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Demystifying the digital transformation of the real estate brokerage industry in China: A case study of Lianjia (Beike)

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Abstract

The rapid digital transformation of the real estate brokerage industry in China has revolutionized traditional business models, with Lianjia (Beike) at the forefront of this shift. This study explores Lianjia's journey from a conventional brokerage firm to a leading digital platform, analyzing the strategic digitalization

of housing data through the creation of the Housing Dictionary, the development of the agent cooperation network (ACN), and the implementation of a management information systems (MIS) based Offline-to-Online (O2O) business model. Through a qualitative case study methodology, this research highlights how Lianjia's innovative use of technology has enhanced operational efficiency, customer satisfaction and competitive advantage. The findings provide valuable insights into the potential of digital platforms to drive continuous innovation and transformation in the real estate industry. This study also discusses the broader implications for the digital economy and offers recommendations for businesses aiming to undergo similar transformations.

Keywords: digital transformation, real estate brokerage, platform ecosystem, digital platform, Chinese housing market, case study, Lianjia (Beike)

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Introduction

The development of China's real estate industry, just like Chinese culture, is full of mystery. In addition to the impressive macroeconomic-growth indicators of real estate brought by China's economic development, academia and industry seem to possess only modest knowledge about China's real estate industry. Indeed, the real estate market has grown rapidly and played an important role in the economy over the past two decades. Investment in fixed assets (excluding rural households) nationwide totaled 50,303.6 billion yuan in 2023, marking a 3.0 percent increase over the previous year [1].

Real estate brokerage plays an important role in real estate promotion and sales by being the key channel of circulation and transaction in the real estate industry. The real estate brokerage industry in China has experienced four significant evolutions since the Chinese government restructured the real estate industry from planned to market-oriented in 1998, coinciding with the explosive growth of the real estate industry as a whole [2]. As of now, the real estate brokerage indus-

try has become the most significant and effective element in the digital transformation of the entire real estate industry, which is remarkable for the industry as a whole because the real estate industry is believed to be difficult for carrying out technological innovation due to the existence of hard barriers in solidified processes and systems [3].

At the current stage, real estate brokerage in China is undergoing the digital transformation of the offline-to-online (O2O) commerce model under the Internet economy, in which the most prominent feature is the transformation from traditional offline brokerages to digital brokerage platforms. Moreover, the trend of evolution to digital platforms is spreading and penetrating at an accelerated pace due to the impact of the COVID-19 crisis [2, 4].

This study utilizes a qualitative case study methodology to explore Lianjia's digital transformation journey. Lianjia (Beike) stands out as a prime example of how traditional real estate firms can leverage digital technologies to transform their operations and service delivery. By exploring Lianjia's journey, this research seeks to understand the mechanisms and outcomes

of digital transformation in the real estate brokerage industry. The primary objectives are to analyze the strategies employed by Lianjia, such as the creation of the Housing Dictionary, the development of the agent cooperation network (ACN), and the implementation of a management information systems (MIS) based Offline-to-Online (O2O) business model, as well as to evaluate the impact of these strategies on operational efficiency and customer satisfaction.

1. Literature review

1.1. Review on management information systems (MIS)

Management information systems (MIS) are integral to modern business operations, supporting decision-making, streamlining processes and enhancing organizational efficiency [5]. These systems encompass a range of technologies and processes used to collect, store, manage, and analyze data, providing valuable insights for management. Over the past few decades, the field of MIS has evolved significantly. Initially focused on basic data processing and record-keeping, MIS now incorporates advanced technologies such as big data, artificial intelligence (AI) and cloud computing [6]. This evolution has expanded the scope of MIS to include enterprise resource planning (ERP) systems, supply chain management (SCM), customer relationship management (CRM) systems and knowledge management systems (KMS) [7].

The successful implementation and operation of MIS are influenced by several key factors, including technological infrastructure, data quality and management, user training and engagement, organizational support and integration with business processes. A robust technological foundation, comprising reliable hardware, up-to-date software and a secure network, is essential for the effective functioning of MIS. This infrastructure supports the collection, processing and dissemination of information across the organization [8].

The accuracy, relevance, completeness and timeliness of data are crucial for the effectiveness of MIS. Proper data management practices ensure that high-quality data is available for analysis and decision-

making [9]. Additionally, ensuring that users are adequately trained and engaged with the MIS is vital for its success. Users need to understand how to utilize the system effectively to support their tasks and decision-making processes [10].

Strong support from top management and alignment with organizational goals are essential for the successful implementation and operation of MIS [11, 12]. This includes providing the necessary resources and fostering a culture that values data-driven decision-making [12]. Furthermore, MIS must be integrated with existing business processes to provide relevant and actionable insights, ensuring that the system supports the organization's strategic and operational objectives effectively [11].

1.2. Offline-to-Online (O2O) business models in China

The Offline-to-Online (O2O) business model emerged to address the limitations of traditional offline operations by leveraging online capabilities to attract and retain customers. This approach seamlessly integrates online marketing and transactions with offline fulfillment and services, creating a cohesive customer experience. The rapid proliferation of smartphones and internet infrastructure in China has provided an ideal environment for O2O businesses to flourish across various sectors, for example, retailing [13, 14], manufacturing [15], food delivery [16, 17], wooden furniture [18] and real estate [4]. Key drivers of this transformation include supportive government policies, technological advancements and changing consumer behaviors.

First, the Chinese government has played a crucial role in the development of O2O businesses by implementing favorable policies and regulations that promote e-commerce and digital innovation while ensuring consumer protection and market stability [19]. This supportive regulatory environment also helped in shaping the service quality standards across industries [20].

Secondly, technological progress, particularly in big data, artificial intelligence (AI) and mobile internet, has been fundamental to the evolution of O2O

business models [15]. These technologies enable synergistic interactions between online and offline platforms, enhancing operational efficiency and customer engagement.

Furthermore, consumer behavior has significantly influenced the adoption and success of O2O models. Chinese consumers increasingly favor the convenience of online shopping combined with the tangible benefits of offline experiences [21]. This preference reveals the importance of effectively integrating online and offline channels to provide personalized and seamless interactions, thereby enhancing customer satisfaction [18].

1.3. Data management in the application of MIS in O2O business models

The integration of management information systems (MIS) in Offline-to-Online (O2O) business models has revolutionized business operations by bridging the gap between traditional physical operations and digital platforms. MIS plays a crucial role in optimizing business processes by providing real-time data, improving inventory management, and streamlining workflows [22]. The integration of offline and online data ensures that businesses can efficiently manage their resources and respond promptly to market demands [23, 24].

MIS enables the integration of virtual online behavior with real-world offline activities, meeting clients' personalized requirements across multiple dimensions such as time, location, media, manner and cost. This integration optimizes resources and enhances the overall effectiveness of marketing campaigns [25]. By analyzing customer data, businesses can tailor their services to meet individual preferences, thereby enhancing customer satisfaction [21].

Moreover, MIS provides valuable insights that support strategic decision-making by integrating and analyzing data from both offline and online operations [26]. This comprehensive view enables businesses to make informed decisions that enhance their competitiveness and growth [27, 28]. However, implementing MIS in O2O business models comes with challenges,

such as ensuring data accuracy, integrating different systems and maintaining customer privacy [13, 25]. Businesses must adopt advanced technologies and develop robust strategies to address these challenges effectively [29].

Data management is the cornerstone of digital transformation in business operations [30]. It involves the systematic collection, organization, storage and utilization of data to support decision-making processes and business operations. For example, the integration of big data and analytics allows managers to make informed decisions based on real-time data insights, improving market analysis and customer relationship management, which leads to more accurate and timely decision-making. Effective data management within MIS enhances operational efficiency and facilitates strategic renewal in O2O business models [2, 30, 31]. Through effective data management, MIS ensures that O2O business models can leverage accurate and timely data to drive continuous improvement and innovation, ultimately leading to sustained competitive advantage [32, 33].

2. Methodology

2.1. Selection of case study method

This study employs a qualitative case study methodology, which is ideal for investigating the research question within its specific context. As Yin [34] suggests, the qualitative case study method has several advantages, including the ability to provide rich, contextualized insights, capture complex phenomena and adapt to new findings. This approach allows for an in-depth exploration of specific cases, facilitating a comprehensive understanding of organizational processes.

2.2. Selection of case study company

The research design involved a single-case study focusing on Lianjia (Beike). This design was chosen due to Lianjia's exemplary digital transformation, which provides a rich context for exploring the mechanisms and outcomes of such transformations

Beijing Lianjia Real Estate Brokerage Co., known as Lianjia, was founded in 2001. From its establishment until 2017, Lianjia grew rapidly from a local entity to a nationwide real estate brokerage company with more than 8000 offline stores and 130000 employees across 28 cities in China, achieving a gross transaction volume of more than one trillion CNY [35].

In 2018, Lianjia launched a digital platform called Beike, also known as BEKE (KE Holdings Inc.). This platform is open to all real estate brokerage companies, including Lianjia, and provides housing transaction information, transaction support, housing financial support and other real estate services [36]. Beike demonstrated its strong market appeal with 279 resident brokerage brands, nearly 47000 community-centric stores, and nearly half a million real estate agents in over 100 cities in China by 2020, contributing to more than 3.6 million transactions [37]. In May 2020, Beike was listed on the New York Stock Exchange, becoming the largest real estate e-commerce platform in the Chinese market by market capitalization, at one point reaching five times the combined market capitalization of its competitors in China, such as E-House, Fangdd, Fang Holdings, 58.com and 515j.com.

2.3. Data source

This research relies on two primary sources of data: KE Holdings Inc.'s prospectus and annual reports [38, 39], which provide public information regarding Lianjia (Beike). The publicly available research data is carefully reviewed, adjusted and incorporated into this study ensuring a comprehensive case analysis of Lianjia's digital transformation process.

3. Case analysis of digital transformation of Lianjia (Beike)

Step I: Strategic digitalization of housing data – creation of the Housing dictionary.

Lianjia has been preparing since 2008 in order to complete its digital transformation, which has enabled it to seize the market opportunity in this industry.

This was nine years before China officially adopted the AI industry as a national strategy, when in December 2017 the Chinese Ministry of Industry and Information Technology released the “Three-Year Action Plan for the Development of China’s Artificial Intelligence Industry from 2018–2020” [40].

Since 2008, Lianjia has invested heavily in the electronic database of brokerage listings, later known as Housing Dictionary. With the help of a large number of human resources, digital technology and tools to verify and annotate every listing in its system, including house number, house type, orientation and location conditions, etc. From 2008 to the birth of Beike in 2018, this digital housing information has enabled Lianjia to accumulate the most authentic and large-scale data assets in China and also laid the foundation of big data to reconstruct the business model and standardized service process of the entire real estate brokerage industry through the transformation of digital platforms, and rapidly enhancing its technological capabilities in artificial intelligence (AI), virtual reality (VR), and Internet of Things (IoT), and further improving the accessibility and richness of data available to the platform participants. The housing dictionary of Lianjia contains comprehensive information on approximately 226 million homes by 2020, which is seen as the most comprehensive number of residential homes in China.

Step II: Preparation for Offline-to-Online (O2O) model – development of the agent cooperation network (ACN).

The well-established housing database makes Lianjia be able to pioneer the industry standard of “authentic property listings” in the real estate brokerage industry in China to counteract the malicious marketing tactic of fake listings, which is anathema to customers. In the absence of a unified regulatory framework for a long time, unscrupulous agents often post below-market or non-existent listings to increase customer traffic, leaving customers unable to distinguish between genuine and fake listings, and brokerage companies unable to truly control their core asset of listings. To standardize the transac-

tion service process and promote cross-regional and cross-store cooperation to avoid vicious competition, Lianjia innovatively launched the agent cooperation network (ACN) internally in 2014. This network was the second key factor in the success of Lianjia’s digital transformation, and later became the foundation of Beike’s MIS-based O2O business model to connect online and offline infrastructure and manage various industry platform participants.

The agent cooperation network (ACN) defines the housing transaction process by real estate brokerage as ten steps. Each step has a clear role definition and corresponding responsibilities (Fig. 1). Under the premise of abiding by the rules of ACN Network, real estate agents have access to full sharing of property listings data and can participate in a transaction in different roles and interact with their upstream and downstream roles organically to bind interests. It allows multiple agents to process the same transaction to facilitate more frequent cross-store and cross-brand collaboration, with each agent earning a portion of commission based on their role and contribution, instead of the traditional real estate brokerage model where the only agent who ultimately facilitates the transaction gets paid the commission. It allows multiple agents to process the same transaction or one agent to participate in multiple transactions to facilitate the exchange of cross-store and cross-brand information and customer

resources and improve transaction efficiency and customer satisfaction. Each agent receives a portion of the commission based on their role and contribution, as opposed to the traditional real estate brokerage model where only the broker who ultimately brokers the deal gets paid.

Step III: Implementation of the MIS-based O2O business model framework of Beike.

The MIS-based O2O business model framework makes Beike a platform that consists of three parts: platform infrastructure, platform participants and the services provided through the platform (Fig. 2). The platform infrastructure ensures that the platform participants can smoothly enjoy the O2O (offline and online) commerce model and platform usage experience, which in turn promotes the provision of higher quality services. On the other hand, through customer service experience and user feedback from industry platform participants, the iteration and upgrade of platform infrastructure are thus facilitated.

Platform infrastructure. The infrastructure core and operation system of the Beike platform is the agent cooperation network, which connects the online and offline infrastructure based on standardized and digitalized transaction processes and different roles, and each online and offline infrastructure contains four basic modules [37].

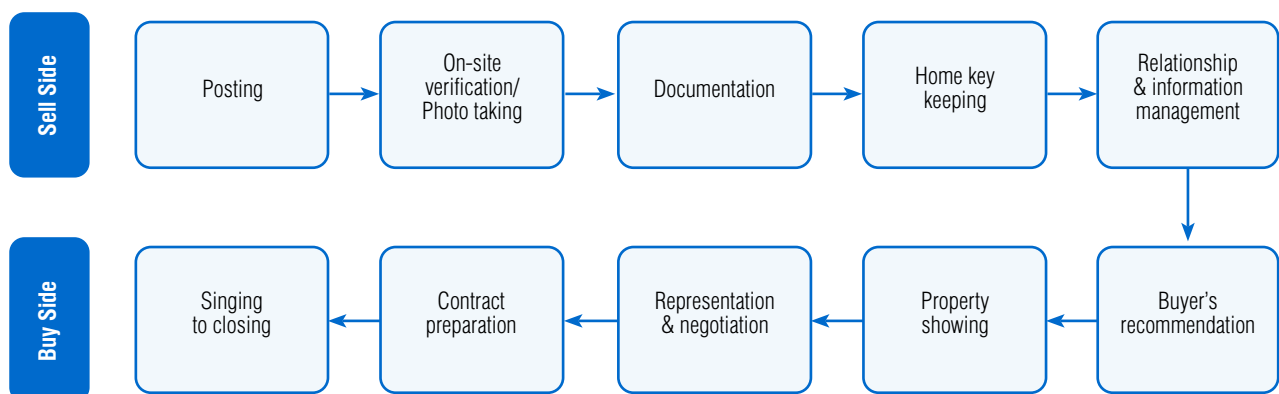


Fig. 1. Brokerage service flow under ACN [23].

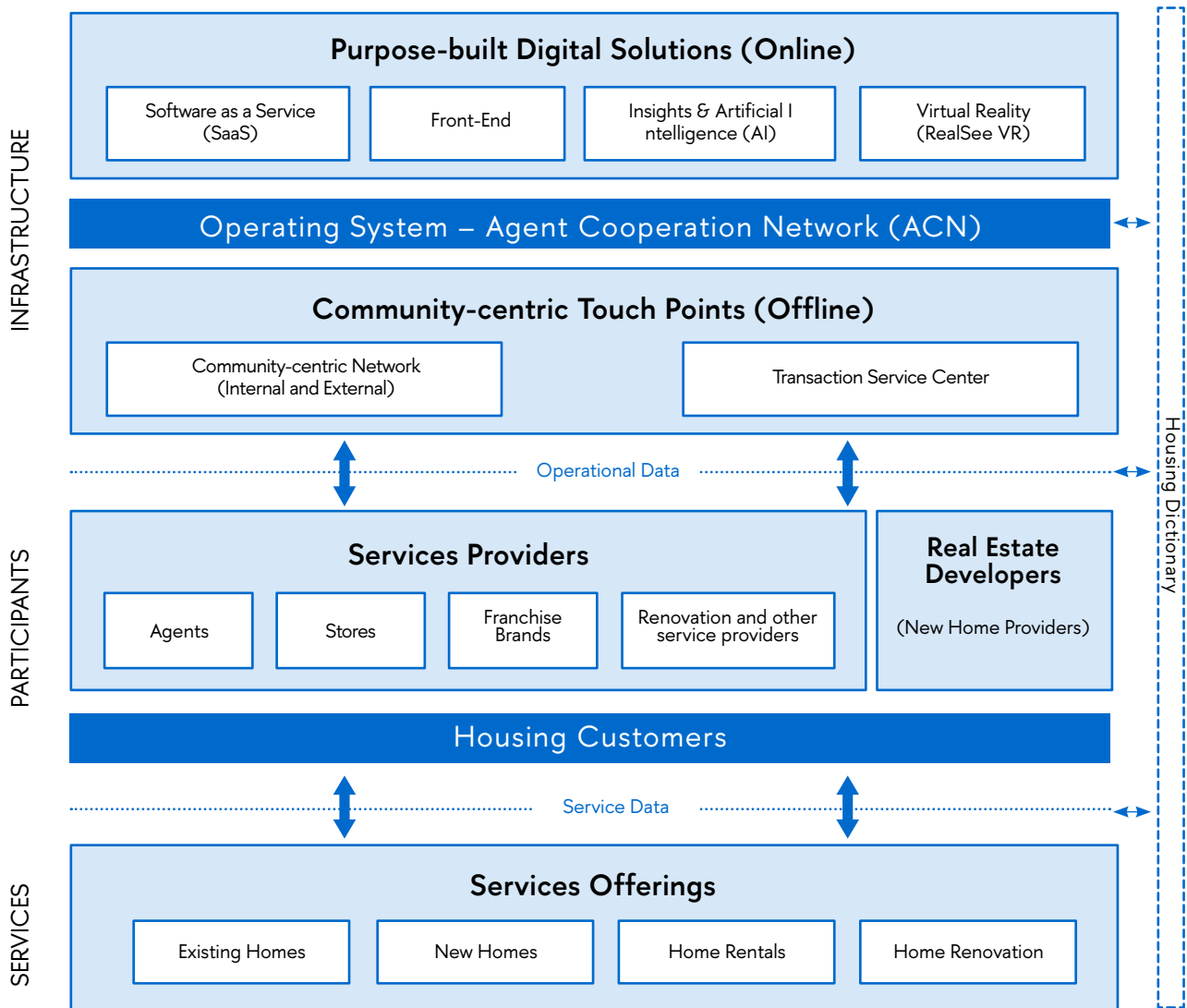


Fig. 2. MIS-based O2O business model framework of Beike [22].

The online infrastructure modules were built to support the digital transformation of its operational systems online, so-called purpose-built digital solutions, including Software as a Service (SaaS); customer front-end; data insights and artificial intelligence (AI); and virtual reality (VR).

- ◆ The SaaS system is for agents and store managers and is a carrier to execute each transaction section of the

ACN, thereby ensuring that the whole transaction process is visualized and standardized.

- ◆ The front end of the Beike platform is to interact with its housing customers, including the ‘ke.com’ website, the Beike app, the customer service hotline in Mandarin Chinese, and other online interfaces.
- ◆ Data insights and AI technologies are applied to support the platform to carry out the foundation of the

data processing business. That helps the platform to process and analyze the historical property and transaction data and to provide analysis, including pricing, supply, and demand for agents and housing customers to better complete demand matching to facilitate housing transactions.

- ◆ The VR technology of the platform is provided by RealSee, a subsidiary of Beike, as one of the four online digital solutions. It brings offline homes to the online scene, which makes up for the deficiency caused by the limitations of offline physical space. Through VR live tours, housing customers could enjoy a 360-degree immersive display of property listings through the Beike front ends, with an agent online touring, and even reach a transaction intention. According to KE Holdings Inc. [39], as of 2022, a total of 1.508 billion times had been accumulated using VR tours by users of the Beike platform.

For the offline infrastructure, Beike has set up two modules for its community-centric touchpoints which include transaction service centers, and both internal and external community-centric networks. This offline infrastructure is defined as a community of agents, stores, housing customers and other public institutions that support the majority of the operations that need to be done offline.

- ◆ The transaction service center is one of the most important offline infrastructure modules of the Beike platform and connects to its online transaction supporting system. It helps housing customers and agents with transaction services such as providing home purchase agreements; tax payments to tax authorities; title transfers; home ownership registration; bank loans; and guarantees through cooperation and staffing with government agencies, real estate valuation agencies, banks and guarantee companies. The module is designed to address trust issues such as the failure of the buyer to pay the seller as agreed; the failure of the seller to transfer the title to the buyer after receiving payment; the failure to complete the transfer due to ownership issues; and the failure of the buyer and seller to pay the agent's commission, etc.

- ◆ The community-centric network refers to the offline contact points formed by Lianjia (internal) and its affiliated offline stores (external). These offline stores are distributed in large and small residential communities, focusing on community outreach and engagement, and through the ACN and SaaS system of the Beike platform, form a network that interacts both online and offline.

Platform participants. The Beike's platform is composed of three types of participants. These are service providers, real estate developers and housing customers. The service providers are connected and interacted with by the agent cooperation network as the infrastructure, which includes agents, brokerage stores, brokerage brands, home renovation providers and other home-related service providers. By joining the Beike platform, they automatically join and become part of the agent cooperation network, which enables them to proactively allocate the role-based commissions and enjoy the online purpose-built digital solutions and offline community-centric touch points to facilitate their transactions. Unlike service providers, real estate developers are not directly involved in the agent cooperation network, but rather cooperate with Beike to put their new housing project listings on the platform to attract and match customers, while the platform divides and matches different roles for different stores, brands and agents based on the agent cooperation network. The platform housing customers are defined as home buyers and sellers, landlords and tenants, and other customers with housing-related needs.

Services offerings. As an e-commerce platform, Beike does not directly provide services and products related to real estate, but rather serves as a platform to connect its resident real estate brands, stores, home renovations and other service providers, as well as real estate developers with potential housing customers through information matching. The platform services corresponding to the service providers include existing home transactions (also called second-hand house transactions), home rentals, home renovation services, etc. For this part of the service, the

main source of revenue for the Beike platform is to extract a portion of the commission from the housing transaction and the platform service fee for the resident brands and stores. The other part of the service is for real estate developers. The Beike platform acts as a sales channel for new homes (first-hand houses), matching developers with new home buyers and providing sales and marketing solutions including brokerage services, sales plans, online marketing, digital tools, etc. For new home services, Beike generates platform revenue through developer commissions.

4. Discussion

4.1. Key factors for Lianjia's successful digital transformations

A company will be more competitive and able to compete with the whole industry ecosystem when it transforms into a platform [2, 41]. By transforming into a digital Beike platform, Lianjia opens its infrastructure and operation system to the entire real estate industry, enabling it to gain competitiveness and industry voice through compatibility with both internal and external ecosystem participants. Lianjia's successful digital transformation to Beike can be attributed to a combination of key factors. These include the favorable macro-environment of the Chinese market, characterized by the government's emphasis on technological innovation and a regulatory framework that allowed for flexibility. This environment enabled Lianjia to challenge traditional industry barriers and establish itself as a disruptor.

What's more, data plays a key role in connecting the traditional and digitalized business processes. The transformation of real estate brokerage business processes from traditionally offline operations to digital online operations has led to significant improvements in efficiency, accuracy, security, and customer experience [29]. Essentially, as shown in *Fig. 3*, the management and application of business data, alongside the digital infrastructure that carry this data, are crucial to this transformation [42]. Leveraging digital technology, this shift streamlines property listings, viewings, negotiations, and transactions, ensuring

efficiency and compliance with regulatory standards [37, 38].

According to KE Holdings Inc. [37, 38] and Zuo [4], there are four main processes structured as the major activities or services provided by real estate brokerage: market research and property listing (**A1**), property viewing and interaction (**A2**), negotiation and agreement (**A3**), and transaction and documentation (**A4**).

In the traditional real estate brokerage, the initial stage of market research and property listing (**A1**) relied heavily on manual data collection, printed materials and in-person visits. Real estate agents would physically visit properties to gather information, take photographs and create listings. These listings were then promoted through printed brochures and advertisements distributed to potential buyers. This method was time-consuming and prone to errors and delays. The digital transformation of this stage leverages platform-based automated listing systems and online promotion algorithms. Real estate agents can now use online platforms to instantly upload property details, photographs and virtual tours. These platforms use advanced algorithms to promote listings to targeted audiences, significantly increasing the reach and efficiency of marketing efforts.

The second stage, property viewing and interaction (**A2**), traditionally involved physical showings, phone calls for scheduling and manual coordination between agents and potential buyers. This approach was highly limited by geographical and logistical constraints, often making it difficult for buyers to view multiple properties in a short period. The digital revolution has drastically improved this stage, particularly in terms of time-saving and reducing management loops. Potential buyers are able to take virtual tours of properties, interacting with agents through video calls and chat features. This reduction in process loops cuts the time cost from weeks to minutes and hours, saving resources and enhancing overall operational efficiency and customer experience.

Negotiation and agreement (**A3**), the third stage, traditionally involved face-to-face negotiations and

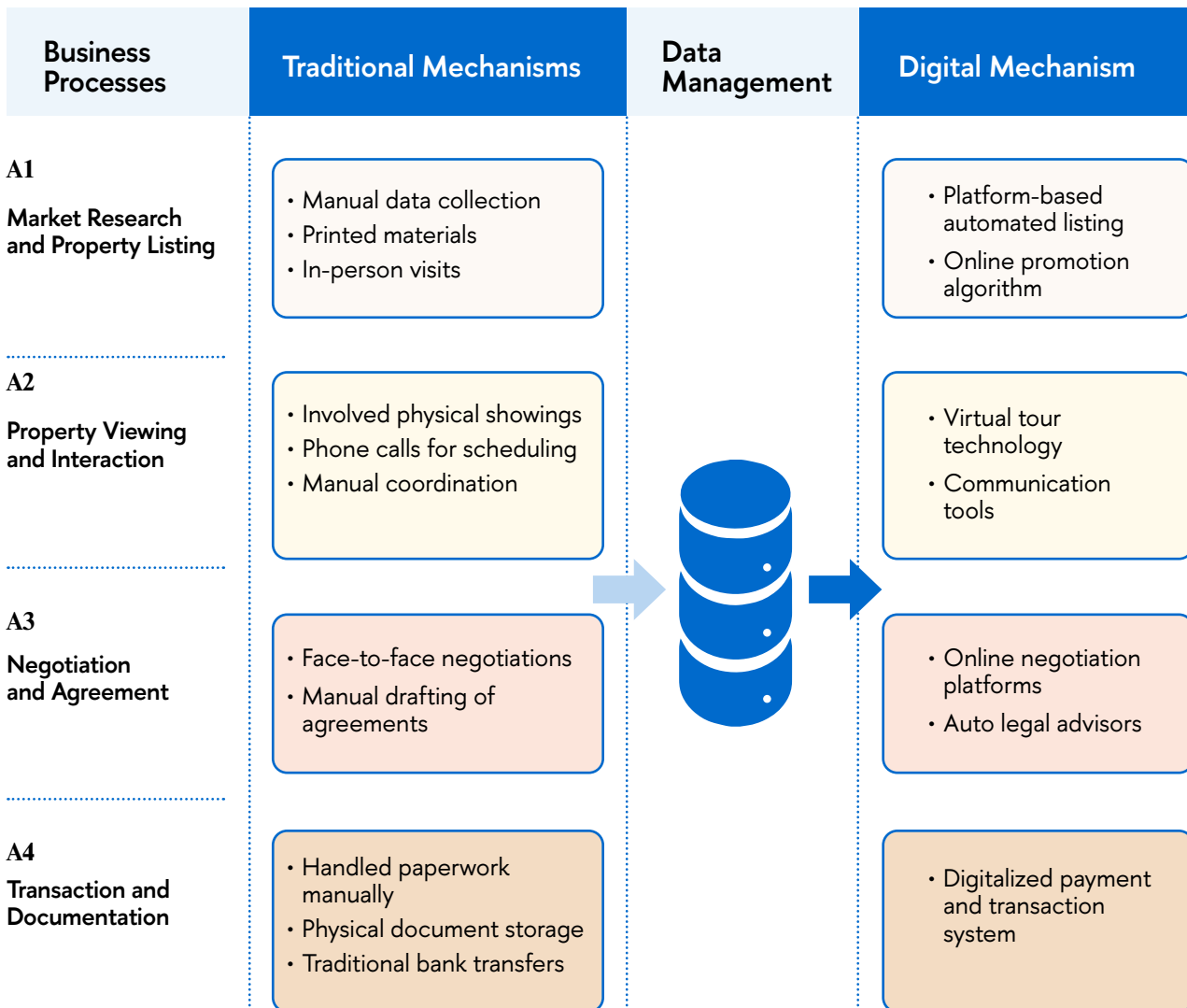


Fig. 3. Embedded mechanisms of transformative business processes.

manual drafting of agreements. Real estate agents and legal advisors would meet with buyers and sellers to negotiate terms, draft contracts and ensure compliance with legal requirements [10]. Digitalization has streamlined this stage with online negotiation platforms and automated legal advisors. These platforms facilitate real-time negotiations through chat and video features, while automated legal advisors

use predefined AI databases to draft and review contracts, ensuring accuracy and compliance [44].

The final stage, transaction and documentation (A4) traditionally involved manually handling paperwork, physical document storage, and traditional bank transfers for payments. This approach was labor-intensive and vulnerable to errors, fraud and delays. Digital transformation has introduced digital-

ized payment and transaction systems, significantly improving the efficiency and security of this stage. Digital payment gateways and blockchain technology ensure secure and transparent transactions, while digital signature services facilitate the electronic signing of documents [45, 46].

4.2. Key differentiators in Lianjia's digital transformation

Several key differentiators have enabled Lianjia (Beike) to maximize the benefits of digital transformation, setting new standards in the real estate brokerage industry, and so to become an industry leader. These differentiators include an early start and accumulation of data, a wide stack of technologies in use and cross-cutting coverage of all business processes.

Firstly, Lianjia's digital transformation journey began with an early focus on accumulating and leveraging extensive data. This initiative was spearheaded by the creation of the Housing Dictionary in 2008. The Housing Dictionary is a comprehensive database that dynamically includes detailed information on millions of homes across China. It serves as the foundation for Lianjia's digital knowledge base, integrating historical transaction data, performance indicators of agents and other critical information.

- ◆ **Comprehensive Data Repository:** The Housing Dictionary provides a detailed and accurate repository of property data, enhancing the reliability of property listings and facilitating advanced analytics.
- ◆ **Historical Transaction Data:** By integrating historical transaction data, Lianjia can offer precise property valuations and market trend analysis, improving customer trust and decision-making.
- ◆ **Performance Indicators:** Tracking agents' performance metrics helps in identifying top performers, optimizing agent allocation and improving overall service quality.

Secondly, Lianjia's ability to integrate a broad range of advanced technologies has been pivotal in its digital

transformation. The company employs a diverse technological stack to enhance operational efficiency, customer experience, and service delivery.

- ◆ **Big Data Analytics:** Utilizes extensive data to gain insights into market trends, customer preferences, and pricing strategies, enabling data-driven decision-making.
- ◆ **Artificial Intelligence (AI) and Machine Learning (ML):** Implements AI and ML for predictive analytics, personalized customer recommendations, and automation of routine tasks, increasing efficiency and customer satisfaction.
- ◆ **Cloud Computing:** Leverages cloud infrastructure to ensure scalable, secure and efficient data storage and processing, supporting the company's extensive digital operations.
- ◆ **Virtual Reality (VR):** Offers immersive property viewing experiences through VR technology, bridging the gap between online and offline interactions and enhancing customer engagement.
- ◆ **Blockchain:** Ensures secure and transparent transactions, reducing fraud and increasing trust in the digital transaction process.

Thirdly, Lianjia's comprehensive digital transformation approach extends across all its business processes, integrating both internal operations and interactions with various stakeholders.

- ◆ **Agent cooperation network (ACN):** Standardizes the transaction process and promotes collaboration among agents across different regions and stores. It facilitates data sharing, resource allocation and cooperative transactions, enhancing efficiency and service quality.
- ◆ **Management information system (MIS)-based O2O Business Model:** Supports internal workflows, enhances communication and optimizes resource management, ensuring seamless integration of digital processes within the organization. It bridges online and offline activities by integrating digital platforms with physical services. This model ensures a consistent and comprehensive customer experience both online and offline.

- ◆ **Customer Front-end Platforms:** Includes multiple channels such as the 'ke.com' website, Beike app and customer service hotlines, ensuring accessible and efficient customer interactions.

4.3. Criticisms of Lianjia's digital transformation

Traditional Chinese real estate brokerage companies, represented by Lianjia, have been able to gain tremendous platform advantages and create a competitive platform ecosystem through digital platform transformation, but the industry drawbacks brought about by the transformation or not changed through the transformation are also obvious. While the digital transformation of the real estate brokerage industry is not unique to different market characteristics, these drawbacks seem to have common features across different markets.

Increasing commissions and transaction costs. Barwick and Wong [47] criticized Lianjia, which has rapidly increased its market share in China after transforming into a digital platform and has increased its commissions while bundling its brokerage service products. This has undoubtedly increased eventual home transaction costs. Customers also tend to stick with only one platform and a single home, which strengthens the market dominance of digital platforms, particularly the dominating prices. Similarly, when home buyers in the United States realize that the final closing price will be adjusted, home buyers' decisions will be swayed and the final decision will no longer depend on who pays [48].

Negative effects of low entry barriers. Hsieh and Moretti [49] and Barwick and Pathak [50] pointed out that due to the low barriers to entry and the large number of participants in the real estate brokerage industry, especially in the residential brokerage industry, has led to extremely fierce competition in the industry. The real estate brokerage industry is considered to be a highly profitable industry due to the substantial brokerage commissions. This has attracted a lot of brokerage practitioners and companies to join the industry, but the number of proper-

ties available for transactions, both new and existing homes, is limited. This has led to the competition of different agents for the same housing listing, including many inexperienced agents, resulting in a long housing transaction cycle, which has led to lower labor productivity and indirectly affects the loss of social welfare [51].

Concern about service quality. Another concern caused by the lower entry barrier is the uneven quality of brokerage services. The low industry entry barrier makes the service quality of real estate agents vary. For example, the brokerage industry in China has developed for only 20 years since its formation, which makes the whole industry ignore the overall quality of practitioners, such as professional attitude, level of education, and professional training. In this industry, brokerage companies or agents could interface with potential housing customers as long as they have listing information, and digital brokerage platforms make it easier for them to assess this information and reach out to the customers. However, it is difficult for customers without home buying experience to distinguish which agents would provide better brokerage services, resulting in a huge gap in service experience and even the image of the entire industry [52].

Conclusion

This study has shown that Lianjia's comprehensive digital transformation, through the creation of the Housing Dictionary, the agent cooperation network (ACN) and the implementation of an MIS-based O2O business model, has significantly enhanced operational efficiency and customer satisfaction in the Chinese real estate brokerage industry. The innovative use of digital platforms has not only provided Lianjia with a competitive advantage but also offers a blueprint for other real estate firms aiming to undertake similar transformations.

However, the focus on a single case study presents certain limitations, as the findings may not fully represent the diverse experiences of digital transformation across the entire industry. Future research could

address these limitations by conducting comparative studies across different markets or examining the long-term impact on profitability and market share.

In conclusion, this study underscores the critical role of digital transformation in modernizing the real estate brokerage industry and suggests that other firms

could achieve similar success by adopting strategic digital innovations. The insights gained from Lianjia's experience contribute to the broader understanding of digital transformation and its potential to drive significant improvements in business performance and customer engagement. ■

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