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Application and Impact Analysis of Intelligent Financial Systems in Small and Medium-Sized Manufacturing Industries

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Abstract: This paper explores how smart financial systems can empower small and medium-sized manufacturing industries by integrating artificial intelligence, big data analytics and cloud computing technologies to provide customised financial service solutions for the sector. The study outlines the core challenges faced by small and medium-sized manufacturing industries, such as financing difficulties, lagging risk management and operational inefficiencies. The core components of the smart financial system are detailed, including functional modules such as automated credit assessment, supply chain finance optimisation, cost prediction models and personalised insurance product recommendations. This paper proposes strategies to address data security, technology acceptance, and regulatory compliance issues that may be encountered during the implementation process, and emphasises the importance of building a good ecosystem between the government, financial institutions, and technology enterprises to comprehensively support the intelligent transformation and sustainable development of the small and medium-sized manufacturing industry.

Keywords: Intelligent Financial Systems; Manufacturing Industries; Artificial Intelligence.

1. Introduction

The abundance of elements in the Earth's crust is shown in Figure.1; aluminium is present in the Earth's crust after oxygen and silicon and is the second most used metal globally after iron, but mankind did not master the technology to isolate and produce pure aluminium until the 19th century. Almost everyone in the world has used an aluminium-containing product at some point. Desirable physical properties, whether in terms of abundance, heat capacity, or tensile strength, make aluminium widely used in commodities. It is also infinitely recyclable and is part of the world's infrastructure [1]. According to data, with the development of the economy, China's small and medium-sized micro-enterprises number of rapid growth in size, the number of China's small and medium-sized micro-enterprises has exceeded 52 million, of which the aluminium industry is an indispensable and important part. 'Replace steel with aluminium, save wood with aluminium, save copper with aluminium, and replace plastic with aluminium' has gained wide social consensus [2]. In China's social development and construction, the role of aluminium is very important, the aluminium industry as a traditional manufacturing enterprises to seek advanced manufacturing technology and a new generation of information technology to achieve the depth of the integration of magnificent turn, this is the industry's question, but also the times must be answered.

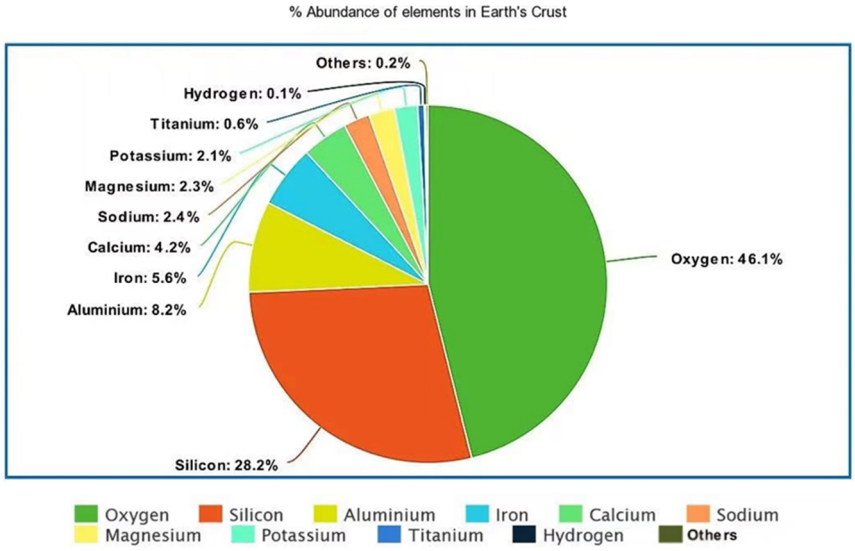


Figure 1. Abundance of elements in Earth's Crust

At present, China's economic growth is slowing down, medium-speed growth has become the new normal, the cost advantage of traditional enterprises is gradually disappearing, and enterprises urgently need digital transformation to

achieve the next round of healthy development [3]. The rapid development of the Internet economy, big data, intelligence, mobile Internet, cloud computing and other new technologies continue to innovate and apply, revealing the advent of the era of intelligence, the intelligent era is behind the era of data. And data analysis and application is the core ability of financial people. Therefore, financial management has also stepped into the 4.0 intelligent financial era. The centre of gravity of financial work will be shifted from accounting for the past to managing the future, and from traditional finance based on historical data to modern finance based on future forecast data in a comprehensive manner [4]. Accelerate the pace of transformation and upgrading of the entire industry. Because of this, the aluminium processing industry has the most abundant and complex application scenarios of 5G+ Internet. If you can apply intelligent financial digital transformation and upgrading in aluminium processing enterprises, can to a large extent to help aluminium processing enterprises to improve production management efficiency, deeper promote the development of aluminium processing enterprises, and is conducive to promoting the production of high quality and high yield of aluminium [5].

2. Understanding of Intelligent Finance

Intelligent finance is relying on the comprehensive application of big data, cloud computing, mobile Internet, artificial intelligence, blockchain and other advanced digital means to promote the realisation of traditional finance to the automation of data sharing and information transmission, the financial function of intelligent and machine learning intelligent financial change, and maximise the value of financial data [6]. 1) Internally, it can strengthen the level of financial management intelligence. Based on the application of new technologies (such as big data, artificial intelligence, cloud computing, Internet of Things, etc.), it promotes the intelligence of financial accounting, financial analysis and forecasting, risk control, reduces manual operations, reduces miscalculations and omissions, and at the same time effectively releases financial manpower to improve the overall operational efficiency and reliability of the enterprise. 2) Externally, financial intelligence promotes business development and strengthens business information grid management. Through the improvement of finance in performance management, risk control and operational forecasting capabilities, finance penetrates into the business loop and reconfigures the enterprise business, providing high-quality data and information for the business sector, truly empowering the management of the enterprise, improving insights, and becoming a true partner of the business. Based on the enterprise's digital capabilities, we collect information on customers' transaction characteristics, risk preferences, channel preferences, etc., form a systematic model, and provide external customers with specialised and customised products and services that meet their actual needs, enhance customer satisfaction and customer stickiness, and promote the sharing of customer resources and secondary development.

3. The Current Problems Faced by Small and Medium-Sized Manufacturing Enterprises - The Aluminium Industry, for Example

Problem 1: Difficult to standardise the operation process, difficult to count the capacity of the personnel, difficult to assess the fairness of the performance appraisal, difficult to assess whether the on-site work affects the production efficiency, for employees can not be real-time supervision and effective evaluation.

Problem 2: It is impossible to obtain real-time production equipment status and statistical equipment operation efficiency, equipment inspection, maintenance, repair, spare parts, etc. failed to form a complete equipment history system, it is difficult to guarantee timely maintenance after failure; small and medium-sized aluminium enterprises may lack sufficient technical research and development capabilities, it is difficult to carry out product innovation and technological updating, which affects the competitiveness of the enterprise.

Problem 3: Low efficiency of storage materials and finished products management, real-time and accuracy is difficult to ensure, can not real-time inventory, data lag, slow progress of updating the number of specific products; aluminium product quality directly affects the reputation of the enterprise and the market competitiveness of small and medium-sized enterprises may be due to mismanagement or lack of technical level and face quality management and product quality problems.

Problem 4: Manual transcription of energy management such as power consumption, gas consumption, etc. is inefficient, real-time is poor, and cost analysis is lagging behind; Aluminium production usually requires a large amount of capital investment, and small and medium-sized enterprises may face the problem of lack of funds, which makes it difficult to carry out technological updating and equipment updating.

Problem 5: The manual transcription of inspection data (temperature, hydrogen content, dross content, density, hardness, etc.) is inefficient, and cannot form complete real-time quality traceability data and visualisation charts, so it is inefficient to find, analyse and statistic.

4. The Study on the Exploration of Intelligent Financial Systems to Empower Small and Medium-Sized Manufacturing Enterprises

With the continuous popularity of intelligent technology in all walks of life, intelligent finance has become an inevitable development trend. Intelligent finance provides new ideas and new paths for the transformation and development of financial management. In order to achieve the transformation of financial management, enterprises will need to constantly change the inherent financial management concepts in the transformation process, constantly improve the financial management process, further improve the information level of financial management, make full use of technical means, system advantages to play the financial supervision function, and pay more attention to cultivating talents, and through the transformation to effectively improve the efficiency of financial management [7].

(1) In the enterprise production cost management application of intelligent financial systems in this area can greatly improve efficiency and accuracy. 1) Intelligent financial system can monitor all aspects of the production line in real time, including raw material procurement, personnel deployment, production process, inventory management and so on. This monitoring can help enterprises quickly and timely detection of problems in the production process of

aluminium processing, and the possible emergence of a variety of situations to make timely and effective adjustments, thereby reducing production costs. 2) Intelligent cost control system will constantly look for opportunities to reduce inventory costs, including optimising inventory turnover, reducing inventory holding costs and so on. 3) Conduct regular inventory counts and classifications, and use inventory management software or systems for inventory tracking and monitoring to effectively identify expired or obsolete inventory and clear it in a timely manner to reduce waste. Timely update the remaining quantity of inventory quantity products to improve the efficiency and accuracy of inventory management. Take care to avoid additional costs such as inventory expiration and damage.

(2) The costing function of the Intelligent Financial System can calculate the cost of a product according to different costing methods (e.g., job costing, process costing, etc.), taking into account the impact of various cost elements. This helps enterprises to assess the profitability and market competitiveness of their products. Enables companies to calculate the cost of products more accurately. The intelligent financial system is able to analyse and track direct costs (e.g. raw materials, direct labour, etc.) and indirect costs (e.g. indirect materials, indirect labour, manufacturing overheads, etc.), which helps companies to accurately calculate the full cost of a product or service and to assess production efficiency. Use intelligent systems to develop sound pricing strategies and identify which products or product lines are the most profitable. By analysing cost data, companies can also identify potential ways to reduce costs, thereby improving competitiveness. Intelligent financial system in each month, quarter, year can set the cost budget and standard cost, and with the actual cost of comparison and analysis, to facilitate the investment of physical capital and production factors before the management of the system can be monitored through the system to monitor the difference between the actual cost and the budget, and take timely measures to control and optimise the cost.

(3) Intelligent financial system can also optimise the supply chain management to ensure timely supply of raw materials and optimal management of inventory, which can help to improve the flexibility and responsiveness of production, and also reduce inventory costs and save logistics costs to adapt to changes in market demand [8]. At the same time to add quality testing management: quality inspection centre laboratory using data acquisition system is mainly used for the collection of groove samples, electrolyte, finished ingots and other samples of laboratory data, laboratory analytical instrument testing results directly uploaded to the laboratory data acquisition system, laboratory technician in the control will be the results of the audit will be submitted to the auditor for review, after successful review of the laboratory data will be in the form of a report in the catty checking and dosage module to call. After successful audit, the lab data will be called in the form of report in the module of weighing and batching. At the same time, the system generates a standardised quality report of the assay for query, and can be printed out for the record.

(4) Intelligent financial system in the enterprise raw material inventory management through the introduction of intelligent financial system, can achieve effective monitoring and control of enterprise inventory, so as to improve the efficiency and accuracy of raw material inventory management, reduce inventory costs, optimise the inventory structure, and enhance the overall level of enterprise operations and market competitiveness [9]. The introduction of advanced automation equipment, through the introduction of unmanned forklifts, unmanned trucks, automatic sorting machines and other automation equipment, can greatly improve the efficiency of warehousing, reduce manual errors, and provide data support for the optimisation of inventory structure. Intelligent financial systems in small and medium-sized manufacturing enterprises will be on the procurement information and the control of the list of goods to be effective, on the subsequent application and ordering of goods, such as prices, order codes, procurement organisations and change records, etc., but also contains the main information on the goods and raw materials, to a certain extent, can play a guiding and decisive role. Effective control in the procurement price, that is, the price of the material with the validity of the period can be carried out: forecasting the amount of orders needed and orders placed and other procurement activities.

(5) Effective union of intelligent financial systems with big data and artificial intelligence technologies: by collecting and analysing a large amount of data in the warehouse, such as information on goods inbound, outbound and inventory, it is possible to predict the demand for goods and optimise inventory strategies. At the same time, through artificial intelligence technology, such as machine learning, deep learning, etc., the intelligent identification and tracking of items in the warehouse can be realised to improve the efficiency of warehousing [10].

(6) Intelligent financial system establishes a perfect training and service system: the intelligent financial system is able to comprehensively analyse the training needs of employees within the enterprise [11]. The intelligent financial system collects and evaluates through employee surveys, performance evaluations, management feedback, etc., and scores the effective work of staff in different areas within each enterprise. Based on the training objectives, a detailed training plan is formulated, including training content, format, schedule, and participants. Considering the different responsibilities and positions of staff, it may be necessary to design multiple training courses or activities, provide multiple professional operation training, regular equipment maintenance, and rapid fault response, etc. This can ensure the stable operation of the system, enhance user satisfaction, and thus the stability and optimisation of the corporate structure. The system initiates the organisation and implementation of training activities in accordance with the training plan and schedule. It ensures the quality and effectiveness of the training content, as well as the smooth running of the training process.

(7) The application of intelligent financial systems in corporate financial management can automatically collect and integrate financial data from different departments, including information on sales and purchasing capital flows. This eliminates manual data entry errors and ensures the correctness and consistency of financial data. Secondly, intelligent financial systems mention timely detection of potential financial problems and take appropriate measures.

(8) The study of IFS in enterprise personnel management. Personnel management is an important part of enterprise management, and is crucial for employee recruitment, training, performance evaluation and salary management. The application of intelligent financial system in manufacturing enterprises can greatly improve the efficiency of management.

5. The Necessity of Intelligent Financial System to Empower Small and Medium-Sized Manufacturing Enterprises

5.1. Help to Further Improve the Establishment of Information Systems

At present, the information management system of more enterprises is still in the process of continuous expansion and improvement, and has not yet fully realised financial informatisation. As the business development of enterprises is more diversified, the layout is more decentralised, and the management level is becoming more and more complex, a perfect information system can greatly improve its operational adaptability and help enterprises efficiently realise financial sharing. Financial transformation under the background of intelligence can help further improve the information system, effectively solve various problems in the process of collecting, integrating, processing and outputting financial information, and at the same time increase the business relevance of each business unit, break down information barriers, and achieve efficient communication across regions, subjects and departments. Although the accounting information system of many enterprises has been perfected, other modules, such as business information system, inventory management information system, etc., are still missing or in a low-level state, unable to achieve real-time data docking with the accounting information system, resulting in a data gap. The transformation of financial management under intelligence will start from the practical level and better guide the establishment of correlation between various information systems.

5.2. Help Realise the Interconnection and Sharing of Big Data

The transformation of financial management under the background of intelligent finance means that enterprises will realise financial management through artificial intelligence, big data and cloud computing and other modern technologies, so as to realise deep enterprise process reengineering, simultaneously improve the functional framework and improve the efficiency of financial management. If you want to successfully realise the transformation of financial management, it is crucial to open up all kinds of data barriers and realise the interconnection and sharing of big data. It can be seen that this type of transformation can motivate enterprises to make better use of technical means to achieve the interconnection and sharing of big data, including the interconnection and sharing of internal and external business data, the interconnection and sharing of cross-functional business data, and the interconnection and sharing of practical and modelling data, and so on. In the process of transformation, enterprises will reengineer their processes and promote the integration of business and finance, and the key prerequisite for achieving the in-depth integration of business and finance is the in-depth integration and sharing of data. In this process of continuous adjustment and integration, data can be more appropriately circulated and processed, greatly improving the efficiency of data interconnection. More potential data processing risks will surface, and enterprises will be able to develop better data collection and application strategies in the process of sorting out, further improving the efficiency of data use.

5.3. Helps to Improve the Efficiency of Financial Management

Through the results of some existing studies, it can be seen that the later the establishment of the financial sharing centre, the more efficient its operation. That is because the transformation of financial management in the context of smart finance requires major changes and improvements to the original financial management model. In the process of continuous change and improvement, inefficient, repetitive and mechanical processes will be re-engineered, and at the same time, the successful experience of similar projects can be drawn on to achieve a more accurate deployment of automation and intelligence. This has laid a solid foundation for improving the efficiency of financial management, the original financial information system because the process is embedded in more intelligent, automated elements, such as some of the higher degree of intelligence of the enterprise financial system, you can achieve the system automatically scanning invoices for automatic bookkeeping, for the need for frequent reimbursement of expenses for the enterprise has greatly improved the efficiency of the financial work. At the same time part of the enterprise also in the documents audit link introduced the robot intelligent audit technology, so that a lot of the original need for manual work to complete the task to be achieved through automation. Visible intelligent technology embedded, not only increases the prudence of accounting work, to avoid the generation of subjective fraud, the most critical is able to significantly improve the efficiency of financial management work, so that the financial personnel from the cumbersome accounting, checking work freed.

6. Specific Objectives of the Intelligent Financial System

(1) Build up an enterprise information management network platform that is highly related to financial data, and enhance the support for enterprise business management; clarify the specific needs of the enterprise information management platform, including the collection, storage, analysis and reporting of financial data, while also taking into account the needs of other departments, such as human resources, marketing, and so on. Integrate data from different departments and systems, including financial systems, ERP systems, CRM systems, etc., to ensure data consistency and integrity. The enterprise information management network platform, which is highly related to financial data, can be automatically upgraded to continuously optimise the functions and performance of the enterprise information management platform, and to make continuous improvements and upgrades based on user feedback and business needs.

(2) Build an enterprise information management network platform that is highly correlated with financial data. Intelligent testing can ensure that the enterprise information management platform complies with relevant regulations and industry standards, such as GDPR, SOX, etc., establish a compliance management mechanism, and conduct compliance audits on a regular basis.

(3) Provide multi-dimensional data analysis functions to support multi-dimensional analysis and report generation of financial data, including monitoring, trend analysis and forecasting of financial indicators. Provide mobile applications to support users to view and manage financial data anytime and anywhere, enhancing the convenience and flexibility of users.

(4) Provide users with relevant training and technical support to ensure that users are able to use the enterprise information management platform proficiently and solve problems encountered by users in the process of using it in a timely manner.

(5) Improve the enterprise's ability to supervise business data and strengthen the cornerstone of 'digital operation' by constructing an enterprise financial data monitoring system; ensure system security, including data security, access control, identity authentication and authorisation. Ensure system security, including data security, access control, authentication and authorisation. Implement security measures such as password policy and multi-factor authentication. Conduct regular security audits and vulnerability scans, and update patches and firewalls in a timely manner.

(6) Multi-source data integration: Support the use of various data sources, such as existing financial and business platforms, in order to expand the coverage and breadth of data mining; integrate multiple data sources, including structured and unstructured data, such as databases, log files, and social media data, in order to obtain more comprehensive information. Introducing new technologies and tools: utilising new technologies and tools such as artificial intelligence, machine learning, natural language processing, etc. in order to mine more data and extract deeper information.

(7) Real-time data analysis: Realise real-time data analysis and processing to discover and respond to changes and trends in the data in a timely manner and improve the timeliness and flexibility of data mining. Realise real-time monitoring and early warning functions for financial data, discover abnormalities in time and take corresponding measures.

(8) Increase data dimensions: Consider introducing more data dimensions, such as geographic location, time, socio-economic factors, etc., in order to enrich the perspective of data analysis and discover more associations and laws. Continuous optimisation of algorithms and models: Continuous optimisation of data mining algorithms and models to improve the accuracy and efficiency of data mining and adapt to the ever-changing data environment.

(9) Open Data Sharing: Consider cross-departmental co-operation within the company and work with different departments to share data and resources to gain more data sources and a more comprehensive perspective. For example, co-operate with marketing department to obtain market trend data, co-operate with customer service department to obtain customer feedback data, and so on. Outside the company consider establishing data sharing mechanisms with external organisations or partners to obtain more external data and expand the scope and breadth of data mining. Continuous learning and innovation: Actively pay attention to the industry development trend, continuously learn new data mining techniques and methods, innovate, and improve the ability and level of data mining. Better discover the value and potential laws in the data to provide more accurate and comprehensive support for enterprise decision-making.

(10) Data security backup: Reduce redundancy and improve system management efficiency by optimising system management; ensure stable data quality by setting up a quality monitoring system and improving corresponding information management capabilities; ensure regular backup of financial data and store backup data in a safe location. Establish a perfect data recovery mechanism to cope with system failures, data corruption and other unforeseen circumstances.

7. Digital Intelligence Enterprise Management Sand Table Routine Operation Steps

The Digital Intelligence Enterprise Management Sandbox refers to the process of using digital technology and data analytics to simulate and optimise an enterprise's business strategy. This sandbox simulation is usually based on the enterprise's historical data, market intelligence and economic environment and other information, through the establishment of mathematical models and algorithms to predict the results of business under different strategies, and provide decision-making support.

1.Define objectives and key indicators: Define the business objectives of the enterprise, such as increasing revenues, improving profit margins, reducing costs, etc., and define the key indicators related to these objectives, such as sales, gross profit margins, and market share.

2.Collect data: Collect data from inside and outside the enterprise, including historical performance data, market competition data, and industry trend data. These data can be obtained through internal systems, market research, industry reports and other channels.

3.Build a model: Use the collected data to build a mathematical model, which can use statistical analysis, machine learning and other methods. Models can include modelling of sales forecasts, cost structures, market demand, etc. in order to assess the impact of different business strategies on the enterprise.

4.The establishment of a digital management platform: 1) RPA robot design: design tasks that can be processed automatically as well as conditions. 2) Intelligent recruitment algorithm design: set the key indicators of intelligent screening of resumes and sorting logic. 3) Intelligent production algorithm design: set the key links of intelligent production algorithm and judgement logic. 4) Operation data visualisation: set data indicators and dimensions, visualise and present the data, form a Kanban board, and assist decision-making.

5.Simulation scenarios: On the basis of the established model, different business strategies are simulated. For example, the effects of marketing activities, the impact of product pricing strategies, etc. can be simulated.

6.Evaluate the results: Analyse the results of the simulation of different scenarios and evaluate the extent of their contribution to the business objectives. Data visualisation tools can be used to visualise the results in order to understand and compare the effects of different scenarios more intuitively.

7.Optimising decision-making: Adjusting the business strategy based on the evaluation results to find the optimal solution. This may involve decisions about investing in different areas, adjusting product portfolios, improving operational processes, and so on.

8.Implementation and Monitoring: Put the optimised decision-making solutions into practice and continuously monitor business performance. Adjust and optimise the strategy according to the actual situation to maintain the competitive advantage of the business.

8. Conclusion

Along with China's economic growth rate from high-speed transition to the new normal, from the pursuit of speed and scale growth to high-quality development, China's

manufacturing industry to aluminium processing industry, for example, is experiencing explosive growth after the industry to digest excess capacity, enterprise transformation and upgrading development of the pain period. However, the orderly implementation of the 'Belt and Road', 'Industry 4.0', 'Green Economy', '13th Five-Year Plan' and other major strategies and development work. Will provide strong support for the future development of China's economy and the people's pursuit of high quality of life, aluminium as a pillar of the modern economy and high-tech development of raw materials is expected to be more expanded. Intelligent financial system for small and medium-sized manufacturing enterprises digital intelligent information technology financial upgrading and transformation to provide great help.

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