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# The Digital Transformation Path of Haier Group: A Case Study

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## Abstract

As a leading global manufacturer of home appliances, Haier Group launched its digital transformation strategy in 2012, thereby establishing a paradigmatic model for the transformation of traditional manufacturing firms into IoT-ecosystem enterprises. Centering on "user value creation," this case study systematically examines Haier Group's digital-transformation pathway, which integrates strategic reconfiguration, organizational change, and technological innovation into a tripartite framework. At the strategic level, Haier advanced an "IoT ecosystem brand" strategy that transcends the conventional boundaries of appliance manufacturing; built on its "1+3+N" whole-home intelligent solution, it has assembled a digital ecosystem spanning fifteen domains, including smart homes, healthcare, and the industrial internet. At the organizational level, Haier pioneered the "Individual-Goal Combination" management model, dismantling the hierarchical bureaucracy through a "platform-based organization plus maker mechanism" and converting its workforce into self-managed "micro-enterprise chain ecosystems," thereby establishing an agile response mechanism through which user needs reach the production floor directly. At the technological level, Haier self-developed the COSMOPlat industrial-internet platform and pioneered a "user-driven intelligent manufacturing" model that delivers mass customization through modular production systems. it has built a "10+N" innovation network and cultivated a "trinity" localization advantage internationally. As a benchmark case of digital transformation in Chinese manufacturing, Haier's practice has not only reconstructed its own business logic but also charted an innovative pathway through which traditional enterprises can break through growth bottlenecks.

## Keywords

Haier Group; Industrial Digitalization; Lighthouse Factory; Ecosystem Micro-Enterprise Chains; Cosmoplat Industrial-Internet Platform

## 1. Introduction

Amid the Fourth Industrial Revolution, global manufacturing is undergoing an unprecedented wave of disruptive change. The explosive advancement of the Internet of Things (IoT), artificial intelligence, and big data, intertwined with

increasingly fragmented and individualized consumer demand, confronts traditional manufacturers with an existential choice whether to remain entrenched in the comfort zone of mass production, or dismantle organizational boundaries and reconstruct the logic of value creation through data. In this race for survival, Haier Group has conducted a sustained experiment of "breaking down digital walls" over more than a decade, deploying digitalization as a powerful antidote to the "large-company malaise." Under the Individual-Goal Combination model, its workforce of over 60,000 has fissured into more than 4,000 self-managed "micro-enterprise teams," each directly exposed to user demand. On the COSMOPlat industrial-internet platform, Haier has leapfrogged from mass manufacturing to mass customization, cutting average delivery lead times by 50% and raising production efficiency by 60%. Behind these changes lies Haier's deeply embodied practice of the principle that "the enterprise is the user." From its humble beginnings in 1984 as the Qingdao General Refrigerator Factory to today's global enterprise spanning fifteen ecosystem domains including smart homes, industrial internet, healthcare and etc, Haier's digital transformation is not merely a technological revolution but a thoroughgoing reconstruction of the underlying logic of industrial civilization.

## 2. Company Background

Headquartered in Qingdao and tracing its origins to the Qingdao General Refrigerator Factory founded in 1984, Haier Group has grown into a global leading provider of better-life solutions and digital-transformation services. From those early beginnings to today's global enterprise, Haier has remained user-centered and committed to continuous innovation. Operating primarily in the electrical machinery and equipment manufacturing industry, Haier is dedicated to delivering high-quality smart appliances and whole-home scenario solutions to users worldwide. Its product portfolio spans refrigerators, washing machines, air conditioners, water heaters, freezers, kitchen appliances, and small domestic appliances. Its brand family includes Haier, Casarte, Leader, RRS, Fisher & Paykel, and AQUA. Among them, Haier is the flagship appliance brand emphasizing green and eco-friendly products; Casarte is the premium brand positioned around high-end styling; and Leader is an internet-native appliance brand offering innovative, playful, personalized, and fashion-forward products aimed at young consumers. Haier has established ten R&D centers, seventy-one research institutes, thirty-five industrial parks, and 138 manufacturing bases, supported by an extensive network of 230,000 sales outlets. The company has ranked among the BrandZ Top 100 Global Brands for five consecutive years and is the only IoT-ecosystem brand on the list. Haier brand has held the number-one position for fifteen consecutive years according to Euromonitor International's retail-volume rankings for major appliances worldwide.

The ecosystem-brand strategy is Haier's innovative guide for future development. By building an IoT ecosystem, Haier has effected the transformation from a product brand to an ecosystem brand. Under this strategy, Haier remains user-centered and, in collaboration with platforms such as the Clothing IoT Alliance, the Food IoT Alliance, COSMOPlat, and Three-Winged Bird, delivers a comprehensive suite of smart-service solutions. For example, the Clothing IoT Alliance enhances the laundry experience, while the Food IoT Alliance provides end-to-end home-cooking solutions spanning purchase to preparation. The ecosystem-brand strategy not only creates value for users but also empowers small and medium-sized enterprises and individual entrepreneurs and generates substantial employment, thereby fully demonstrating the social value of ecosystem-brand development.

## 3. Practices of Haier's Digital Transformation

### 3.1. Digital Upgrading of Manufacturing

#### 3.1.1. Haier's Lighthouse Factories

As a global benchmark of intelligent manufacturing, Haier's Lighthouse Factories widely deploy advanced technologies including artificial intelligence, the Internet of Things, cloud computing, 5G, and big data to propel appliance manufacturing from conventional to intelligent modes. Operating a user-centered mass-customization model, the Lighthouse Factories achieve end-to-end intelligence covering digital simulation product development, supply chain data sharing, and intelligent production scheduling. For example, the Haier Tianjin Washing Machine Interconnected Factory applies virtual simulation and intelligent algorithms during R&D, halving the design cycle for new products relative to conventional washing machine lines. On the production floor, it adopts a flexible production model that reduces human interference, quality inspectors receive inspection criteria in real time through AR glasses to prevent mis-inspection. Likewise, the Haier Zhengzhou Water Heater Interconnected Factory leverages digital technologies for simulated product development, delivering high-precision, zero-defect, end-to-end intelligent manufacturing that meets demand for premium products and services. A number of intelligent process installations have been deployed in the plant to form a 5G industrial-internet ecosystem characterized by both digitalization and intelligence including automatic robot repainting, automated shell production lines, intelligent micro-channel gluing, laser smart welding of inner tanks, machine-vision inspection, and automated smart packaging.

5G technology plays a vital role in Haier's Lighthouse Factories, enabling the "interconnection of everything" and substantially raising production efficiency. As Haier's first "intelligent-plus-5G" smart plant worldwide, the Haier Tianjin Washing Machine Interconnected Factory commenced operations in September 2019 and has since adopted over a hundred AI-plus-5G intelligent-manufacturing technologies, with fifteen 5G intelligent-manufacturing scenarios in production. Its production

lines are equipped with tens of thousands of sensors that generate tens of millions of data points daily. With its low latency, high bandwidth, and massive connectivity, 5G acts as a seamlessly woven thread, interconnecting every element of the plant and providing real-time visibility into operations. For example, products and mobile devices carry dedicated codes, the 5G network scans these codes and uploads real-time information, supporting engineers in monitoring and controlling plant-wide operations. In addition, China Mobile, together with Haier, has built the first Lighthouse Factory showcasing 5G-Advanced (5G-A) applications in the world. In logistics scheduling scenarios, an intelligent material-dispatch system built on 5G-A passive IoT and high-precision positioning has improved material-handling efficiency by 50%, while automated inventory counting has reduced staffing from seventeen to one. Enabled by passive IoT, the management platform supports real-time dispatch and rapid location of empty turnover bins around production lines, raising bin utilization from 60% to 90%.

### 3.1.2. The COSMOPlat Industrial-Internet Platform

As an industrial Internet platform with independent Chinese intellectual property launched by Haier, COSMOPlat draws fully on nearly 40 years of Haier manufacturing experience and occupies a distinctive position in the industrial Internet field. The platform brings together participants such as designers, module suppliers, connected factories, and vehicle micro-communities, transforming the original serial, department-based model into a user-facing parallel collaborative mechanism through which each stage can reach customers directly. The platform enables zero-distance interaction among users, enterprises, and resources. Personalized user orders travel straight to the production floor, where the plant's intelligent system autonomously schedules production and simultaneously pushes work instructions and progress information to each process step, module supplier, and logistics partner, rendering the entire production chain fully transparent and traceable. Moreover, Haier has achieved data interconnection with its upstream and downstream suppliers worldwide, as well as data integration and resource sharing across its own manufacturing bases, thoroughly breaking down data silos.

Aiming to build an internationally leading industrial-internet platform, COSMOPlat continuously explores and deploys new empowerment models across regions, industries, and domains, providing comprehensive support for the digital transformation of diverse sectors. Leveraging COSMOPlat, Haier Smart Home has been selected among the first batch of national "Digital Navigation" enterprises, and twelve world-class Lighthouse Factories spanning home appliances, electronics, food and beverages, and other sectors have been established. The platform has built fifteen industrial sub-ecosystems including chemicals, equipment, molds, energy, and emergency supplies, Its services cover 12 major domestic regions within China, while its proven model has been exported to more than 20 countries and regions worldwide, reaching a brand value of 102.777 billion yuan and becoming the first

industrial-Internet brand to exceed 100 billion yuan, while providing comprehensive digital solutions for enterprises in various industries. At the enterprise level, COSMOPlat has deeply participated in the digital innovation of several national-level "little giant" enterprises, including Deyou Electric, Niushidate, and Yisen New Materials, providing platform-based support for SME transformation. At the park level, COSMOPlat has helped the Qingdao Sino-German Ecopark raise industrial output by 60%, and was selected for the Ministry of Industry and Information Technology's 2021 pilot demonstration program for industrial-internet platform solutions to industrial clusters. COSMOPlat will continue to leverage its technological and ecosystem strengths to contribute further to the digital transformation of enterprises worldwide in the future.

### 3.2. Digital Transformation of Marketing and Services

Haier Group employs big data and artificial intelligence to achieve precision marketing, continuously strengthening brand awareness and market share. In the smart-home sector, Haier delivers personalized product recommendations and marketing programs that cater to consumers' pursuit of convenient and comfortable living. According to statistics, Haier's share of the smart-home market has grown year by year and now occupies a prominent position. For example, Haier's scenario brand Three-Winged Bird has been rolling out one-stop smart-home solutions nationwide. Retail sales through Three-Winged Bird offline stores grew by 84% year on year, bundled appliance sales accounted for more than 60% of revenue, and total scenario-business transaction value exceeded 5.1 billion yuan in 2023. Daily active users on the Three-Winged Bird scenario platform rose by 32% year on year, store count grew by 85%, and same-store retail sales increased by 30% in Q1 2024.

Haier's digital scenario marketing has delivered a novel shopping experience. At the Haier Smart Home No. 001 Experience Center, consumers can use virtual reality to immerse themselves in diverse home scenarios, such as smart kitchens and smart living rooms. This immersive approach not only makes the advantages of Haier appliances more tangible but also stimulates purchase intention. For example, when experiencing the smart-kitchen scenario, consumers can operate Haier's smart kitchen appliances on site, appreciate their convenience and efficiency and thereby raise average transaction value.

### 3.3. Digital Transformation of Organizational Management

With the advent of the IoT era, Haier proposed an organizational system of ecosystem micro-enterprise chains suited to that era in 2019. The chain shorthand for "ecosystem micro-enterprise chain" is the basic unit for satisfying user needs and iterating user experience, and is the organizational form best suited to igniting value in the IoT era. Stakeholders within a chain co-create and share added value through Individual-Goal Combination smart contracts, a thorough subversion of

traditional management. Haier's ecosystem micro-enterprise chains enhance their external attractiveness by building highly active and effectively interactive user communities. Centering on users' personalized needs, they address pain points, become users' first choice, and attract large user bases, they iterate user experience and satisfy users' personalized needs across the full process and with full-scenario solutions through the communities corresponding to their chain communities. At the same time, a value-sharing mechanism resolves the issue of "cohesion" among stakeholders within the chain community. The emergence of the chain signals Haier's management-paradigm innovation in the IoT era. The ecosystem micro-enterprise chain is an ecosystem-type organizational system centered on user needs and experience and oriented toward the integration of production and consumption, it is characterized by self-emergence and self-evolution, advancing on its own without top-down management.

The innovation of the chain extends beyond business models to organizational architecture. Chains are self-organizing, a chain exists only where a community exists. The user community is the foundation on which chains and ecosystem circles are built, and a highly active, effectively interactive community strengthens a chain's external pull. Within each chain, the added-value-sharing mechanism addresses stakeholder cohesion and enables co-creation and shared value. According to company statistics, nearly a thousand micro-enterprises have now been incubated across Haier's platform, and Haier Group generated ecological revenue of 15.1 billion yuan, up 75% year on year in 2018. These figures attest to the success of the chain as a management-paradigm innovation for the IoT era.

For example, Haier's micro-enterprise chains have partnered with leading global environmental technology firms to develop more efficient appliance energy-saving technologies, reducing appliance energy consumption and cutting users' utility bills in energy conservation and environmental protection. At the same time, these technologies have also been widely applied in other industries, advancing energy conservation and environmental protection across society. In healthcare, drawing on its accumulated expertise in smart appliances and cutting-edge medical-health technologies, Haier's ecosystem micro-enterprise teams have launched a range of smart health appliances. For instance, smart air conditioner integrates a health-monitoring module that collects indoor air-quality data in real time and simultaneously senses user health status, fostering a healthy and comfortable living environment. Haier also actively collaborates with professional medical institutions to build a home health-management service platform, delivering one-stop, comprehensive health-care solutions to households. In intelligent manufacturing, ecosystem micro-enterprise teams have introduced big data and AI to renovate conventional appliance production, forging a new model of customized products and intelligent production. Consumers can tailor appliances to their own usage scenarios and preferences, better satisfying diversified and individualized market

demand through a dedicated customization platform. The deployment of intelligent production has not only raised production efficiency and product quality but also further compressed operating costs.

## 4. Outcomes of Haier's Digital Transformation

### 4.1. Intelligent Production Lines Optimize Efficiency and Cost Control

By introducing automated equipment and robotics to handle repetitive tasks, Haier has effectively reduced labor input. For example, on refrigerator production lines, robots perform component assembly and quality inspection with high precision, both raising efficiency and reducing defective products caused by manual error. According to company statistics, the deployment of intelligent production lines has lifted Haier's overall production efficiency by more than 40%. Meanwhile, intelligent systems continuously collect production data, dynamically monitor the entire production process, and rapidly identify and resolve issues, driving ongoing improvement in efficiency and finished-product quality.

On the cost-control front, Haier has adopted a series of digital management measures. On one hand, a digital management platform allows refined control over raw-material procurement, production scheduling, and warehousing flows, reducing material waste and alleviating inventory buildup. On the other hand, Haier actively promotes digital supply-chain collaboration and deepens upstream and downstream cooperation, effectively lowering raw-material procurement costs. In addition, production costs have been further reduced through process optimization and improved equipment utilization. Together, these measures have cut the enterprise's production costs by more than 25%.

### 4.2. Digital Marketing Sustains Market-Share Expansion

The traditional appliance manufacturers generally rely on scaled mass production and standardized distribution, which is difficult to align with today's individualized and diversified demand of consumers. Drawing on big-data mining and AI analytics, Haier continuously captures user consumption behavior and latent needs, developing market-fit products and supporting services to achieve precise supply-side matching. Responding to smart-home demand, Haier has successively launched a range of smart appliances and, through an integrated online-offline omnichannel model, expanded product exposure and driven sales. For brand communication, it leverages social platforms and short-video and other new media to reach large cohorts of young consumers. Data indicate that the digital marketing has lifted Haier's market share by more than 30%.

Digital transformation has continued to expand Haier's brand influence. On one hand, the enterprise continuously iterates its products and service solutions, consolidating its brand reputation, as the world's first scenario brand it created, Three-Winged Bird has reshaped the home-consumption experience and won broad

market recognition. On the other hand, Haier actively participates in international industry exhibitions, showcasing the innovation capabilities of Chinese enterprises and cultivating an international brand image. For example, Haier's smart appliances attracted wide attention from buyers at home and abroad, further enhancing international brand awareness at the Consumer Electronics Show. In addition, the enterprise consistently fulfills social responsibilities and conducts public-welfare programs, fostering a positive corporate image and strengthening social identification with the brand.

### 4.3. The Intelligent Service System Raises Customer Satisfaction

Conventional customer service has long been plagued by delayed response, limited human-service hours, and long issue-resolution cycles. Intelligent customer service removes these time constraints, allowing users to initiate inquiries at any time and receive precise solutions. When consumers encounter malfunctions with Haier appliances, they can connect to intelligent customer service through a mobile app; the system automatically pulls device-operating data, identifies the fault type, and pushes a corresponding solution. At the same time, Haier provides complete smart-home packages and personalized customization services, creating a convenient and comfortable smart-living experience in which users can configure home scenarios on demand and realize linked control of multiple appliances.

Against the backdrop of digital transformation, Haier employs multiple approaches to sustain user stickiness and loyalty. First, it earns consumer trust through solid product quality and service, Haier appliances continue to win market favor through stable performance and intelligent features. Second, it builds user communities and membership systems that close the distance between enterprise and consumer and raise user engagement, users can share usage experiences and submit improvement suggestions in the community, and the enterprise iterates its products and services accordingly. In addition, user-reward programs such as points redemption and exclusive offers further consolidate customer relationships. Data show that the digital service system has lifted Haier's user loyalty by more than 20%.

## 5. Conclusion

As global manufacturing accelerates toward intelligence and personalization, Haier Group has used "digital-intelligent transformation" as a fulcrum to complete a strategic leap from a traditional appliance manufacturer to a global ecosystem brand leader. Powered by the "Individual-Goal Combination" model as its core engine, Haier has used the COSMOPlat industrial internet platform to reconstruct the logic of global manufacturing, directly connecting user needs to the full intelligent-manufacturing process and achieving a disruptive shift from "mass production" to "mass customization." Its digital transformation goes beyond technology enablement by reshaping the "factory of the future" through AIoT and

digital-twin technologies to drive fission-style innovation in organization and ecosystem, breaking the boundaries of conventional manufacturing and building a digital ecosystem network spanning R&D, production, and services. In ascending from an “appliance brand” to an “ecosystem brand,” Haier has used user data as the bond to promote the co-evolution of the global industrial chain, offering a “Chinese paradigm” for manufacturing digitalization and continuing to lead the value reconstruction and business revolution of the Industry 4.0 era.

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