

**THE APPLICATION OF INFORMATION TECHNOLOGY  
IN ENYA'S MUSICAL INSTRUMENT R&D, PRODUCTION,  
AND POPULARIZATION OF MUSIC EDUCATION**

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**Abstract.** Enya Musical Instrument Co., Ltd. integrates information technology into core links including product R&D, intelligent production, and music education popularization. By applying digital modeling, IoT monitoring, and online teaching platforms, the company optimizes the industrial chain efficiency and expands the coverage of music education. This paper explores the application paths and practical effects of information technology in the musical instrument industry, providing reference for the digital transformation of traditional manufacturing and education-related fields.

**Keywords:** Enya Musical Instrument, information technology, intelligent manufacturing, music education, digital R&D, online teaching, industrial upgrading.

1. Introduction.

As a key enterprise in the global musical instrument manufacturing industry, Enya has long focused on the integration of information technology and traditional musical instrument production. Against the background of the national economy's digital development, the company has promoted technological innovation and industrial upgrading through three core directions: digital R&D, intelligent production, and educational popularization. This practice not only conforms to the conference theme of "Information Technology in Education, Science, and Industry" but also provides a typical case for the innovative development of the manufacturing and continuing education fields.

2. Application of Information Technology in Enya's Product R&D.

Digital technology has become the core driving force for Enya's product innovation, breaking through the limitations of traditional R&D models.

**3D Digital Modeling and Acoustic Simulation:** Enya uses SolidWorks and COMSOL Multiphysics software to build three-dimensional models of musical instruments such as ukuleles and guitars. The acoustic simulation

module predicts the resonance effect and timbre characteristics of the instrument in advance, reducing the number of physical prototypes by 40 % and shortening the R&D cycle by 30 % [4, 5]. This method aligns with the acoustic simulation application framework proposed in musical instrument design research [5].

**Big Data-Driven Demand Customization:** Through analyzing user behavior data on e-commerce platforms and social media, the company identifies market demand trends [4]. For example, based on the preference data of young users for portable and intelligent musical instruments, it developed the Enya Nova U smart ukulele with built-in Bluetooth connection and tone adjustment functions [4].

### 3. Intelligent Production Supported by Information Technology.

Enya has built an intelligent production base relying on the Internet of Things (IoT) and automation technology, realizing the transformation from traditional assembly line production to data-driven manufacturing [1, 2].

**IoT Quality Monitoring System:** Sensors installed on the production line real-time monitor parameters such as wood moisture content, glue solidification time, and surface polishing smoothness. The data is transmitted to the cloud platform for analysis, with the qualified rate of finished products increased from 92 % to 98,5 % [2, 4]. This IoT-based quality control mode is consistent with the industrial application standards summarized by Smith (2022) [2].

**Automated Production Linkage:** The CNC cutting equipment, robotic arm assembly, and automatic tuning system are connected through an industrial internet. The production schedule and equipment operation status can be viewed and adjusted in real time through the background management system, improving production efficiency by 50 % compared with traditional manual production [4].

Table 1 – Comparison of Production Efficiency Between Traditional Mode and Intelligent Mode

<b>Production Index</b>	<b>Traditional Mode</b>	<b>Intelligent Mode</b>	<b>Improvement Rate</b>
Single Product Production Cycle	8 hours	4 hours	50 %
Finished Product Qualification Rate	92.0 %	98.5 %	6.5 percentage points
Labor Cost per Unit	120 USD	50 USD	58.3 %

#### 4. Information Technology Empowers Music Education Popularization.

Combining the resource and infrastructure requirements of continuing education innovative development, Enya has built a multi-dimensional online music education platform to promote the popularization of musical instrument learning [3].

**Interactive Online Teaching Platform:** The Enya Music Academy APP integrates video courses, real-time feedback, and virtual practice functions. Users can use the APP to connect with intelligent musical instruments, and the system automatically corrects playing errors through audio recognition technology. The platform has accumulated more than 2 million registered users in three years [4]. This functional design follows the online education platform construction logic proposed by Wang (2024) [3].

**AR-Assisted Learning Tools:** The AR function in the APP can overlay virtual fingerboard prompts on the real musical instrument through the mobile phone camera, helping beginners master chord positions and playing postures quickly. Data shows that the learning cycle of beginners is shortened by 40 % with the assistance of AR tools [4].

#### 5. Conclusion.

The practice of Enya Musical Instrument Co., Ltd. shows that information technology can effectively promote the high-quality development of the musical instrument industry [1]. In product R&D, intelligent production, and music education, the application of digital tools, IoT, and online platforms not only optimizes the industrial chain efficiency but also expands the boundary of music education [2, 3]. In the future, Enya will continue to deepen the integration of artificial intelligence and big data technology, contributing more solutions to the digital transformation of traditional industries and the innovative development of education [1, 4].

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## **АНАЛИЗ ДИНАМИКИ ПОКАЗАТЕЛЕЙ ИННОВАЦИОННОЙ ДЕЯТЕЛЬНОСТИ РОССИЙСКОЙ ФЕДЕРАЦИИ**

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**Аннотация.** В данной статье представлен комплексный анализ динамики показателей инновационной деятельности в Российской Федерации за 2019- 2023 года. Исследование охватывает ключевые показатели развития инновационного сектора, такие как объем инвестиций в научно-исследовательские и опытно-конструкторские работы, а также внедрение новых технологий в промышленность. Особое внимание уделяется выявлению основных тенденций и проблем, препятствующих развитию инновационного потенциала страны. Полученные результаты позволяют сделать выводы о текущем состоянии инновационной системы РФ и определить направления ее дальнейшего развития.

**Ключевые слова:** инновационная деятельность, гражданская наука, федеральный бюджет, объем инвестиций.

Инновационная деятельность – это систематическая деятельность субъектов экономики, науки, техники и других сфер, направленная на создание, развитие и внедрение новых или значительно улучшенных продуктов, процессов, методов организации или маркетинга. Она включает в себя исследования, разработку, экспериментирова-