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Enhancing Competitive Advantage through AI and Digital Technology: A Case Study of Jiangling Motors Group

Shengliang Zhu*

Guangzhou Vocational University of Science and Technology, 510555, Guangzhou, Guangdong, China

Corresponding author: Shengliang Zhu , Eric2216@outlook.com

Abstract: The automotive industry is at the forefront of a technological revolution characterized by the convergence of electrification, intelligence, connectivity, and sharing—collectively known as the new four modernizations. These trends are not only redefining the automotive landscape but also presenting new challenges and opportunities for established players like Jiangling Motors Group Co., Ltd. As a pioneer in commercial vehicle manufacturing and a significant exporter of complete vehicles in China, Jiangling Motors is at the vanguard of integrating artificial intelligence (AI) and digital technologies to enhance its competitive edge. This paper delves into the strategic deployment and practical implementation of AI and digital technologies within Jiangling Motors, examining how these innovations are streamlining manufacturing processes, advancing smart driving capabilities, and revolutionizing marketing strategies. By analyzing the company's approach to leveraging cutting-edge technologies, this study aims to provide insights into the transformative potential of AI and digitalization in the automotive sector (Lau, 2014). The findings underscore the importance of proactive technological adoption in maintaining a competitive stance amidst industry disruptions and highlight the strategic initiatives that Jiangling Motors is undertaking to secure its future in the intelligent and digital era of automotive manufacturing. This paper is a case study for understanding the complex interplay between technological advancement and business strategy within a rapidly evolving industry.

Keywords: Case Analysis; Chinese Industry; Vocational System

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1. Introduction

Since its founding in 1947, Jiangling Motors Group has gone through a remarkable journey of development and has now evolved into a highly integrated group company that encompasses extensive research and development, sophisticated manufacturing processes, and wide-ranging sales activities. Its product range has witnessed a significant expansion over the years. Initially focusing on commercial and special-purpose vehicles, it has successfully diversified into the production of passenger cars and new energy vehicles, thereby catering to a broader market spectrum.

Jiangling Motors has managed to maintain a consistently leading position within the commercial vehicle sector. In particular, in the highly competitive light passenger vehicle market, it has held a prominent place for an extended period, with its market share often ranking among the top. This achievement can be attributed to the company's commitment to quality, innovation, and customer satisfaction.

Concurrently, Jiangling Motors has been proactive in forging close and mutually beneficial cooperative relationships with

several internationally renowned enterprises, most notably Ford. Through these partnerships, the two companies have engaged in joint efforts to develop advanced new technologies and innovative products. These collaborations have not only enhanced Jiangling's technological prowess but also broadened its global vision.

However, the current business environment presents several formidable challenges. With the national policy increasingly emphasizing weight reduction and imposing more stringent emission standards for commercial vehicles, Jiangling Motors has to adapt its production lines and product designs accordingly. Additionally, the sales performance of Jiangling's new energy and passenger vehicles has been rather sluggish in recent times, which has further complicated the situation. As a result, the group is now confronting unprecedented difficulties that require urgent attention and strategic solutions.

In the current era, the automotive industry is experiencing a revolutionary transformation as it increasingly adopts AI and digital technologies to break through traditional limitations. Against this backdrop, how Jiangling Motors Group can effectively utilize these cutting-edge technologies to enhance its competitive edge and achieve a successful business transformation has become the primary strategic task. This task is of utmost significance. It not only determines the future direction and prosperity of Jiangling Motors Group but also has a far-reaching impact on the technological advancement and international competitiveness of the entire Chinese automotive industry.

2. Application of AI Technology in Jiangling Motors

Jiangling Motors has entered the market by manufacturing, driving, and marketing with AI technology. Intelligent manufacturing is a significant area in which Jiangling Motors applies AI technology. By introducing intelligent robots, machine vision, data analysis, and other technologies, Jiangling Motors has achieved automation and intelligence in the production process, improving production efficiency and product quality. On the assembly line, Jiangling Motors has introduced intelligent welding robots(CAAM,2018). These robots can accurately identify welding positions through machine vision technology and conduct high-precision welding operations. Compared with traditional manual welding, intelligent welding robots not only increase the welding efficiency but also significantly reduce the welding defect rate. At the same time, Jiangling Motors has introduced and realized real-time monitoring and quality inspection of the production process through machine vision technology, timely detection, and correcting problems in production to avoid defective products from entering the market. In addition, Jiangling Motors conducts in-depth mining and analysis of production data through big-data analysis technology to optimize the production process, reduce production costs, and improve production efficiency.

While intelligent driving is gradually becoming the future development direction of the automotive industry, Jiangling Motors has invested a large amount of resources in this field and promoted the development of intelligent driving technology through AI technology. Jiangling Group has cooperated with several technology companies to research and develop autonomous driving technology. Through sensors, radars, cameras, and other equipment, combined with AI algorithms, the autonomous driving function of vehicles has been realized. Jiangling Motors has cooperated with the Baidu Apollo platform to develop an SUV model with an L2-level autonomous driving function. This model is equipped with multiple sensors and high-definition cameras, which can realize functions such as automatic following, lane-keeping, and automatic emergency braking, greatly improving driving safety and convenience. Currently, Jiangling Motors has achieved L2-level autonomous driving function in some models and plans to launch higher - level autonomous driving models in the future.

In the marketing field, Jiangling Motors has also applied AI technology to enhance brand influence and market competitiveness through intelligent marketing means. At the same time, the enterprise analyzes users' behavior data and consumption habits through big-data analysis technology, formulates personalized marketing strategies, and improves marketing effectiveness. It also applies the AI customer service system for the first time to provide users with 7 * 24-hour intelligent customer service, improving user satisfaction and loyalty. For example, Jiangling Motors has formulated personalized marketing strategies by analyzing users' behavior data on its official website and social media platforms. For example, according to preferences for browsing vehicle models, relevant promotional information and test-drive invitations are pushed, thereby increasing the user conversion rate and satisfaction.

3. Application of Digital Technology in Jiangling Motors

3.1 Digital Design

Digital design is a crucial means for Jiangling Motors to enhance the efficiency and quality of product development. Through the application of digital technology, Jiangling Motors has achieved digitalization and intelligence in product design

3.2 CAD/CAE Technology

Jiangling Motors has realized the digitalization of product design and simulation by applying Computer - Aided Design (CAD) and Computer - Aided Engineering (CAE) technologies, thus improving design efficiency and product quality. CAD technology provides designers with a highly accurate, convenient, and efficient two - dimensional and three - dimensional design platform, enabling them to easily create, modify, and optimize the design models of automotive parts and the whole vehicle. Every line and every curved surface can be accurately presented in this virtual design space. Whether it's the complex structure of an engine or the delicate details of the interior, they can all be meticulously designed. CAE technology, based on this, further plays a huge role. It conducts various physical performance simulation analyses on the design model through powerful simulation functions, such as structural strength analysis, fluid mechanics analysis, and heat conduction analysis. During the design stage, engineers can use CAE technology to predict in advance possible problems that may occur during the actual use of the product(CAAM,2018). For example, whether a certain part will deform or be damaged when subjected to a specific load, and whether the aerodynamic performance of the vehicle is good during high - speed driving. In this way, Jiangling Motors has not only greatly improved the design efficiency. The design process that originally required multiple physical tests and repeated modifications can now be quickly completed in the computer virtual environment, but also significantly improved the product quality, effectively avoiding later - stage problems caused by design defects, making the product safer, more reliable, and with better performance.

3.3 Supply Chain Management System

Jiangling Motors actively introduces an advanced supply chain management system. This system, like a precise neural network, closely connects each link of the supply chain and conducts digital management. From raw material procurement, part production, logistics transportation to vehicle assembly and other links, they are all included in the management scope of this system. In the raw material procurement link, the system can monitor in real - time information such as price fluctuations in the raw material market and the supply capacity of suppliers, helping the enterprise formulate the optimal procurement plan to ensure the stable supply of raw materials and cost control. For the part production link, the management system can accurately track the production progress and quality status of each part, coordinate the production plans among different suppliers, and avoid production delays and inventory backlogs. In the logistics transportation link, the system arranges transportation routes and distribution plans reasonably through real - time logistics information tracking to improve logistics efficiency and reduce transportation costs. Through this all - round digital management, Jiangling Motors has greatly improved the transparency of the supply chain. Enterprise managers can clearly understand the operation status of each link at any time. At the same time, it has also significantly improved the response speed of the supply chain, enabling it to quickly respond to changes in market demand and unexpected situations.

3.4 E - commerce Platform

Jiangling Motors has made bold innovations. By establishing a powerful e - commerce platform, it has broken the limitations of the traditional automotive sales model and achieved a deep integration of online sales and offline services. On this e - commerce platform, consumers can easily browse the entire series of Jiangling Motors' models. From the beautiful pictures of the exterior and interior to the detailed vehicle parameter configurations, everything is available. Consumers can screen and compare according to their own preferences. They can also use the virtual exhibition hall function to view every detail of the vehicle as if they were on the spot. At the same time, the platform provides convenient online car - car-purchasing services, including online ordering, financial loan application, vehicle insurance purchase, and a series of other functions, allowing consumers to complete most of the car - car-purchasing process without leaving home. The offline service network closely cooperates with the e - commerce platform to provide consumers with comprehensive support such as vehicle pickup, after - sales service, and maintenance. This online - offline integration model not only greatly improves the sales efficiency, reduces

the intermediate links in the traditional sales model, and shortens the transaction time but also significantly improves the user experience, making the car - purchasing process more relaxed, convenient, and transparent.

3.5 Social Media Marketing

Jiangling Motors actively uses social media platforms, a powerful marketing position, to conduct in - depth interactions with users, thereby enhancing brand influence and user stickiness. On various social media platforms, Jiangling Motors has established official accounts and regularly publishes a rich variety of content, including new vehicle model release information, automotive technology interpretations, exciting driving experience sharing, user stories, etc. These contents are presented in vivid and interesting forms, such as beautiful pictures, exciting videos, and fascinating articles, attracting a large number of users' attention and participation. At the same time, Jiangling Motors actively interacts with users, responds to users' comments and private messages, and conducts online activities such as lucky draws, question-and-answer sessions, and user co - creation. Through these interactions, Jiangling Motors can deeply understand users' needs and preferences and further optimize products and services. Moreover, during the participation process, users will gradually enhance their sense of identity and belonging to the brand, forming an active user community, effectively enhancing the brand influence and user stickiness, and establishing a good brand image of Jiangling Motors in the minds of users.

4. Challenges in Research Fields

In the era of rapid technological development, the automotive industry is undergoing profound changes, and AI and digital technologies are gradually becoming the key driving forces for its development. However, Jiangling Motors faces many severe challenges in integrating these advanced technologies into its development process.

Firstly, technological complexity is a big problem. AI and digital technologies are not simple concepts. They cover a large number of complex algorithms, models, and data - processing techniques. It's like a tall and intricately - structured building, and every detail has extremely high requirements for the enterprise's technical ability and R&D level. For Jiangling Motors, how skillfully apply these complex technologies to actual production and operation is like opening up a flat road in the thorns, which is an important challenge. For example, during the R & D of autonomous driving technology, Jiangling Motors found that accurately identifying pedestrians, bicycles, and other obstacles when driving in complex urban road environments is as difficult as finding specific people in a vast crowd. This is a highly challenging technical problem. Therefore, Jiangling Motors has actively sought external cooperation and joined hands with several companies with deep technological accumulation in the AI field(Zhang,2021). They have jointly invested a large amount of manpower, material resources, and time to develop more advanced image recognition algorithms and sensor fusion technologies, hoping to break through this technical bottleneck.

Secondly, the issues of data security and privacy cannot be ignored. With the increasing popularity of vehicle - networking and intelligent driving technologies, vehicles are like "data production factories", and the amount of data generated has exploded. These data include not only the vehicle's own operation data such as speed, mileage, and fuel consumption but also a large amount of user - personal information such as location information and driving habits. These data are like precious treasures, like a data bomb that may detonate at any time. How to ensure the security of these data, just like building an impregnable fortress for the treasures to protect user privacy from being violated, is a problem that Jiangling Motors must go all out to solve. To achieve this goal, Jiangling Motors has established a multi - level data security protection system. This system is like a military fortress with multiple layers of defense. The first layer is data encryption, which converts data into seemingly disordered codes that unauthorized people cannot interpret. The second layer is access control, and only strictly authorized personnel can access relevant data, just like only those with special passes can enter the core area of the fortress(Ajzen, 1991). The third layer is anomaly detection, always vigilant against any possible abnormal data behavior, just like having countless pairs of sharp eyes around the fortress. In addition, Jiangling Motors also closely cooperates with professional third - party security companies and regularly conducts comprehensive security audits and vulnerability detections on the entire data system to ensure data security.

Furthermore, the construction and maintenance of the industrial ecosystem are also major challenges. The application of AI and digital technologies does not exist in isolation. They are like various links in a large ecosystem and require close

cooperation and coordination with multiple industrial chain links. For Jiangling Motors, this means building a smooth - communicating and highly - efficient - coordinated bridge among numerous suppliers and partners and constructing and maintaining a healthy and sustainable industrial ecosystem. During the process of promoting the application of intelligent driving technology, Jiangling Motors is well aware of the importance of cooperation. It has established cooperation with multiple sensor suppliers to ensure that vehicles can obtain accurate environmental information, joined hands with map service providers to provide accurate route planning for autonomous driving, and cooperated with cloud computing platforms to ensure the efficient processing and storage of data. Through these strategic cooperation relationships, Jiangling Motors has constructed a complete intelligent driving ecosystem(Zhang,2021). This not only accelerates the R & D and application process of the technology like laying a flat and stable track for a high - speed train but also greatly enhances the synergy of the entire industrial chain, making the gears of each link closely meshed and operating efficiently.

Finally, the imperfection of regulations and standards has brought challenges to Jiangling Motors. In the emerging fields of intelligent driving and vehicle - networking technology, complete regulations and standards are like lighthouses, guiding the direction of enterprise development. However, currently, the regulations and standards for these technologies are still imperfect globally, which makes Jiangling Motors, during the process of promoting the application of technology, like a ship sailing in the fog, facing certain uncertainties. To cope with this challenge, Jiangling Motors has actively participated in the formulation and discussion of relevant domestic and international standards. For example, it has actively participated in the formulation of autonomous driving technology standards by the China Association of Automobile Manufacturers, contributing its wisdom and strength to the standardized development of domestic autonomous driving technology. At the same time, Jiangling Motors has also cooperated with governments and industry organizations of multiple countries to jointly promote the improvement of regulations for autonomous driving technology, striving to set up clear guidance signs in this ambiguous area.

5. Conclusion

Driven by AI technology and digital technology, Jiangling Motors is now developing rapidly in the direction of intelligence and digitalization. Through the application of technologies in intelligent manufacturing, intelligent driving, intelligent marketing, and other fields, Jiangling Motors has not only improved the production efficiency and product quality of the enterprise, but also enhanced the market competitiveness of the brand and the satisfaction of users. In the future, with the continuous progress of technology, Jiangling Motors will continue to work intensively in the fields of AI technology and digital technology, promote the continuous innovation and development of the enterprise, and contribute to the intelligent and digital transformation of the global automotive industry.

Through the above - detailed analysis, it can be seen that Jiangling Motors has a comprehensive layout and far-reaching influence in the application of AI technology and digital technology. Jiangling Motors has not only enhanced its own competitiveness through technological innovation but also provided valuable experience and reference for the intelligent and digital transformation of the entire automotive industry.

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Conflict of Interests

The author(s)declare(s) that there is no conflict of interest regarding the publication of this paper.

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