

## Applications and platform of Technology-driven financial innovation and integration patterns for LED industrial chain of integrated business

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**Abstract.** In this paper, the platform service model achieves the business integration of emerging LED lighting industry, and proposes LED lighting industry chain financing solutions for SMEs based on the industry chain finance theory, which solves the financing difficulties of small and medium enterprises problems LED. The essence is synergistic integration of LED lighting industry chain business information and services and ultimately maximize the benefits of LED lighting industry chain.

### Background

**The rapid development of LED lighting industry.** Semiconductor lighting (LED) is the second incandescent, fluorescent, energy saving lamps and has a revolutionary as efficient solid fourth-generation light source. It has many advantages like energy saving, environmental protection, good color rendering, long life and other significant advantages.

As an emerging industry leading lighting market in the future, LED is gradually from simple decorative lighting, turning to high-powered urban landscape lighting, municipal street lighting, automotive lighting and industrial lighting-based functional lighting products development, and gradually meets highway, tunnels, subways, airports, shipping and other lighting products for reliability which requires a higher market demand. In addition, the explosion-proof lights, semiconductor manufacturing lighting, low lighting, ultraviolet disinfection, medical and other special lighting and specialty lighting applications are gradually using the advantages of LED lighting products. Applications of LED products will face unprecedented comprehensive application market. In recent years, the Chinese market is also focused on government support for science and technology sector working LED industry. The introduction of the observations and planning fully reflects the important position of LED lighting technology in saving energy. The next few years, the semiconductor lighting will continue to expand with the size of the entire LED industry cluster and into the high-speed development stage <sup>[1]</sup>. The rapid development of LED lighting applications forms the broad market. To reduce product costs, and further improve the performance of their products so that industry development and market maturity synchronous lifting, we must make LED products be better and faster accepted. Purely from a technical level to pursuit of lower costs, it is difficult to achieve rapid results. Technology, management, industry,

environment, service platforms, such as full-promoting public awareness is driving the rapid development of LED industry and make society better.

**Increasingly sophisticated LED industry chain and the growing cooperation between enterprises.** Semiconductor lighting (LED) is our emerging strategic industries, and foreign LED industry started almost simultaneously. After 30 years of development, it has formed a relatively complete industrial clusters. A number of National Semiconductor Lighting Project industrialization bases have formed, including Shanghai. Yangtze River Delta, Pearl River Delta, Delta and northern Fujian of China's LED industry has become a gathering place. More than 85% of LED enterprises are located in these regions. Between the LED industry chain enterprises, to share information, collaboration and business processes has almost become a kind of trend.

In today's changing needs and the highly competitive market environment, a key to business success is largely dependent on its energy quickly respond to changes in the business environment, and value for the market it serves. For this reason, LED lighting companies need and suppliers, customers and even competitors should establish a close business partnership. Enterprises should consider himself as LED lighting throughout the supply chain, a member and other members to share information, collaborative planning and business processes to a new business model for customers to provide fast and flexible, and efficient support and services. To achieve all this, the establishment of an integrated support platform across the enterprise is undoubtedly a crucial step.

**Development of chain financial is conducive to LED SMEs financing.** Now, with the development of led lighting market, also further improvement of the industrial chain, quality of chain cash flow is also an important factor affecting the development of the industry chain. LED lighting accounts for the vast majority of small and medium enterprises, and the prevalence of financing difficulties. 1) Direct access to financing is strict, the number of SMEs which are benefited are extremely limited. 2) internal financing can not meet the requirements of their own development. 3) Lack of full, safe and effective collateral, bank loan reeled. 4) indirect financing channels other than bank loans is not yet mature.

Chain financial model can break the LED lighting industry chain financing difficulties of small and medium industrial chain finance that refers to the over-extension of the core business services. The core business and the downstream supply business get together from raw material procurement to the final product, and finally by the sales network to reach consumers. In this chain, the suppliers, manufacturers, distributors, retailers and users get together into a whole, in all directions for several companies in the chain which provides financing services to realize the added value of the whole industry chain, and cooperates through the division of functions related businesses <sup>[2]</sup>.

## **Research of Platform Service Model**

### **LED industry chain collaboration services.**

LED industry integrated service platform makes use of modern information technology to meet the objective LED industry business integration needs, different levels of service integration of industrial chain resources, through the construction of the LED industry collaboration platform for the industry throughout the supply chain to manage different business units to provide a platform tools LED industry to achieve all-round implementation of the project work. Platform structures covering R & D, sales, manufacturing, trading, finance, logistics, services and other business aspects of the collaborative service support, centralized management of the LED industry enterprise business and standardize the production and market behavior. Design and development platform for

standing height of the entire LED industry chain put on coordinating the supply chain collaborative model, covering the entire supply chain of raw materials all aspects of procurement, design, production, manufacturing, services, etc. in the economic globalization, specialization and cloud the inevitable result of network technology under the premise of the great development of computing and effectively changing the traditional service model.

**Research on information collaborative mode.** The platform provides information query and information entry portal providing its supply chain partners for the LED business enterprise information and product information, corporate information systems through direct inquiries on the basis of the development of its external interface, and supply chain partners in accordance with the agreed communication and data standards to achieve information system docking between the parties. At the same time, enterprises can directly register login manufacturing industry cluster collaboration services platform, entry of their products, inventory and other information, so that vendors can check product inventory information they supply parts on collaborative service platform, and scheduled inventory, such companies can proactively replenishment, to shorten order cycle enterprises to further enhance business efficiency. Collaborative Information is to achieve information transmission, information sharing, information integration <sup>[3]</sup>.

(1) Information transfer: the use of POS(Point of Sale), EDI(Electronic Data Interchange) and other technologies to speed up the data processing speed and reduce the cost of processing methods belong to the data transfer information on the coordination level. The degree of coordination on this level is relatively low because of the time-dependent data transfer LED supply chain upstream coordination is passive, the upstream business is based on only the information sent downstream businesses, while the remaining downstream of the upstream information is opaque .

(2) Information sharing: the need for closer coordination process contact and repeated exchange of information, coordination of two or more parties need to be able to freely and actively carry out data access, groupware, shared databases, high-speed leased line connectivity is to meet this demand technology. Shared data can increase mutual understanding between the business units, increase the overall objectivity forecast and plans to reduce duplication of data transfer times to bring errors.

(3) Information Integration With shared data, but if the principles of data processing methods are inconsistent, the same might coordination difficult. As a manufacturing and selling party while access to the historical market data, but if the prediction method is not uniform, the prediction results may be completely different, so that each of the parties by means of respective data execution service, then a conflict will occur. Application integration allows the parties to coordinate their business processing logic may be linked, so keep on working pace consistent with making the supply relationship is more reasonable. Based on open protocols such as Internet and web, web-based computing technology and so are the means to achieve application integration.

**Financing solutions for SMEs of LED industry chain.** Change the traditional corporate finance perspective, from the industrial chain finance perspective, the overall development of small and medium enterprises for the LED industry chain which provides comprehensive financial solutions, we can to some extent solve the financing difficulties of SMEs <sup>[4]</sup>, as Figure 1 SME credit financing credit chain.

(1) Get the information flowing through the LED SMEs flow of information industry chain. In the industrial chain finance model, service principal financial institutions are no longer confined to a single enterprise, but to provide financial services to SMEs on the core business and the entire

industry chain upstream and downstream, from credit risk assessment of individual SMEs static data evaluation to assess the risks of trading in the whole industry chain.

(2) The core business and through the LED industry chain capital flow and logistics control risk. In the industrial chain finance model, on the one hand, financial institutions will be introduced to its core business of credit on credit services downstream of SMEs, based on the core business transactions with SMEs and downstream inventories, prepayments, receivables other assets to provide financing for SMEs; on the other hand, financial institutions through cooperation with third-party logistics companies, industry chain-related cash flow, logistics for effective controls to ensure the safety of loan funds.

(3) Through the whole industry chain development and comprehensive services to control costs. Chain interdependence between upstream and downstream enterprises, trading activity, and very regular, so it is suitable for financial institutions to develop standardized, comprehensive financial services program.

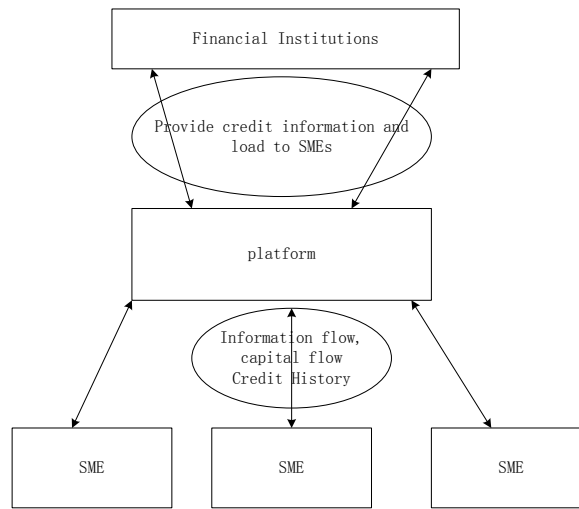


Fig1:SME financing credit chain

#### A. Research on Knowledge Management System

Currently, the characteristics of the LED industry knowledge is the knowledge of fast update rate, and cutting-edge technology has been mastered by foreign enterprises, the country can only be applied to knowledge. In order to establish LED innovation service platform from the industry point of view, the knowledge management system is indispensable, one-stop service system enables the LED industry, technology, intellectual property and new product businesses can get the exchange and promotion, while promoting technology the development, to provide conditions for the development of industry standards.

KMS(Knowledge Management System) system architecture can be divided into four levels<sup>[5]</sup>, called: the presentation layer, application layer, functional layer and the storage layer. Each layer also includes a specific module component, which together form a complete KMS system configuration<sup>[6]</sup>, as shown in Fig2.

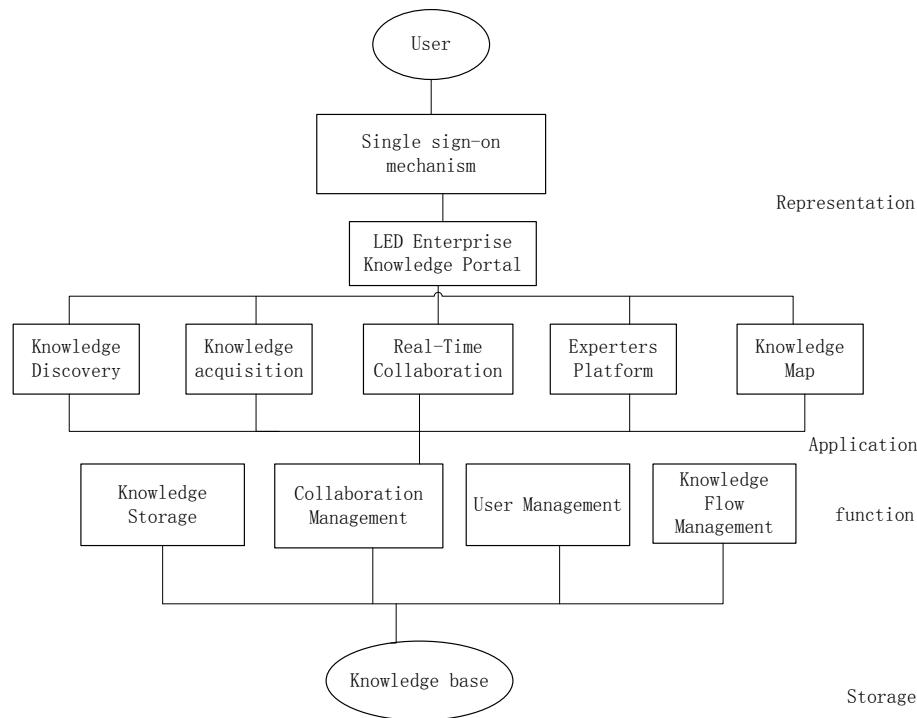


Figure2: System architecture of KMS

(1) Representation is connected to the presentation layer and the KMS user interface responds to a user operation, and displays the processing results. The main module is the presentation layer of enterprise knowledge portal. Enterprise Knowledge Portal enables employees, customers, partners, can be accessed from a single platform, extraction, analysis, storage knowledge to their respective needs. Users can use this platform to acquire knowledge, to make sound business decisions and implement them.

(2) The application layer processing logic of knowledge management is the core constitute KMS software system, the basic modular components are: knowledge discovery, knowledge acquisition, real-time collaboration, project collaboration, knowledge maps, electronic training.

(3) A functional layer is to provide a tool or platform support for the application layer. Generally include: knowledge of process management systems, information management, unified user management, storage management.

(4) The storage layer constituted by a unified knowledge base, responsible for responding to search requests, storage management and data security management functions such data.

## Conclusion

LED lighting industry is a recently developed new industry, LED lighting industry chain accounted for the vast majority of small and medium enterprises, therefore, information collaboration is the future direction of the LED lighting industry, through the industrial supply chain business collaboration platform to create business synergies supporting technology, business collaboration business model, play an exemplary role in the industry, thus contributing to enhance the overall competitiveness of the LED industry; through the integration of the LED lighting industry chain, to achieve business integration, SMEs make LED lighting industry chain based on financial theory financing options. Create LED lighting business integration and financial innovation platform for all kinds of objects in the chain offers a variety of services, and the

formation of large-scale business promotion through subsequent development, thus supporting the development of effective LED lighting industry.

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