

Advanced Topics in Science
and Technology in China

Jianwei Yin · Bing Li ·
Zhongjie Wang · Shuiguang Deng
Editors

Convergence in Crossover Service



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Preface

The world is borderless; however, the limited cognition and capabilities of human beings have led to various types of traditional boundaries. Recently, the development and application of new-generation information technology have significantly enhanced cognitions and capabilities. It has also redefined human cognitive boundaries. *Crossover* breaks the original boundaries and obtains the perception and collaboration within and outside the boundaries through cross-organizational business process reconstruction that improves the efficiency of social production and daily life. In the crossover process, services from different industries, organizations, and value chains are deeply converged. These services provide users with high-quality and high-value *crossover services*. Crossover service is a new mode of the modern service industry (MSI), enterprise management, a scenario of information technology application in MSI, and a new direction of service computing research with the characteristics of 3C (crossover, convergence, and complex).

The key to implementing crossover service is *convergence* of multiple dimensions, including pattern, requirement design, runtime environment, quality, and value. In pattern convergence, it is necessary to obtain deep convergence of service patterns from different participants, resolve pattern conflicts and achieve a win-win situation in addition to data convergence, processes, and services in the service ecosystem. During the requirement analysis and convergence design, crossover scenarios cross multiple service systems, and service-design methods are complex and dynamic. Thus, convergence requires different service-design procedures. In runtime environment convergence, services run in open, heterogeneous, and dynamic environments to form complex service networks, which should shield heterogeneous environments and provide a transparent and virtual convergence environment. In the quality-convergence stage, services cross the boundaries of time, space, and domain with different qualities and high variability in the evaluation, which requires a multi-dimensional attribute convergence of service quality. Value convergence maximizes the value of each party, but there are explicit or potential value conflicts among service participants that require trade-offs. Therefore, based on our current knowledge, this book is the first to focus on convergence in crossover services to provide a comprehensive introduction, the definition of concepts, opportunities, challenges,

and discussion, including pattern modeling and computing, requirements analysis, design, infrastructure, optimization, and platform.

Ultimately, research on crossover phenomena, crossover services, and convergence problems can further improve its applications in industry and our daily lives.

In this book, Chapter “[Crossover Service: A Brief Overview](#)” and “[Crossover Service Infrastructure: Service Network](#)” were written by Dr. Shengye Pang and Bangpeng Zheng, Prof. Jianwei Yin and Shuiguang Deng. Chapter “[Crossover Service Pattern: Modeling and Computing](#)” and “[Crossover Service Platform: Scenarios and Applications](#)” were written by Dr. Meng Xi and Jintao Chen, Prof. Jianwei Yin and Shuiguang Deng. Chapter “[Crossover Service Requirements: Analysis and Design](#)” was written by Dr. Yu Qiao, Lecturer Zhengli Liu, Associate Professor Jian Wang, and Prof. Bing Li. Chapter “[Crossover Service Optimization: Value and Quality](#)” was written by Dr. Min Li, Associate Professor Zhiying Tu, and Prof. Zhongjie Wang. The whole book was finalized by Prof. Jianwei Yin, Bing Li, Zhongjie Wang, and Shuiguang Deng.

The work in this book was partially supported by the National Natural Science Foundation of China (No. 61825205) and the National Key Research and Development Program of China (No. 2017YFB1400600). Because of our limited knowledge, errors and defects in this book are inevitable. Hence, we welcome comments and suggestions from our dear readers.

Hangzhou, China
June 2022

Jianwei Yin
Bing Li
Zhongjie Wang
Shuiguang Deng

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Crossover Service: A Brief Overview



Jianwei Yin, Bangpeng Zheng, and Shengye Pang

Abstract With the development of crossover in the modern service industry (MSI), various traditional boundaries have been broken, and the cross-integration of services has led to the need for crossover services. A crossover service is the deep convergence and model innovation of services that cross the boundaries of different industries, organizations, and value chains, aiming to provide users with high quality and high value services. The key to achieving crossover service is convergence, which includes the deep multidimensional convergence of patterns, requirement design, runtime environment, quality, and value.

Keywords Crossover · Crossover service · Crossover convergence

Although the world is inherently borderless, the limited cognition and capability of human beings has resulted in various traditional boundaries. These boundaries have been redefined through the development and application of new generations of information technology (IT).

Crossover is an important innovative strategy for modern firms to expand their products, services, and markets. This strategy promotes cooperation across enterprises, fields, and industries, as well as the creation of innovative products, services, markets, and business models. The increasingly prevalent crossover trend combines traditional and modern sensibilities as well as cultural ways and technology.

The development of crossover in the modern service industry (MSI) has afforded a highly developed stage based on IT and modern management concepts. The traditional service supply chain can no longer create value efficiently because of various gaps. In the value-innovation process, enterprises are faced with changes in the

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ecology from single value to mutual win–win, the environment from single organization to mutual collaboration, and methods from single pattern to online/offline. This transition has led to the need for crossover services.

A crossover service is an innovation process that enables enterprises to provide users with creative, novel, and cross-domain products/services, which break through the traditional boundaries of enterprises. The crossover service approach has formed gradually with the application of IT in the MSI. It integrates capabilities across multiple boundaries to meet the diverse needs of users and provide more valuable services.

This chapter provides an introduction of crossover, crossover services, and typical crossover scenarios, taking Rural Taobao as an example. Further, we discuss the convergent needs and research challenges faced while realizing crossover services.

1 Emergence and Development of Crossover

Crossover phenomena are observed in daily life. It is clear that crossover is indispensable because a single domain cannot meet complex requirements, as services across multiple boundaries need to be combined to innovate and create value.

1.1 *Origin of Crossover*

An early example of crossover in the field of Western industrial design is found in the 1950s. Ford, an American car manufacturer, applied a design concept from aircraft to cars. Inspired by the flight of aircraft, wings were spread out like a seagull on the tail of the car. This crossover design aroused the curiosity of the public, and the concept of crossover was thus born. Not long after, the concept of crossover was extended to the field of music. Various styles of music, including modern, traditional, classical, popular, eastern, and western, blended with each other, resulting in songs that appeared on multiple record charts, which track specific musical styles or genres. Thus, crossovers were widely accepted and became popular. In recent years, crossover marketing has developed rapidly. With the development of the economy, it has become difficult to determine to which traditional industry a company belongs owing to the mutual penetration of industries in the market. Crossover cooperation expands brand markets and reduces business risk. Through cooperation in different fields, the reputation and experience of a partner brand in a new region is an intangible asset that can help an enterprise establish its brand image and consumer groups faster. The contrast between different fields also provides a strong visual impact to the brand, eventually forming a marketing effect greater than the sum of its parts.

Crossover was originally defined as a path from one side to another; however, crossover is now regarded as an important innovative strategy or method for modern firms to expand their products, services, and markets. It is the result of globalization

and is widely used in a wide range of fields across industries. Thus, its definition differs in different fields.

In business, crossover describes corporate behaviors that break the inherent boundaries among different industries, introduce ideas and technologies from these industries, and carry out an overall business process (BP) to create value.

In art, crossover is defined as the reference and application of different core elements across fields by using creative methods to interpret artwork. Crossover art aims to show creative thinking and achieve more creative art.

In education, crossover is the breaking of boundaries between different disciplines through convergent knowledge, through which students are able to combine multiple disciplines to pursue different ways of thinking about the same problem or subject.

Crossover remains a vague concept, as it is widely used in different fields. Crossover is not only a kind of behavior, but also a way of thinking. It exists in the leap from one field to another, the conversion from one method to another, and the sublimation of one thought to another. It breaks traditional boundaries to address existing issues.

1.2 Why Crossover?

Crossover is the process of generating new products, fields, attitudes, and ideas through the cross collision of professions, fields, concepts and ideologies. There are several causes of crossover:

- (1) **Ideology:** Crossover thinking emerged with ancient philosophy. By the time of the European Renaissance, from the 14th to the seventeenth centuries, its main ideas had been widely accepted and applied in many fields. The concept of crossover created a huge innovation in the politics, culture, economy, and thought of the time, which was a major turning point in the history of human civilization. Thinking was liberated from the thousands of years of theological shackles, as the knowledge of various fields was combined and connected to reimagine our understanding of the world. The emergence and popularity of crossover is not accidental. Crossover arouses people's innovative consciousness by breaking through conventional thought patterns.
- (2) **Culture:** With increasing globalization, the cultures of various countries are integrating. This influence is seen as a homogenizing trend that will eventually make human experience everywhere essentially the same. Propelled by technological development, time and space are no longer obstacles and information exchange has become faster and more convenient. Cultures from different regions collide in the exchange, inspiring people with creative talents to continuously pursue new cultural innovations that reflect the progress and development of society.

- (3) **Technology:** The current generation of IT, which includes cloud computing, the Internet of Things (IoT), mobile Internet, and artificial intelligence, interconnects everything, profoundly altering information generation and processing. These changes not only promote the cross-domain collaboration of organizations globally but also lead to profound changes in social production and lifestyles. Limitations in the traditional service supply chain result in decreased value creation, and enterprises are faced with the need for new ecologies and methodologies. These challenges are resolved using crossover.
- (4) **Demand:** American psychologist Abraham Maslow theorized that human decision making is undergirded by a hierarchy of psychological needs [1]. Crossover is an effective approach to fulfill these needs. With the increasing expansion of material and spiritual needs, increasingly varied commodities can better meet the needs of consumers. In the field of spiritual consumption and commodity sales, crossover products undoubtedly have a wider customer base and innovative value.

Crossover promotes cooperation among enterprises, fields, and industries, as well as the creation of innovative products, services, markets, and business models. Crossover has become an increasingly prevalent trend as it bridges tradition and modernity, the East and the West, and culture and technology. Thus, it has become difficult to judge to which traditional industry a company belongs. More and more industries today have evolved into combinations of different industries.

Crossover not only promotes resource integration and value creation, but also brings us more valuable ways of thinking. From artistic works to digital products and from commercial markets to academic research, the functions and characteristics of a given field have become more abundant and diversified as a result of crossover. Everything changes from the perspective of crossover. Traditional boundaries are increasingly blurred by crossover, that is, by considering design from the perspective of crossover countries, emotions from the perspective of crossover theories, and market behavior from the perspective of crossover fields. Therefore, crossover has become a trend in theoretical research to bring more possibilities for innovation. The role of crossover in various fields effects new changes and is highly significant. The main impacts are detailed below.

- (1) **New products:** The emergence of novel products strongly impacts people and brings a sense of urgency to competitors. Crossover provides a method for companies to develop new products through the combination of cross-field advantages.
- (2) **New fields:** The penetration of crossover causes participants to pay more attention to expansion of the intersection of different fields, which is an important area of future growth. The scope of the field itself has been expanded, and potential space for further development within the field has been found.
- (3) **New thinking:** Crossover enables a variety of creative solutions and novel ways of thinking. The concept of crossover provides an opportunity to refine classical innovative methods and to develop creative methods for future activities.

1.3 Crossover Phenomenon

Crossover is not only a reemergence of a classic form of thinking and cooperation, but also a modern trend of cross-field cooperation entailing the intersection and integration of elements in different fields. Crossover has been used in many fields and is becoming increasingly influential.

- **Crossover Marketing**

Crossover marketing is a cutting-edge marketing method involving the integration and mutual infiltration of originally irrelevant elements according to the commonalities and connections between consumers in different industries, products, and preferences. This process demonstrates a new attitude toward life and aesthetics to win the favor of the target consumers, enabling brands to maximize marketing via cross-border cooperation. In the new era of increasingly fierce market competition, cross-industry penetration and integration have made crossover marketing an important means of brand development.

In 2019, Canadian cosmetics brand M.A.C. partnered with Chinese mobile game Honor of Kings to introduce 5 limited-edition lipsticks featuring the game's most popular characters. This combination of products was selected because the category is readily accepted by the public in the local Chinese market, and the lipstick is more compatible with the personality and characteristics of the female characters in the game. The ability to wear the same lipstick colors as their favorite characters was very exciting and appealing to consumers. This cross-industry collaboration achieved tremendous success, with over 14,000 preorders across M.A.C.'s WeChat miniprogram, Tmall, and the official website. All of the lipsticks were sold out within 24 h of the campaign launch. The crossover collaboration between the cosmetics and mobile gaming industries was a rather bold approach.

- **Crossover Vehicle**

A crossover vehicle is a type of automobile similar to a sport utility vehicle (SUV) built with unibody construction. The term originated in North America. A crossover vehicle is based on the platform of a passenger vehicle, as opposed to that of a pickup truck. For this reason, a crossover vehicle is also called a car-based SUV. Crossover cars have become increasingly popular worldwide since the early 2010s.

Chrysler was one of the first car companies to propose and advocate the concept of crossovers globally. The Journey is a midsize crossover SUV manufactured and marketed by Chrysler's Dodge brand that employs a unibody construction, meaning that the underlying body architecture and frame are a single unit, similar to that of a passenger vehicle. The unibody design is lighter than the more rugged body-on-frame construction used in traditional SUVs. The benefits of this design include more interior space for both passengers and cargo, greater fuel economy, and superior ride and handling qualities on paved roads.

- **Crossover Health**

Crossover health typically describes offshoots of offline medical organizations and the combination of the internet and healthcare. Online medical treatment mainly consists of four types of services: online consultation and treatment, online diagnosis, follow-up treatment, and health management. At present, internet hospitals have two main operation modes: internet hospitals as a part of offline medical institutions, and independent internet hospitals affiliated with medical institutions.

The first internet hospital in China was established in 2015 in Wuzhen, Zhejiang province by the digital medical service platform WeDoctor. The hospital connects well-known doctors with patients all over the nation through its app and website. After talking with doctors via video chat, an electronic patient record is saved in the system. The patient can choose a doctor at home, receive a treatment protocol after remote consultation, and pay their bills online.

2 Crossover Service

The development of the MSI, which relies on crossover services, is highly significant to promote the global economy, accelerate social progress, and build an innovation-oriented and harmonious society.

2.1 *Modern Service Industry*

The MSI is information- and knowledge-intensive based on IT and modern management philosophy that emerges when industrialization reaches an advanced level. It comprises an upgraded traditional service industry and emerging service industry. The MSI has increased its share in the gross domestic product (GDP) and become a critical criterion for both domestic and global economic development.

MSI development has three basic characteristics: Triple-High, Triple-New, and Triple-Little. Triple-High means high human capital, technology, and added values; Triple-New means new technologies, business models, and approaches; and Triple-Little means little area, cost, and pollution.

Alternatively, the MSI can also be categorized into four classes based on service sectors: (1) basic services, which include communication and information services; (2) manufacturing and market services, which include finance, logistics, e-commerce, agricultural support, intermediary, and consulting services; (3) personal consumption services, which include education, healthcare, hospitality, entertainment, tourism, real estate, and retail; and (4) public services, which include government public administration services, compulsory education, public health, medical treatment, and public information services.

The evolution of the MSI can be separated into four stages. From the 1930s to 1950s, business, transportation, and communication rapidly developed. From the 1950s to 1990s, finance, insurance, and business services enhanced the service function of secondary industries. In the 1990s, e-commerce and modern logistics expanded quickly, and through 1990s into the twenty-first century, information and communication technology facilitated the explosive development of the MSI. Note that in the 1960s and 1970s, the developed world shifted its focus from capital-intensive industries to knowledge- and technology-intensive industries. In the 1980s, the developed world extensively built high-tech industries and transformed conventional industries. Since the 1990s, the developed world has gained a strong foothold at the top of the industry value chain.

With the shift from an industry-based economy to a service-based economy, the globalization and professional work division have further promoted MSI development. Statistics from the World Bank¹ indicate that the service industry in developed countries accounts for approximately 70% of their GDP; the MSI has accomplished a production value of over 50% of the service industries in total and facilitated more integrated development of the primary, secondary and tertiary industries [2]. The MSI and traditional industries have been increasingly integrated, which helps upgrade the latter. Emerging service industries, including the internet-based e-commerce and content services, have become a leading engine for the global economy; the MSI is becoming a core link of the modern industrial system.

Countries at all levels of industrialization and income can exploit transformative opportunities from the service industry. In the past three decades, the service sector has grown faster than manufacturing in many developing economies. By 2019, services accounted for 55% of the GDP and 45% of employment in developing economies. In developed economies, services account for an even larger share of economic growth—75% on average. A few low- and middle-income countries were among the top 10 global exporters of services between 2005 and 2017 [3].

IT, professional, scientific, and technical services are growing in importance within the service industry. Economic transformations in the MSI offer new opportunities for scale, innovation, and spillover effects similar in scope to those that increased the productivity of manufacturing in the past. Remote delivery, branching, and franchising enable service providers to tap larger markets, and providers who offer services digitally are no longer restricted to face-to-face engagements with their customers. Digital technologies are improving BPs, introducing new product features, and creating new markets. Far more research and development are now being performed in services than in industry: big data is enabling the improvement of transportation systems as well as spurring retail outlets to improve their offerings.

The characteristics of crossover and convergence have become an important trend, requirement, and feature of innovative development of the MSI, which highlights the need for crossover service.

¹ <http://data.worldbank.org/indicator>

2.2 *Concept of Crossover Service*

With the development of crossover, the integration of the MSI and the primary sector and the secondary sector is accelerating. Various traditional boundaries have been broken, and the cross-integration of services has led to the need for crossover services. A crossover service is the deep convergence and model innovation of services that cross the boundaries of different industries, organizations and value chains, aiming to provide users with high quality and high value services. Crossover service is a new style of the MSI, and a new form of modern enterprise management, and a new scenario for the application of IT in the MSI, and a new trend of service computing. The essence of crossover services lies in the deep convergence of services across different industries and organizations, forming a complex service network and generating a large service ecosystem.

In this book, we generally define crossover service as an innovation process for enterprises to provide users with creative, novel, and cross-domain products and services that break through the traditional boundaries of enterprises. The crossover service can be understood from both broad and narrow perspectives. From the broad perspective, it is a service that crosses different boundaries, such as different organizations, different domains, and different industries. From the narrow perspective, a crossover service entails all the necessary processes and activities that support an enterprise to design, implement, produce, and manage new products or services targeting a completely new market or industry.

Crossover service is a new style formed gradually with the application of IT in the MSI. It integrates capabilities across multiple boundaries to meet the diverse needs of users and provide more valuable services. The emergence of new technologies, such as cloud computing, mobile Internet, and artificial intelligence, has blurred the boundaries of various enterprises, industries, and fields and promoted the rise of crossover services.

Crossover services have “3C” characteristics, namely, crossover, convergence, and complexity.

Crossover: Crossover is the basic characteristic of crossover services, which are provided across different business areas, different industries and different industrial domains. Intangible products formed or derived from crossover services are always cross-domain. For example, Internet hospitals provide online appointments, online consultation, and other Internet services across organizational and geographical boundaries. For example, the crossover e-commerce Rural Taobao provides agricultural products transactions across the boundaries of finance, e-commerce, and logistics.

Convergence: Convergence is the fundamental attribute for which modern enterprises provide crossover services. Convergence occurs among different industries and gradually forms a new crossover industry through interaction and mutual infiltration. Convergence is a dynamic development process comprising technological, product, service, enterprise, and market convergence. Intangible products formed or derived from crossover services are the result of convergence. For example, the health code is an innovative service provided by Alibaba Group that integrates capabilities in multiple fields, such as public services, mobile services, and big data.

Complexity: Compared with traditional services, crossover services are more complicated in the innovation, development, and operation process. It is difficult for the providers of crossover services to not only cross the boundaries of different industries and integrate all kinds of resources into industries or areas with which they are not familiar, but also conduct a series of innovative activities, such as service innovation and business pattern design, by combining their resources, market, and technology. Furthermore, those enterprises already existing in the market have advantages in marketing, technology, and services, which brings more risks and challenges to the crossover service providers. For example, Rural Taobao has served more than 7,000 villages in 2020 while covering the retail, finance, agriculture, logistics, and warehouse industries [4].

2.3 *Typical Crossover Scenario*

With the rapid development of e-commerce, the growth of traditional e-commerce users has reached a bottleneck, and major e-commerce giants have begun to focus on the vast market of rural areas. However, the shortcomings of poor network coverage in rural areas, relatively backward logistics systems, and farmers' low ability to apply the network have limited the development of rural e-commerce. In response to these problems, Alibaba launched the Rural Taobao project based on an e-commerce platform to give full play to the advantages of e-commerce by building county-village service networks, thereby breaking through the bottleneck of logistics and information flow and realizing the two-way flow of online goods to the countryside and agricultural products to the city.

Rural Taobao is a typical crossover scenario crossing the boundaries of domain, system, identity, and technique to achieve the multidimensional convergence of pattern, design, runtime environment, quality, and value.

- **Crossing domain boundaries**

The Rural Taobao crossover scenario involves eight domains, namely, agency services, agriculture, agricultural and sideline food processing, warehousing, postal services, manufacturing, retail, and finance, with nearly 25 types of service participants working together to achieve upward mobility of agricultural products and downward mobility of consumer goods, as shown in Fig. 1.

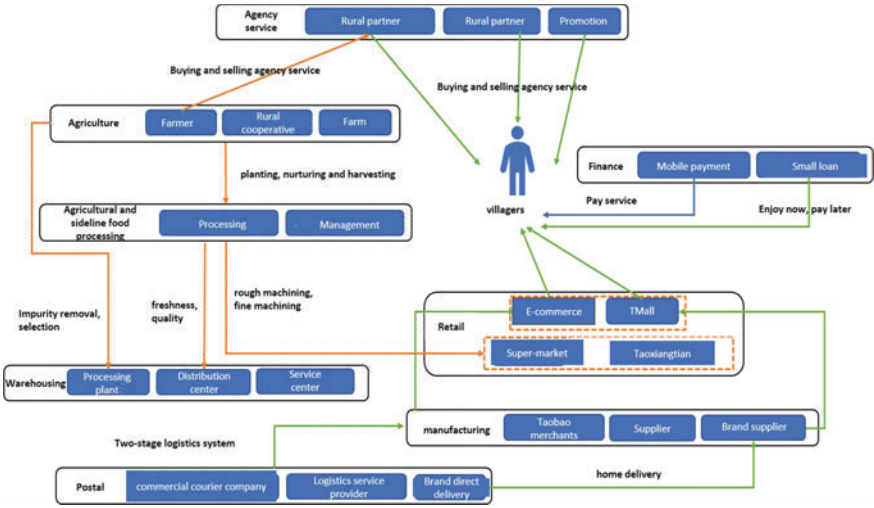


Fig. 1 Rural Taobao service crossing domain boundaries

• **Crossing system boundaries**

Crossover in the Rural Taobao system is mainly reflected in the information interactions of five subsystems: payment, Rural Taobao, the courier company, the logistics company, and e-commerce. The traditional and rural e-commerce systems share merchant, commodity, and user data. The financial payment system is docked with the rural e-commerce system to complete the interaction between order settlement and payment information and jointly complete the payment function. The interaction between the systems of Rural Taobao, logistics companies, and courier companies is mainly reflected in the interaction between delivery and status information, and the parcel status is kept synchronized between them, as shown in Fig. 2.

• **Crossing role boundaries**

In the Rural Taobao scenario, a participant can assume different roles and functions at a certain time, thus reflecting the cross-role features of the crossover scenario. As a participant who interacts directly with villagers, the rural partner has four roles: purchasing agent, receiving agent, selling agent, and sending agent, and can switch between different service scenarios. In the scenario where online goods are sent to the countryside, the rural partner mainly embodies the purchasing and receiving roles; in the scenario sending agricultural products to the city, the rural partner mainly realizes the selling and distributing roles, as shown in Fig. 3.

• **Crossing technique boundaries**

In the upstream chain of agricultural products, Rural Taobao has made a bold attempt to use e-commerce data to support the planting and harvesting of agricultural products. While traditional e-commerce is only responsible for online sales, Rural Taobao

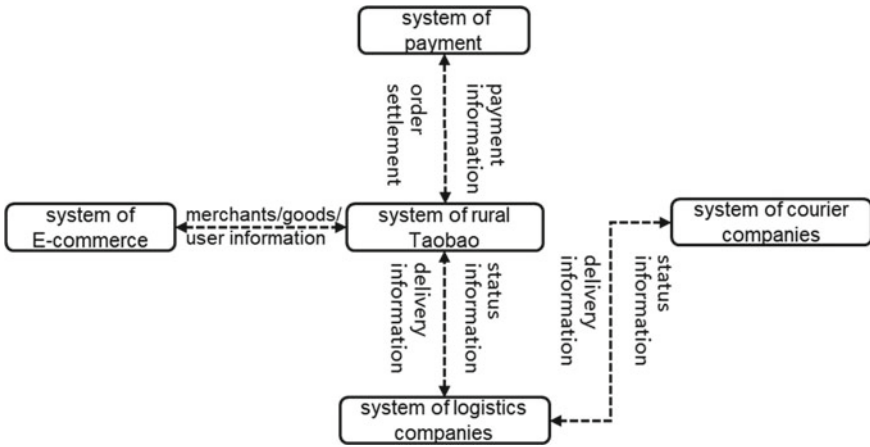


Fig. 2 Rural Taobao service crossing the boundary of system








	Role 	Service function 	Service scenario 	Service category
	Purchasing agent	Promoting quality products Collect information on products to be purchased Place orders in bulk	Online goods to the countryside	General service
	Receiving agent	Second-level logistics temporary storage	Online goods to the countryside	
	Selling agent	Selecting local specialty product Put local specialty product on sale Online pre-sales / after-sales service	Agricultural products to the city	Innovative Services
	Sending agent	Agricultural product order taking, packing and shipping	Agricultural products to the city	

Fig. 3 Rural Taobao service crossing role boundaries

not only provides a platform for online shopping, but also makes full use of online sales data to explore special varieties, planting areas, and market preferences and demand. It also helps villagers improve production and optimize the quality of agricultural products through the participation of agricultural experts. However, there is still distance between the primary agricultural products and commodities, and there is a lack of brand-operation knowledge among farmers. Rural Taobao can be of great help to villagers in creating regional brand characteristics, as shown in Fig. 4.

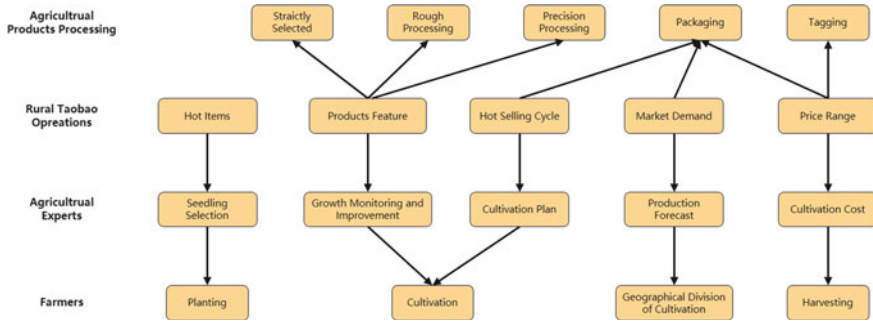


Fig. 4 Rural Taobao service crossing technique boundaries

3 Convergence Perspective of Crossover Service

The key to achieving crossover service is convergence, which includes the deep multidimensional convergence of patterns, requirement design, runtime environment, quality, and value. In pattern convergence, it is necessary not only to converge data, processes, and services in the service ecosystem, but also to realize the deep convergence of service patterns from different participants, resolve pattern conflicts, and achieve a win-win situation. During requirement analysis and convergence design, crossover scenarios cross multiple service systems, the service-design methods are complex and dynamic, and different service-design methods need to achieve convergence. In runtime environment convergence, services run in open, dynamic and heterogeneous environments to form complex service networks, which need to shield heterogeneous environments and provide a transparent and virtual convergence environment. In the quality-convergence stage, services cross the boundaries of time, space, and domain with different qualities and high variability in evaluation, which require multidimensional attribute convergence of service quality. The purpose of value convergence is to maximize the value of each party, but there are often explicit or potential value conflicts among services participants that require trade-offs.

- **Pattern convergence**

As an important driving force for the development of the MSI, the service pattern is a service-provision method that supports the realization of business models. It describes end-to-end services provided by service companies, such as methods for industry chain synergy, approaches for service acquisition, and the operation and maintenance system. Moreover, service patterns include various strategies, such as service resource allocation, activity organization, and stakeholder synergy, which guide the design of specific BPs.

The simplest atomic service pattern comprises only two entities that interact directly, while complex patterns are obtained by combining multiple atomic service patterns. For example, there are nine participants in the Rural Taobao crossover scenario, namely, the Rural Taobao platform, traditional e-commerce platform,