organization, optimize the existing scientific and technological innovation, for the modern equipment manufacturing industry research, product innovation, invention patents to build exchange trading platform.

Plans to build and provide modern equipment manufacturing industry research institutions, patent search query, patent transactions, intellectual property protection and other public services, and then form a scientific and technological achievements into the core of the service platform, to promote scientific research institutions and enterprises, scientific and technological achievements commercialization, resulting in good economic and social benefits.

**Rapid Development of Enterprises through Electronic Commerce**

Modern equipment manufacturing industry e-commerce service platform for the modern equipment manufacturing industry to provide a full range of e-commerce services, through the platform Zhengzhou equipment manufacturing enterprises will be able to establish a network of sales channels, expand domestic and international markets, improve brand awareness, and create more
economic benefits, for the development of enterprises, industrial agglomeration scale to provide power.

Plan to build and provide business information display, product information promotion, brand image maintenance, industry information data services, to further increase the market share of equipment manufacturing products, foster a number of highly influential high-end brands, enhance the overall strength and influence of modern equipment manufacturing industry.

**Changing the Modern Equipment Manufacturing Industry Trading Mode**

The modern equipment manufacturing industry online trading platform is committed to the realization of the equipment manufacturing products online transactions, through in-depth mining equipment manufacturing products for the core needs of customers, to provide the best purchasing experience, to promote the purchase of users online orders, to achieve the equipment manufacturing products online transactions.

The construction plan and provide enterprise authentication, online transactions, data statistics, marketing service, enterprise switchboard and other services to offer technical and service support for the equipment manufacturing products online transactions.

**Developing New Products to Meet the Needs of the Market**

Modern equipment manufacturing industry electronic commerce application of public R&D center is mainly to solve the problem of the overall technological progress and enhance the capability of independent innovation, and to provide a variety of R&D services in the process of electronic commerce application, which is the problem that the small and medium enterprises need to solve. The development of technology, technology promotion, technical advice, product design, equipment and product testing services for small and medium enterprises, new product research and development, equipment testing, technology improvement and other conditions, to promote the development of small and medium enterprise technology and product technology.

**Construction Contents**

Modern equipment manufacturing industry public service platform maybe include transformation platform of scientific and technological achievements, e-commerce application platform, online trading platform, e-commerce applications, public R&D center, on-line training platform. The platform architecture is as showed in figure 1.

![Public Service Platform Structure of Modern Equipment Manufacturing Industry](image)

Figure 1. Public Service Platform Structure of Modern Equipment Manufacturing Industry.

The main construction contents include:

**Transformation Platform of Scientific and Technological Achievements**

The platform is the bridge of Equipment manufacturing enterprises and scientific research institutions, universities, the construction of the platform include scientific and technological
achievements into service, science and technology literature information services, intellectual property public service, professional and technical public services.

The platform will provide a new technology publishing and trading platform to provide technology, management, policies and regulations. Through the establishment of intellectual property rights, to establish and improve the professional technical service chain, establish and improve the professional technical service chain, and improve the technical innovation and development center of scientific and technological innovation and technology. Through the establishment and improvement of technology and technology. Enterprises to provide professional technical services, reduce the risk of their business and venture capital.

**E-commerce Application Platform**

The platform provides a one-stop e-commerce modern equipment manufacturing applications, the main construction contents include portfolio, procurement database, global corporate libraries, information and community [7].

E-commerce application platform of modern equipment manufacturing industry will have the functions of product information online publishing, online publishing, enterprise information online publishing, enterprise authentication, inquiry management and so on. Through this platform, Zhengzhou's equipment manufacturing enterprises can realize supply and demand information disclosure, online marketing, data analysis, etc.

E-commerce application platform of modern equipment manufacturing industry will also provide multi language overseas trade channels for equipment manufacturing enterprises. Through international edition, Russian, Arabic, Spanish, French, Japanese, equipment manufacturing enterprises can promote the product promotion to overseas, and promote the export scale of modern equipment manufacturing industry.

**Online Trading Platform**

Modern equipment manufacturing online trading platform is the best platform for equipment manufacturers for online transactions. The platform as the core foundation of the factory store, modern equipment manufacturing by embedding public service platform for equipment manufacturers to provide online trading services. The principal construction contents include purchasing membership management systems, supplier management system, operators management systems, online payment systems.

Modern equipment manufacturing industry online trading platform will be settled in the equipment manufacturing enterprises to provide product release, order tracking, transaction confirmation and other operating functions, while the integration of the line under the transaction involved in logistics, after-sales installation and other aspects, and ultimately to achieve online transactions, the line to confirm the new e-commerce model.

Compared with online transactions in the field of consumer goods, modern equipment manufacturing industry online trading market size is more huge, but due to the large amount of industrial raw material transaction, and related services are also very complicated, so it is difficult to achieve, high demand, modern equipment manufacturing industry online trading platform will be in-depth industry online trading services, creating a precedent for the modern equipment manufacturing industry.

**Public R&D Center of Modern Equipment Manufacturing Industry Information Application**

The public R & D center is modern equipment manufacturing information application solutions, such as two-dimensional code housekeeper, sales housekeeper, butler and cloud station stewards inquiry. The core construction contents include: e-commerce applications in public R & D base and public R & D salon.

Integration of high quality technical resources, construction of electronic commerce application of public R & D base. Public R & D base will bring together a large number of high-end technical
personnel, strong technical support to protect the power and excellent management personnel, to solve the problems of small and medium enterprises in the application of electronic commerce. Launch, benefit by mutual discussion of senior management personnel and technical backbone of wisdom, technological innovation, technology and technological breakthroughs, as the cornerstone of e-commerce application in Henan province.

E-commerce application of public R&D Sharon, broaden the channels of technical exchange of small and medium enterprises. The theme of the development of electronic business application is not regularly salon and academic exchanges, the performance of the special training and communication in this area, and to give long-term communication channels, to achieve mutual learning and common progress.

Visit other research and development of other enterprises, in-depth implementation of the combination of industry and research. To achieve the theory with practice, with theoretical guidance, from practice to explore the development of electronic business application and implementation plan and implementation plan, to learn from other enterprise quality management concepts and technical measures, and constantly optimize the construction of technical team, in-depth technical research, to promote the continuous improvement of the competitiveness of the company.

**Online Training Platform**

Based enterprise e-commerce applications in the process of difficult points, Set round integration courses, Enterprise e-business applications throughout the analysis and teaching, combined with the SME practice, using taught, research, case type, experiential teaching methods, etc, SMEs to carry out the management, professional and technical personnel, highly skilled personnel and staff skills training and e-commerce applications, training, and help enterprises to quickly embark on the road of e-business applications, improve the overall quality and core competitiveness of SMEs.

For the function of the platform, we should include online courseware, online course, online learning plan, input and import test, manual test paper and random test paper, power protection and examination, score inquiry and modification, automatic scoring and manual scoring, user guide, unlimited data classification, the creation of any level of statistical analysis, based on the role of authority management, data backup and recovery.

**E-Commerce Processes of Modern Equipment Manufacturing Industry**

Modern equipment manufacturing industry e-commerce platform focusing on MRO procurement, providing online trading services products for different customer purchasing demand, industrial manufacturers and agents to join the supply chain system, After becoming the platform provider of procurement services purchasing managers through the platform, the platform providers charge a commission contract ratio.

Currently platform products are already covered by six major industrial areas, more than 500,000 kinds of products, including tools, labor, metalworking supplies and instrumentation, materials handling and storage packaging, machinery parts and related products and utilities related products. Supplying the full range of industrial purchasing managers' one-stop shopping services to help users save time and energy procurement, reduce overall procurement costs.

The basic process of modern equipment manufacturing supply chain e-commerce platform is as showed in figure 2.

Process analysis is as follows:

**Supplier occupancy**

After signing the agreement settled online sellers online settled landing system and to submit company information to the current operating status of elementary information, including the company's basic information, business scale, related contacts and other information. Business information is submitted to the pre-assigned the company expects to submit the names of shops
settled in the platform business, business category, brand and other information. Submit information submitted settled qualification and improve the company's qualified electronic version, including the company's business license information, organization code certificate, the general taxpayer to prove (both official seal and ensure the picture is clear).

**Cash Deposit**

Suppliers pay a deposit, after confirmation platform, suppliers can log supplier backstage platform information management.

![Diagram of supply chain and e-commerce platform](image)

*Figure 2. Basic process figure of modern equipment manufacturing supply chain e-commerce platform.*

**Product Management**

After entering supplier management background, start uploading need to publish products, according to the published specifications of the product platform, released after the completion, users can purchase the foreground page, category pages, search pages for online viewing.

**User online purchasing**

Purchasing a user logs on platforms, according to the procurement requirements to screen need to buy products, and product details page for buyers to provide online customer service were asked questions, you can order online or quick purchase to buy the required products.

**Order Management**

Users online orders, began ordering process, substantially comprising a single-user, platform confirmation, supplier deliveries, logistics, procurement confirm receipt, rejection and other processes.

**Payment**

Platform currently used third-party payment platform, including China UnionPay, Alipay, micro letters; after docking with third-party platform, real-time monitoring of financial flows accurately and safely.

**Logistics**

Platform currently used third-party logistics, a partnership with the logistics, real-time monitoring of logistics information to ensure product safety in the logistics chain.

**Confirming receipt**

Procurement Members receive the product, check the product quality non-destructive, confirm receipt.
Financial accounting
After the account of, supplier management background to automatically generate profit statements, to start reconciliation.

System Structure of Modern Equipment Manufacturing Industry E-Commerce Platform

System Structure of E-Commerce Platform
For high concurrent access, massive data processing, high reliability and some other problems and challenges, modern equipment manufacturing commerce platform eventually take architecture as shown, in order to achieve a high-performance platform, highly available, easy scalable, extensible, security and other infrastructure targets. The system in the lateral dimension cut into several sections, each responsible for a portion of relatively uniform duties, and composition platform and calling by depending on the underlying. Modern equipment manufacturing e-commerce platform is hierarchical, split into the application layer, service layer, data layer [8, 9]. Structure is illustrated in figure 3.

1) The application layer: Responding for specific operations and view shows such as Home and search input and results show.
2) The service layer: Providing support services for the application layer, such as user management services, shopping cart services, order services, search services.
3) The data layer: Providing data storage access service, such as a database, cache, files, search engines and the like.

Figure 3. System Structure of E-Commerce Platform.

Through each automated operation and maintenance, monitoring, logging system, platform can operate normally in the case of unattended, everything can be automated, currently publishing platform focused on operation and maintenance, release process automation, automated code management and automated testing. Website during operation may encounter various problems: server downtime, program bug, insufficient storage space, the current automated monitoring platform architecture, the server heartbeat detection, and monitor its performance and the application of key data index.

System Design of E-commerce Platform
Modern equipment manufacturing industry e-commerce platform designed for symmetrical structure (hot standby redundancy), flat architecture (core and access layer), as the picture shows. Modern equipment manufacturing as well as e-commerce platform in accordance with the
deployment of the role is divided into four parts, namely: the access layer, logic layer, data layer, and operation management [9, 10]. The system design figure is as set out in figure 4.

The Access Layer

The layer of access contains security, load balancing, CDN and other services.

Content Distribution Network (Content Delivery Network) the source station closest to the user's content to the edge node, so that users can get to obtain the desired content, improve response time and success rate of user access. Solution platform due to the distribution, bandwidth, server capacity to put access to high latency problems and provide accelerated solutions. While providing static acceleration, dynamic acceleration, file downloads video and other pictures acceleration; providing DDoS, cc security capabilities. Access provider domain, ftp, svn, api variety of ways, enabling quick and easy access. Provide caching strategies, configuration item control CDN. Real-time monitoring of alarms can be timely feedback problems; a wealth of statistical analysis reports and logs provide support of operation.

Load Balance can be drawn from more than one public IP address traffic to the back-end distributed cloud server, automatically detect and eliminate back-end host port unavailable host, enhance service availability. High availability with redundant equipment; 99.95% availability guarantee; automatic investigation, promptly remove the fault; security anti-DDoS attacks; e-commerce platform for different business resource isolation; support public network / network load balancing service available TCP, HTTP protocol port forwarding; supports session hold function, and within a set period of time, the same client requests to the same back-end cloud server.

Security Safe as a platform is to provide network protection, intrusion detection, vulnerability detection and prevention protection, real-time detection of problems and provide security. Periodic reports and recommendations will serve as a safe, secure platform business try to update dynamically. For the server to provide integrated security services; provide network protection, intrusion detection, and vulnerability protection. Real time alerting aspect, the platform currently 7 * 24 hour security services; real-time detection, real-time notification exceptions; intelligent analysis and regularly sent security status report.

DDoS protection aspect, with Tencent cloud DDoS protection level distributed T Yu systems and single IP one hundred G's high defense zone, support for multiple protocols, to protect operational security platform. DNS hijacking detection, distributed detection; centralizing, comprehensive analysis, found that the domain name hijacking behavior quickly and accurately [11].

Site security aspect, real-time blocking hackers trying to invade the web server vulnerability, hazards and other malicious user behavior, real time blocking malicious scanner reptiles, for the system to bail out bandwidth and resources.
The Layer of Logic and the Layer of Data

The layer of logic and the layer of data includes cloud servers, search servers, database servers, caching servers.

Cloud server: Service availability of 99.95%, not less than 99.999 percent data reliability, automatic migration downtime, automatic snapshot backup, data recovery is more convenient; I/O optimization examples of the underlying hardware and software have been upgraded and adapted to mount the disk SSD Cloud when efficient cloud disk can get all the performance. The instance which is not support I/O optimization, mount SSD cloud disk, when efficient cloud disk IOPS performance available around 1000. It supports automatic/custom backup, fast data recovery [12].

Server administrators set up automatic snapshot policy in the console, cloud server system disk, disk data generated snapshots, you can set up a snapshot manually via the console or API. In snapshot rollback, you can quickly restore the snapshot generation time point of the data state, strengthen data security.

Search server: Provide segmentation and indexing features, including improved Chinese lexicon. Provide visual data preprocessing and offline ordering custom, retrieval takes milliseconds.

Demand for complex queries: internet search services have a special natural language processing technology support, to provide Chinese word, an intelligent error correction, synonyms identification, intent recognition and other functions. Basic search services, providing advanced error correction, according to domain search word custom, intelligent word associations and other services. Let products provide better service for the platform in each dimension.

Database server: Data import and backup retreated, offers a full range of ways to complete the initialization data import. Data can be backed up at any time, the cloud database to provide three days at any point in time correction according to the backup file. Multi-dimensional monitor, a custom resource threshold alarm, provides slow query SQL complete analysis reports and run reports for download.

Cache server: Cloud Redis Store is compatible with Redis protocol distributed caching and storage services. Supports master and slave hot standby automated disaster recovery, supporting data snapshots and Key granularity of data management and correction, the current platform as the Key-Value database.

Capacity expansion seamless upgrade, smooth expansion, without service interruption; support meet, meet and other Key operating; support transactional operations.

Support backup multiple copies, highly reliable data; master-slave hot standby, automatic disaster recovery, service availability; persistent cache process does not affect the foreign service; support
data persistence; supports data logging operation flow; automatic data backup, multiple recovery
the way.

**Operation Management Layer**

Operations management focus on data processing and analysis, to provide a large data processing
platform. Platform can be deployed on demand huge data processing services for data processing
requirements, such as: statements showing, data extraction, analysis, customer portraits and other
large data applications.

Operations management: Unified console for cluster configuration, start and stop, centralized
monitoring real-time operation of each component index by Dashboard, also a full range of
permissions for unified management platform.

Service platform: To provide a unified multi-component log centers; support a variety of data
access and output, to provide unified management of data sources and metadata.

**Conclusions**

Using information technology construct public service platform of modern equipment
manufacturing industry, takes regional enterprises as the main service object, to realize the regional
take enterprise integrated information service resources digitization, business services and logistics
service network, integrated information service internationalization and to achieve the goal of
regional enterprise integrated information service sharing, scientific decision-making and
management efficiency. The application of public service platform can give play to the leading role,
drive the realization of regional enterprise business process informatization, promote the
coordinated development of regional enterprise supply chain, promote regional economic
development, drive the application of small and medium-sized enterprise information technology, to
further improve the level of enterprise information technology application, effectively enhance the
competitiveness and innovation of small and medium-sized enterprises.

**References**

[1] Geurt, Jongbloed, Ger. Koole. Managing uncertainty in call centers using Poisson mixtures.
Applied Stochastic Models in Business and Industry, 2001, vol. 17, 307-318.

[2] Jing Bo, Chen Ming, Guo Guanqing, Distributional and central unifies call center, Computer
application, 2002, vol. 7, 46-51.

[3] Ji Luping, Luo Kelu, Tan Hua, Based on three structures disperser -like call center system,
Computer application, 2004, vol. 12, 66-73.

[4] N. Prindezis, C. T. Kiranoudis, An internet-based logistics management system for enterprise
chains, Journal of Food Engineering, 2005, vol. 70, no. 3, 373-381.

[5] Jose Santa, etc, Telematic platform for integral management of agricultural/perishable goods in
terrestrial logistics, Computers and Electronics in Agriculture, 2012, vol. 80, 31-40.

[6] John D. Nelson, Corinne Mulley, The impact of application of new technology on public
transport service provision and the passenger experience: A focus on implement in Australia,
Research In Transportation Economics, 201, vol. 39, no. 1, 300-308.

[7] Yang Changhui, Data interface design of digital city management system, International Journal
of Online Engineering, 2013, vol. 9, no.7, 57-60.

[8] Yang Changhui, Kang Ju, Research on business process and e-business platform design of
barter trade, Information Technology Journal, 2013, v 12, n 19, 5315-5320.
[9] K. Christian, D. J. Chen, P. Jean-Michel, “Integrated Analysis Platform: An Open-Source Information System for High-Throughput Plant Phenotyping”, Plant Physiology, 2014, vol. 165, no. 2, 506-518.

[10] Yang Changhui, Research on construction of Digital Intelligent City Management System, International Journal of Hybrid Information Technology, 2014, vol. 7, no. 5, 285-294.

[11] L. Tihamer, D. Abhishek, R. William, etc, “Distributed Real-Time Managed Systems: A Model-Driven Distributed Secure Information Architecture Platform for Managed Embedded Systems”, IEEE Software, 2014, vol. 31, no. 2, 62-69.

[12] Yang Changhui, Wang Xi, Research on Construction Exhibition Integrated Information Service System in Airport Economic Zone, Computer Modelling and New Technologies, 2014, vol. 18, no. 12, 232-238.