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# Research on time-value-oriented business model innovation path in life services enterprises and its impact on customer perceived value

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In the era of the digital economy, the acceleration of life pace has induced to a continuous increase in people's sense of time scarcity. In order to satisfy consumers' lifestyle changes and immediate needs, life service enterprises have carried out lots of business model innovation activities guided by value of time. However, it is still unclear what the time-value-oriented business model innovation path is and whether it can improve the perceived value of customers. Under such background, this paper aims to construct a time-value-oriented business model innovation path in life services enterprises and to discuss its relationship with customer perceived value. The study indicates that: Firstly, specific innovation paths of enterprises include putting forward the purpose of value of time proposition, designing standardized process based on time-oriented, constantly forming unique core resources such as big data, brand and supply chain, and updating the transaction method combining online and offline, and so on. Secondly, the questionnaire results indicate that time-value oriented business model innovation in four aspects - value proposition, key processes, core resources, and transaction methods - can effectively enhance customer perceived value. Thirdly, there are differences in the matching degree between time-value-oriented business model innovation and customer value perception among different types of enterprises in the life services industry. Among them, the express delivery industry has the highest enhancing degree and customer satisfaction. This is related to the heterogeneous characteristics of industries such as express delivery, transportation, catering, and retail. Overall, this study offers a comprehensive and practical perspective for enterprises to meet customer perceived value demands by presenting business model innovation paths and solutions.

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## Introduction

**T**ime is money (Feldman, 2010).” With the development of society, the sense of time scarcity among people is increasing year by year (Rudd, 2019; Chaumon et al. 2022). Especially in the context of the digital economy era, people’s lifestyles have changed significantly (Mpungose, 2020; Noehrer et al. 2021; Lo Piano, 2020; Indira, 2020), consumers have an increasingly high demand for instantaneity in life services enterprises, which brings big challenges for life service enterprises that have high touch characteristics (Li et al. 2022; Sardar et al. 2022). Time has gradually become one of the key factors determining consumer behavior (Bradford et al. 2017), customer time and attention have also become a focal point for businesses (Pine and Gilmore, 2019). Increasing number of life services enterprises have begun to consider consumers’ increasing time requirements into business model innovation to satisfy consumers’ needs regarding the value of time. For example, in China, Meituan has begun to provide instant delivery services, Didi has proposed the value proposition “saving time for life,” and HaiDiLao has developed an online reservation system to reduce in person waiting time. Although life service enterprises have made numerous attempts and practices in business model innovation to meet customers’ time value demands, no systematic innovation path has been theoretically developed and summarized. Hence, how should a time-value-oriented business model innovation path be designed? Is this path reasonable and able to increase customer perceived value? These issues have gained significance and have become major concerns for both academia and industry.

Business model innovation is the basic logic to change the value creation of enterprises (Vaska, et al. 2021; Andreassen et al. 2018; Tykkyläinen and Ritala, 2021), which is an activity to improve customer perceived value and corporate competitiveness (Sanaz et al. 2023). Scholars have conducted extensive research on the elements of business model innovation, including the three-element model (Amit and Zott, 2001), four-element model (Johnson et al. 2008), five-element model (Timmers, 1998), six-element model (Chesbrough and Rosenbloom, 2002), and nine-element model (Osterwalder et al. 2005). In previous studies, scholars have reached a consensus that business model innovation achieves corporate value creation by changing elements such as value proposition, key processes, core resources, and transaction methods (Sjödén et al. 2020), which gives our research a good theoretical basis. Our study will continue to explore the business model innovation path in depth by focusing on the four elements of value proposition, key processes, core resources, and transaction methods.

At the same time, business model innovation is a complex process driven by multiple factors, including external environment and internal factors of the enterprise. Existing research has explored business model innovation based on these two levels. On the external level, factors such as national strategic change (Klein et al. 2021), institutional transitions (Heider et al. 2021), industry competition (Velu, 2016), customer demands (Sun et al. 2021), market orientation (Randhawa et al. 2021; Ye et al. 2023), technological change (Essen et al. 2023; Trischler and Li-Ying, 2023; Chasin et al. 2020), and value networks (Best, et al. 2022) can stimulate dynamic adjustments of business models. On the organizational level, factors such as organizational decision making perspectives (Randhawa et al. 2021), internal resources and capabilities (Zhang et al. 2021), managerial cognition (Heubeck and Meckl, 2022), top management team characteristics (Snihur and Zott, 2020), corporate social responsibility (Halkos and Skouloudis, 2018), organizational characteristics (Foss and Saebi, 2018), and organizational learning (Yi et al. 2022; Li et al. 2022) also have a significant impact on business model innovation. However, there is limited research on how to explore the

specific path of business model innovation from the perspective of the value of time while considering the increasing demand for time from customers.

Furthermore, can the business model innovation path achieve the expected results? Research on the organizational level suggests that business model innovation has a positive impact on enhancing organizational capabilities (Souto, 2015), reducing operational costs, strengthening competitive advantage (Foss and Saebi, 2018), and improving firm performance (Ferreras-Méndez et al. 2021). Further research has found that business models achieve their own target value by creating customer perceived value. Therefore, the value of business model innovation needs to match the customer perceived value and achieve value exchange in order to achieve the goal of increasing enterprise value (Clauss et al. 2019). In other words, customer perceived value directly determines the effectiveness of business model innovation and ultimately affects the acquisition of enterprise value (Reichheld and Sasser, 1990). Therefore, our research aims to analyze the rationality of the business model innovation path from the perspective of consumer perception.

This paper is based on the theories of time-value and business model innovation, focusing on the following research questions: “How do life service enterprises innovate their business models considering the value of time? What are the specific paths? And can these paths enhance customer perceived value?” The key contents include three aspects: (1) Exploring a time-value-oriented business model innovation path in life service enterprises through the practical innovation experience of six typical companies—Hema, JD.com, HaiDiLao, Meituan, SF Express and DiDi Global; (2) Proposing hypothetical relationships between the elements of business model innovation paths of life service enterprises and customer perceived value, based on a review of previous research on business model innovation; (3) Empirically testing the innovation paths by assessing customer perceived value across various dimensions of business model innovation in life services enterprises, further uncovering the differences in business model innovation performance among different types of life service enterprises. This study aims to enrich the related theories of business model innovation, explore a specific path for business model innovation from the perspective of the value of time, provide practical guidance for enterprises to enhance competitive advantage, achieve customer satisfaction, and ultimately maximize customer perceived value in today’s time-driven environment.

## Practical background

The objective of this section is to conduct a preliminary exploration of a time-value-oriented pathway for business model innovation. This will be achieved by delving deeply into the business model transformation processes of representative life services enterprises. Their practical experiences in business model innovation from the perspective of the value of time will serve as valuable insights.

**Practical experiences.** In recent years, China’s life service industry has made significant progress and has become an important part of the national economy. Moreover, the life service industry is closely linked to people’s leisure time, directly offering consumers both material and spiritual consumption products and services. The quality of these services directly affects consumers’ feelings of achievement, happiness, and security (Zhong and Moon, 2020). As previously mentioned, time is becoming the scarcest resource for people. In this context, some leading life service enterprises have started to incorporate the

**Table 1 Basic information about the selected firms.**

Firm	Hema Fresh	JD.com	HaiDiLao Hotpot	Meituan	SF Express	Didi Global
Listed company	Yes	Yes	Yes	Yes	Yes	Yes
Industry	New retail	Logistics and express delivery	Catering	Food delivery	Logistics and express delivery	Transportation
Time-value characteristics	Honed the new retail model “catering + supermarket + e-commerce app + logistics” that integrates online and offline operations	Upgraded from “abundant, fast, high quality, and money-saving” to “live up to every love”	Has taken customer perceived value as the starting point to promote “service first, customer first”	Provides convenient and instant delivery services that emphasize timeliness: “Meituan delivery, punctual, and easy to use”	Committed to fast, safe, and accurate delivery that lives up to customer trust as well as becoming and remaining the leading company in the express delivery industry	“Ride with Didi for a pleasant trip; ride with Didi, save time for life”

element of time into their business model innovations, such as Hema, JD.com, HaiDiLao, Meituan, SF Express and Didi Global. The basic information of the enterprise is shown in Table 1.

We chose these six companies for several reasons. Firstly, these enterprises all have distinct time-value characteristics. Although they belong to different industries such as catering, retail, transportation, and express delivery, and their business models show diversity, they all revolve tightly around the demand for customers’ value of time. For example, through the use of key technologies like big data and intelligent systems, these companies comprehensively manage various aspects like consumers, logistics, and delivery, achieving a combination of online and offline services. By catering to diverse time needs of consumers, these enterprises develop suitable reservation and delivery options, offer personalized services, and fulfill a wide array of customer demands. This approach significantly reduces consumers’ waiting time, ultimately enhancing the overall value of time for them. Secondly, these six enterprises are all grounded in local life services, have matured in their respective industries, and cover different regions of China. Thirdly, their service models are typical and distinctive, earning favor and widespread acclaim from consumers.

In order to better extract experiences from these six companies and explore the time-value-oriented path of business model innovation, we collected three types of materials about these companies to support the analysis content from multiple perspectives.

The first category comprised secondary data, including data retrieved from the Internet; data collected and compiled from existing documents, written materials, and media reports (e.g., newspapers and magazines, industry reports, industry databases, news reports, official Weibo, WeChat, and TikTok accounts); and data collected from past studies (available on platforms such as the China National Knowledge Infrastructure [CNKI] and China Science and Technology Journal Database [CQVIP]). The second category comprised official information, including official corporate information (e.g., from official disclosures and annual reports) and materials disclosed through official channels (e.g., corporate annual reports, executive speeches, and interview records). The third category of data was collected and compiled based on user reviews of the selected firms’ online platforms.

Next, six independent researchers compared and summarized the practical experiences of six companies. They used NVIVO software for the statistical analysis of relevant textual data, extracting commonalities among the six companies in time-value-oriented business model innovation. These commonalities are gradually distilled into three levels (see Table 2) to assist in deriving a general innovation path.

**Practical path.** Further, how should the specific path of time-value-oriented business model innovation be designed? How should it be implemented? Next, through summarizing and organizing the cases of the six lifestyle service enterprises mentioned above, further analyzing specific practices for each element of business model innovation from the perspective of the value of time, and constructing an enterprise business model innovation path diagram, as shown in Fig. 1.

Generally, the time-value-oriented business model of enterprises is a value system that aims to improve the customer perceived value by improving existing operations, establishing cross-enterprise collaborations, and engaging stakeholders to create and distribute value. Such transformation is realized through innovation in value propositions, key processes, core resources, and transaction methods.

Value propositions refers to the combination of values that a company provides to its customers to customers, intended to satisfy their diverse needs (Rintamäki and Saarijärvi, 2021). Specifically, these three paths include Time-Value Proposition, Continuous Innovation of Time-Value Concept, and Time-Value Competitive Advantage. Correspondingly, based on customers’ pursuit of the value of time, life services firms have proposed corresponding value propositions, such as Didi’s “saving time for life” and SF Express’s “committed to fast, safe, and accurate delivery that lives up to customer trust.” Furthermore, various enterprises adhere to the concept of continuously innovating the value of time, and continue to innovate in areas such as “fast delivery, timely delivery, and efficient delivery”. As more competitors have begun to follow up, the leading firms have started to propose further improved and refined strategies to increase their competitive advantage.

Key processes, such as roles, operating links, time, rules, and standards, are the most important part of the processual system and play a decisive role (Sjödin et al. 2020). These processes typically entail three pathways: efficient operation of time-oriented standardized processes, greater convenience compared to competitors, and balancing the value of time and service quality. Firstly, regarding key processes, firms should establish time-oriented standards and continuously optimize processes accordingly. For instance, Didi Global has implemented the standardized procedure “passenger places an order – Didi platform inquiries about available vehicles within the area and sends a passenger request – a driver accepts the order and contacts the passenger by phone – the passenger arrives at the destination – Didi charges the passenger according to their usage – the passenger evaluation,” which has greatly improved operations efficiency. Secondly, firms should aim to be more convenient and efficient than their competitors. For example, JD.com has combined self-operated and outsourced logistics to provide diversified delivery options, such as selected

**Table 2 The commonalities of business model innovation among six enterprises.**

Core variables	Main factors	Characters	Partial citation
<b>Value proposition</b>	Proposal for value of time	Online-offline Integration	① Creating an online-offline integrated new retail model that combines “dining + supermarket + e-commerce app + logistics.”
	Continuous innovation in time-value philosophy	“Fast, efficient, and cost-effective” (quick and time-saving). Service value	② Upgraded from “Fast, efficient, and cost-effective” to “Never let any passion down.”
		Instant delivery, punctuality	③ Putting customer perceived value as the starting point and advocating for “service first, customer first”
	Time-value competitive advantage	Fast, Expedited delivery	④ Providing convenient and timely delivery services, with a strong emphasis on timeliness. Meituan Delivery ensures prompt and reliable delivery. ⑤ Committed to delivering customer trust with speed, safety, and accuracy, aiming to be a continuously leading company in the express delivery industry, surpassing competitors.
<b>Key processes</b>	More convenient compared to competitors	Time-saving	⑥ Didi provides convenient transportation options that save time and enhance the quality of life.
		Fast delivery	① Emphasizing fast delivery, the company promises to deliver goods to customers’ doorsteps within 30 min within a 3-kilometer radius of the store. It is the world’s first 24-h delivery business model, with nighttime delivery achieving the fastest 30-min delivery.
	Balancing the value of time and service quality	Shipping speed (fast)	② By combining self-operated logistics with outsourced logistics, the company has implemented new methods such as ‘fast and accurate delivery’, ‘ultra-fast delivery’, ‘211-fast delivery’, and ‘next-day delivery’ to enhance the speed of order fulfillment
		Time saving	③ Collaborating with Ele.me, the company has launched a third-party food delivery service. The delivery service operates from 9:00 am to 10:00 pm, offering a wide time range for customers to order food. Additionally, an intelligent kitchen management system is implemented, which helps to save an average of 8 min of waiting time for customers when dining.
<b>Core resources</b>	Efficient operation of time-oriented standardized processes.	Time evaluation (fast/slow) and algorithmic assignment.	④ After receiving user orders, Meituan needs to consider the interests of users, merchants, and delivery riders in order assignment. The goal is to ensure timely pickup and delivery of orders while allowing delivery riders to earn income within a reasonable workload. Meituan takes into account the availability and proximity of delivery riders when evaluating time, and the algorithm for order assignment is based on these factors.
		Convenient process flow.	⑤ Customer submits the package for delivery - Company coordinates with the delivery department for pickup - Internal data processing within the company - Delivery department receives the order and arranges for delivery - Delivery.
		Systematic distribution (Distributing orders based on shortest time using big data)	⑥ Passenger places an order - DiDi platform searches for available vehicles nearby and sends a ride request to drivers - Driver accepts the request and contacts the passenger to confirm - Arrival at the destination - Fare is calculated and charged accordingly - Passenger provides feedback or rating
Big data and branding advantages	Technology integration and optimization matching	① The core selling points of the product include direct sourcing from the origin, freshness guarantee, and selling products within a day. The logistics and distribution system leverages technologies such as big data, mobile internet, the Internet of Things (IoT), and advanced automation facilities to optimize the matching between the workforce, goods, and locations. This ensures efficient and seamless operations throughout the supply chain.	

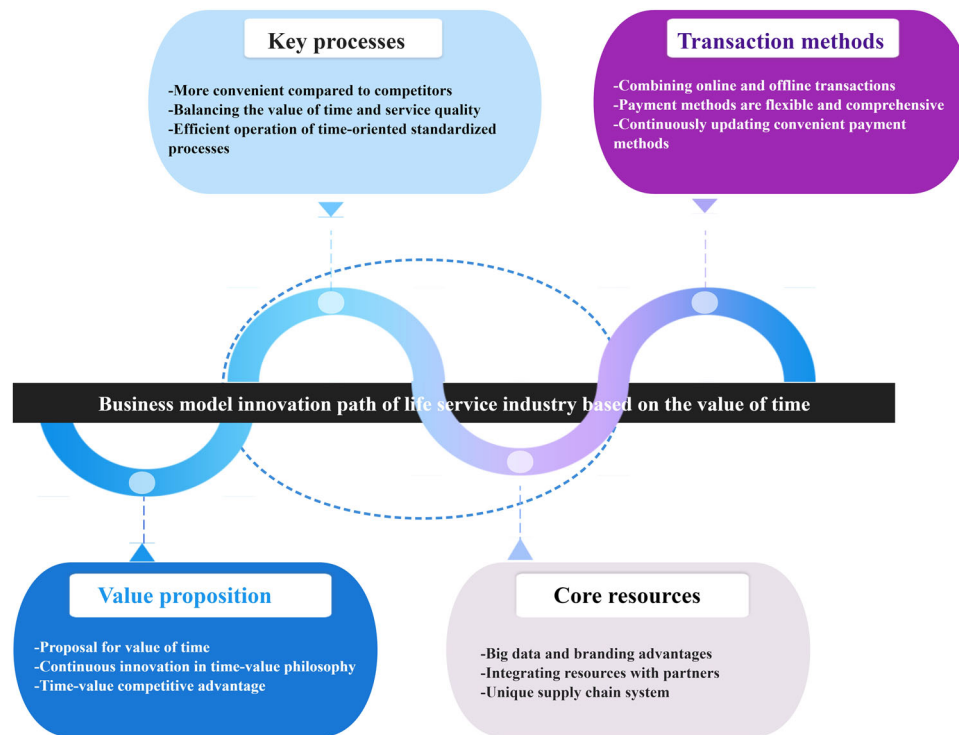
**Table 2 (continued)**

Core variables	Main factors	Characters	Partial citation
		Intelligence	<p>① JD.com has a nationwide warehousing system and an intelligent distribution network. Currently, JD.com has 7 logistics centers, 9 Asia No.1 warehouses, 25 front-end distribution centers, 22 independent warehouses for large items, and 256 warehouses in total. Compared to Suning, which has 7 automated sorting centers and 32 regional distribution centers, JD.com has a significant advantage in terms of network layout.</p> <p>② First, there is the DiDi Intelligent Credit Control System, which includes real-time traffic status perception, real-time alarm information, real-time intersection ranking, traffic problem diagnosis, problem indicator reproduction, intersection optimization, and mainline coordination optimization.</p> <p>Second, there is the Artificial Intelligence system, which includes six aspects: natural language processing, driver-passenger experience, platform efficiency, voice interaction technology, computer vision, and intelligent map engine.</p>
	Integrating resources with partners	Resource integration, distinctive services, humanization, and convenience	<p>③ The resource integration model of “heroic leadership + dignified employees + full authorization” brings advantages and unique marketing strategies. In addition to the benefits derived from distinctive services, its humanized management approach, extremely low employee turnover rate, large-scale direct chain operations, and cost advantages in raw materials and convenient logistics and distribution formed by its business matrix are also excellent advantages of Hai Di Lao.</p>
	Unique supply chain system	Instant delivery and efficiency (high efficiency)	<p>④ They have built a complete and efficient overall technology system for instant delivery, which enables precise sensing, intelligent decision-making, and efficient execution throughout the entire process of instant delivery. This has significantly improved delivery efficiency and user experience.</p>
		Big data and automation	<p>⑤ SF Express has the largest fleet of aircraft and cargo air transport network in the logistics industry. They adopt an end-to-end sorting and transshipment logistics model. Core resources such as SF Airlines, SF Technology, big data ecosystem, artificial intelligence, intelligent maps, automated cross-belt sorting machines, indoor AGVs, drones, and more provide strong support for meeting consumers’ demands for time value.</p>
<b>Transaction methods</b>	Combining online and offline transactions Payment methods are flexible and comprehensive.	Online and offline payments are both accepted.	① Online Alipay, Alipay and Cash on Delivery (COD) in offline stores
		Flexible payment methods	② Cash on Delivery (COD), Online Payments, Installment Payments, Bank Transfers, Postal Remittances, etc.
	Continuously updating convenient payment methods.	Comprehensive payment methods	③ Online + Cash Mode: Alipay, WeChat Pay, UnionPay settlement, and member account settlement are used in both online and cash transactions.
		Fast Payment	④ Cash Payment, Online Payment, WeChat Pay, Alipay Payment
		Password-Free-Payment	⑤ Establish a self-built Meituan payment platform with a low-value password-free fast payment system, while also integrating other online payment platforms such as Alipay and WeChat
			⑥ Password-free payment, manually pay after order completion

① Hema Fresh ② JD.com ③ HaiDiLao Hotpot ④ Meituan ⑤ SF Express ⑥ Didi Global.

time-range delivery, extreme express delivery, 11 a.m./p.m. cut-off delivery, and next-day delivery services; this has allowed them to provide faster shipment speeds than their competitors. Finally, firms also should take into account the improvement of service

quality. For instance, in the State Post Bureau’s 2021 Express Service Satisfaction Survey, SF Express ranked first in the industry regarding satisfaction with end-to-end delivery time and a 72-h punctuality rate.



**Fig. 1** Path of time-value-oriented business model innovation.

Core resources are the vital resources that enable organizations to create and deliver their value proposition, reach their markets, build relationships with customer segments, and generate revenue (Tallman et al. 2018; Annarelli et al. 2020). Specifically, there includes leveraging advantages in big data and brand, integrating resources with partners, and establishing a unique supply chain system. Firms should continuously enhance their advantages in big data technology, brand awareness, and brand reputation to improve value generation efficiency. For example, Didi Global has established a smart information control system that uses technologies such as big data to optimize routes, reduce the likelihood of encountering traffic congestion, and reduce customers' waiting times. Additionally, firms should cooperate with upstream and downstream partners to build core resources and continuously improve efficiency. For instance, HaiDiLao Hotpot has partnered with Ele.me to launch a third-party food delivery service and a smart kitchen management system, saving customers on average 8 min of waiting time. Firms should also integrate and develop the entire value chain to form a unique supply chain management system that enables more scientific, rigorous, and efficient operations flows, providing a new path for the realization of the value of time.

The transaction method is the main embodiment of profit and is also the last link in value acquisition. Through interaction with customers during the transaction process, enterprises realize value transformation (Chesbrough et al. 2018). Specifically, there includes integrating online and offline transactions, continuously updating convenient payment methods, and offering flexible and comprehensive payment options (De Luna et al. 2019). The selected firms have adopted a combination of online and offline payment methods to expand transaction channels and increase the convenience of transaction methods, such as electronic payments, confidential payments, etc. Furthermore, through technological innovation, enterprises continue to upgrade their transaction methods to form omni channel including the cooperation with WeChat, Alipay, UnionPay system, Digital

renminbi experiment, and the development of independent payment system, which can create a more convenient and swift value conversion at the final step so that consumers can obtain value.

### Hypothesis

We explored a time-value-oriented business model innovation path through enterprises practical experiences in the first part. This section attempts to further review the literature on the main factors in this path based on this foundation, and proposes hypothetical relationships between them and customer perceived value, thereby laying a solid foundation for the next part to continue exploring and verifying the impact of each element of the business model path on customer perceived value.

**Value proposition innovation and customer perceived value.** In the business model of life services enterprises, the value proposition refers to the combination of values offered to customers by the enterprise, which can solve customers' diversified needs (Rintamäki and Saarijärvi, 2021; Osterwalder, 2013). It answers questions like "Who are the target customers of the enterprise? What kind of value is created for customers? What combination of products and services is provided?". As the starting point of business model operation and a primary component of the business model, a clear value proposition enables an enterprise to deeply and clearly define its position (Helmold, 2020). Through market and product segmentation, the enterprise can identify its target market and target customers, thus effectively meeting customer needs (Dolnicar, 2022). Value proposition innovation involves designing genuine solutions based on customer needs, aligning products with the market (Abdel-Basst et al. 2020, Osterwalder et al. 2015), to better meet market demands and provide added value to customers. This leads to customer satisfaction, making them more willing to pay a premium and

consume the company's products and services more continuously and frequently (Dash et al. 2021).

Firstly, enterprises can use modern information technology and big data to obtain early customer transaction data and feedback, accurately grasp the real needs of customers and their changing trends (Gallego and Font, 2021), and further clarify the target market of the enterprise (Liu, 2019; Suoniemi et al. 2020). Currently, the fast-paced lifestyle and work patterns have led to customers' increasing demands for efficiency and experience. Businesses in the life service industry are closely related to the daily lives of customers. Facing the changing trends in customer needs, enterprises should make adaptive adjustments to their products and services to better meet current customer needs and possibly lead future demands (Liu et al. 2020).

Secondly, enterprises, through value proposition innovation, reposition the value supplied to target customers and strive for differentiation. With the development and widespread application of mobile internet, customers find it easier and cheaper to access information, leading to more personalized and diversified needs (Zhang et al. 2023). The desire for novelty and difference is particularly prevalent among young consumers. To better cater to customer needs and enhance customer perceived value, enterprises need to change their value propositions, truly solve customer problems, and create innovative or entirely new products or services, thus significantly enhancing customer perceived value.

Finally, enterprises should clearly define the goods that carry customer benefits. Modern customers, becoming increasingly discerning, demand diverse and personalized advanced needs to be met, driving enterprises to shift from basic single products or services to integrated solutions, thus bringing not just single product or service value to customers, but a combination of values to meet diversified needs.

In summary, the broader and faster-growing the market space of the target customers of the enterprise's services, the more obvious the differentiation of the core benefits provided by the enterprise, and the more the enterprise can provide personalized solutions around unique customer needs, the greater the customer perceived value it can create, and thus achieve better performance.

Based on the above analysis, this paper proposes the following hypothesis:

H1: Time-value-based proposition innovation in the business model of life service enterprises can enhance customer perceived value.

### **Key processes innovation and customer perceived value.**

Innovation in a business model requires interaction and synergy among its various elements. Following the proposal of a new value proposition, it's necessary to explore the path to its realization – the key processes. Key processes are the core operational and management activities designed and implemented by a business to realize and deliver its value proposition (Johnson et al. 2008). Typically encompassing aspects like production, sales, marketing, customer service, and supply chain management, key processes are an indispensable part of creating and delivering customer perceived value. Innovating in these key processes defines new ways of value delivery, directly affecting the delivery, quality, and efficiency of products or services, thereby enhancing customer perceived value.

Time-value-based innovation in key processes can improve production and delivery efficiency by quickly meeting customer needs. By using technology and methodologies, businesses can reduce the time for value-creating activities in production operations and eliminate non-value-adding activities, thereby

speeding up the provision of products and services. For instance, introducing advanced production technologies, automated processes, or intelligent manufacturing systems can enhance production efficiency and shorten delivery cycles, enabling customers to receive their desired products or services faster. This capability of prompt delivery enhances customer satisfaction, creating more value for customers.

Innovations in sales, marketing, and customer service can enhance the value of time of consumption and improve customer experience (Zott and Amit, 2010). With the rapid development of digital technology, businesses can offer more convenient and personalized customer services (Coronado-Medina et al. 2020). Innovations like intelligent customer service systems, online shopping platforms, mobile applications, and virtual reality technologies break the synchronicity of time and space in consumption, providing more convenient and real-time consumption channels (Lee and Lee, 2020). Meanwhile, businesses can eliminate temporal and spatial distances with customers using emerging technologies, allowing real-time interaction and better understanding of customer needs. These innovations reduce the time customers spend searching, increase the efficiency of fragmented time utilization, and help businesses build closer customer relationships and increase loyalty (Yan et al. 2022).

Furthermore, key processes play a significant role in supply chain management, regulating the health of the entire supply network, enabling the business activity system to operate more efficiently and at lower costs, thereby enhancing customer perceived value (Ranta et al. 2019). By optimizing the supply chain, businesses can accelerate production and logistics processes, shortening product delivery times (Song et al. 2018). Using digital technologies like blockchain enhances the timeliness and transparency of information, reduces information asymmetry, and improves the efficiency of inter-enterprise collaboration (Barenji et al. 2019). This enables businesses to quickly adapt to changes in consumer demand, thus better meeting customers' real-time needs. Additionally, innovative supply chain management processes strengthen product quality management, improve product traceability, and help increase customer confidence and satisfaction.

In summary, this paper proposes the following hypothesis:

H2: Time-value-based key process innovation in the business model of life service enterprises can enhance customer perceived value.

### **Core resources innovation and customer perceived value.**

Core resources are the key resources that a company must own or control to offer its value proposition and implement critical processes (Foss and Saebi, 2018). These resources form the foundation that supports the entire business model's operation, playing a central role in fostering business model innovation and determining the level of value creation and delivery by the company (Zhang et al. 2021). Specifically, a company's competitive advantage in core resources such as proprietary technology, brand recognition, and reputation acts as a "catalyst" in achieving efficient and effective flow of services, information, capital, and decision-making, and in enhancing the efficiency of value creation (Jajja et al. 2018). Therefore, companies should strive to reduce time costs through more efficient processes and operations, relying on the "value of time" to form a competitive advantage. This involves the optimal utilization of resources, including the effective organization and collaboration of technological, material, and human resources.

Companies introducing advanced technology as a core resource, oriented towards the value of time, can accelerate service processes and improve efficiency (Christensen et al. 2018). By utilizing digital technology, companies promote a shift in production towards

personalization, intelligence, and networking, thereby transforming company boundaries into a penetrable structure linking “company-platform-customer”, enhancing service efficiency. These technologies also help companies reshape their interactions with customers, strengthening their understanding of customer needs. Companies provide solutions centered around the customer, getting closer to them and uncovering their needs, thus helping customers create more value (Gawer, 2021).

Companies innovating their logistics and supply chain systems oriented towards the value of time enhance the flexibility, speed, and collaborative efficiency of their logistics and supply chain systems, thereby optimizing production and logistics planning, and reducing production and delivery cycles. Companies integrate core resources with upstream and downstream partners, achieve network collaboration, and establish unique supply chain management systems, continuously improving the level of customer value on the basis of enhancing their own value creation efficiency. For example, DiDi Global has built an intelligent information control system that uses big data and other technologies to optimize travel routes, reduce the likelihood of encountering traffic congestion, and to some extent reduce customer waiting time.

In addition, innovation in core resources such as data also provides companies with more accurate forecasting and decision-making support, reducing decision cycles, and increasing responsiveness to market changes, thereby reducing ineffective time waste in management. At the same time, companies can more effectively train employee skills, thereby accelerating the completion of tasks.

Based on the above theoretical analysis, this paper proposes the following hypothesis:

H3: Time-value-based core resources innovation in the business model of life service enterprises can enhance customer perceived value.

### Transaction methods innovation and customer perceived value.

The transaction method is a primary embodiment of a company's profit model and the final link in value acquisition. Businesses realize value conversion through transactions and interactions with customers (Chesbrough et al. 2018). It describes how a company obtains revenue, reduces costs, and improves asset utilization. While meeting customer value needs, it maximizes financial returns, answering the question of “How does the business effectively obtain economic returns?”. Its essence is to bring more value to customers, gain more customer recognition, make customers feel their purchasing behavior is worthwhile, thereby enhancing customer perceived value. In other words, customer perceived value is at the core of the entire profit model and is a fundamental and decisive factor in the entire structure (Woodruff, 1997).

The rapid development and widespread application of mobile internet have made customer needs more personalized and diversified (Wang, 2021). Business transaction modes that solely pursue high profits but neglect the quality of products and services not only fail to meet the new changes in customer needs but also lead to increased customer aversion (Zhang and Li, 2021), causing a continuous decline in customer perceived value. On the contrary, when businesses design transaction modes, they not only focus on the value of products and services but also pay attention to the consumption experience, bringing maximum satisfaction to customers, thereby improving customer loyalty and maximizing customer perceived value (Jiang et al. 2018). This will inevitably bring substantial returns to the enterprise, enabling it to have more financial resources.

The innovation of time-value-oriented transaction methods of enterprises mainly relies on modern information technology to

innovate better, such as integrating online and offline, mobile payment, omnichannel payment, etc., realizing the diversity of transaction channels, the convenience of transaction modes, and breaking down the barriers of time and space in transactions (Liao and Yang, 2020). This maximizes convenience for customers and reduces costs for both parties, creating a sufficient sense of trust and identification in the minds of customers, thus enhancing customer perceived value (Kim et al. 2021).

The design of new transaction modes should be customer-centered, allowing customers to customize the products they need based on their value demands and even actively participate in the entire process of designing and producing the needed products. This fully meets their personalized and experiential service needs, better realizing customer perceived value (Flavián et al. 2019). In this process, the business will also obtain substantial profit returns.

Based on the above analysis, this paper proposes the following hypothesis:

H4: Time-value-based transaction methods innovation in the business model of life service enterprises can enhance customer perceived value.

### Research methods and data collection

**Questionnaire design.** Customer perceived value is the subjective evaluation that customers form after perceiving the utility of a product or service (Sheth et al. 1991). It can be considered as the emotional bond established between the customer and the producer when the customer finishes using a product or service, where this bond often stems more from the service level of the business and the satisfaction of the customer (Zeithaml, 1988). Through business model innovation, enterprises can not only provide differentiated products and services, but also improve customer satisfaction (Allee, 2000). This enables customers to form positive psychological perceptions and evaluations of the exchange relationship during the purchase decision-making process, thereby enhancing customer perceived value (Betten-court et al. 2019). It is apparent that there is a strong correlation between customer satisfaction and perceived value. Because customers are the ultimate decision-makers in assessing these values (Slater and Narver, 1998), to a certain extent, customer satisfaction can assist in measuring customer perceived value (Ryu et al. 2012), and the hypothesis was further tested from the perspective of customer perceived value.

Time-value-oriented business model innovation focuses on advantages such as efficiency and convenience, which generating a customer perceived value different from traditional shopping experiences. Therefore, this article refers to the traditional customer perceived value (Sweeney and Soutar, 2001) and service satisfaction measurement scales, combined with the four dimensions of time-value-oriented business model innovation proposed above, to construct the following Questionnaire (see Appendix 1). Questions 1–3 measure whether value proposition innovation based on time-value orientation can enhance customer perceived value; questions 4–7 measure whether key processes innovation based on time-value orientation can enhance customer perceived value; questions 8–11 measure whether core resources innovation based on time-value orientation can enhance customer perceived value; and questions 12–14 measure whether transaction methods innovation based on time-value orientation can enhance customer perceived value. This questionnaire is designed as a 7-point scale, ranging from 1 to 7, which indicating strongly disagree to strongly agree.

**Data collection.** Firstly, design a measurement questionnaire for business model innovation based on time value. Next, conduct a small-scale pre-survey before formally distributing the questionnaire



**Table 3 Demography characteristics.**

Basic characteristics	Type	Frequency (person)	Percentage (%)
<b>Gender</b>	Male	496	42.9
	Female	660	57.1
<b>Age</b>	Under 25 years of age	518	44.8
	26-35 years old	303	26.2
	35-46 years old	144	12.5
	Over 45 years old	191	16.5
<b>Education</b>	High school/technical secondary school and below	47	4.1
	College	92	8.0
	Undergraduate	716	61.9
	Master's degree or above	301	26.0

**Table 4 Analysis of the average level of business model innovation dimension.**

	Number	Minimum	Maximum	Average	Standard deviation
Value proposition	1156	1.000	7.000	5.718	1.169
Key processes	1156	1.000	7.000	5.753	1.121
Core resources	1156	1.000	7.000	5.728	1.088
Transaction methods	1156	1.000	7.000	5.819	1.050
Average score of four dimensions	1156	1.000	7.000	5.755	1.011

to test the reliability and validity of the scale. Inappropriate measurement items are removed to make the final questionnaire more concise and effective. Then, distribute the survey questionnaire to collect data from consumers and use SPSS software and Excel to empirically test the research propositions. The questionnaire is distributed randomly through field surveys, email, and online platforms such as Questionnaire Star.

A total of 1280 questionnaires were distributed. After excluding the invalid questionnaire with missing data, consistent scores on all items, and too short time to fill in (Zhou and Yu, 2021), yielding 1156 valid questionnaires were obtained, resulting in an effective response rate of 90.31%.

The respondents' gender, age and educational backgrounds varied greatly (See Table 3), indicating that the sample effectively represented the whole consumer population and that the respondents' viewpoints reflected the overall differences in the perceived value of time following the firms' business model innovations.

The valid sample exhibits the following characteristics: a relatively balanced gender ratio, with the majority being middle-aged and young individuals, and the majority of the sample having received higher education.

**Reliability and validity analysis.** The reliability and validity of the questionnaire were analyzed. The Cronbach's alpha values of the four dimensions of business model innovation were all greater than 0.8, indicating that the internal consistency of the scale was satisfactory.

Validity analysis indicated that the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was 0.967 (above the 0.5 threshold), and the *p* value according to Bartlett's test of sphericity was 0.000 (< 0.05). These results indicated that the structural validity of the questionnaire was sufficient.

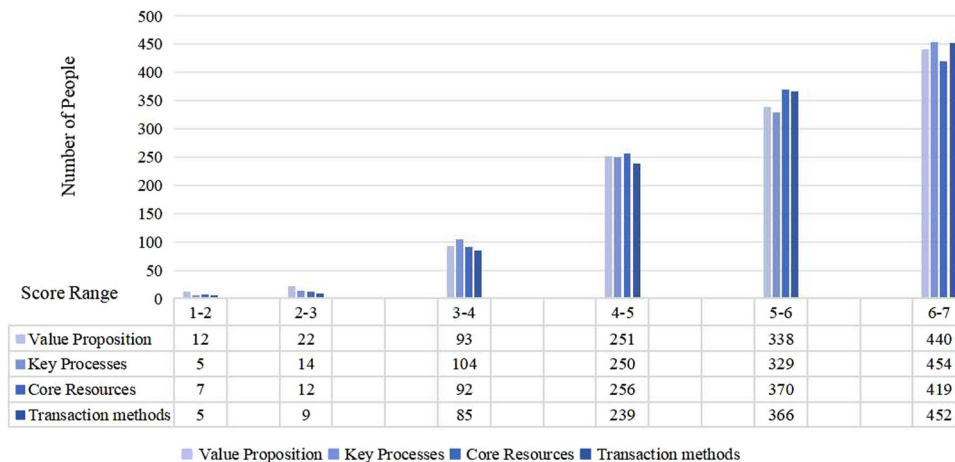
In summary, the developed questionnaire had satisfactory reliability and validity.

**Results**

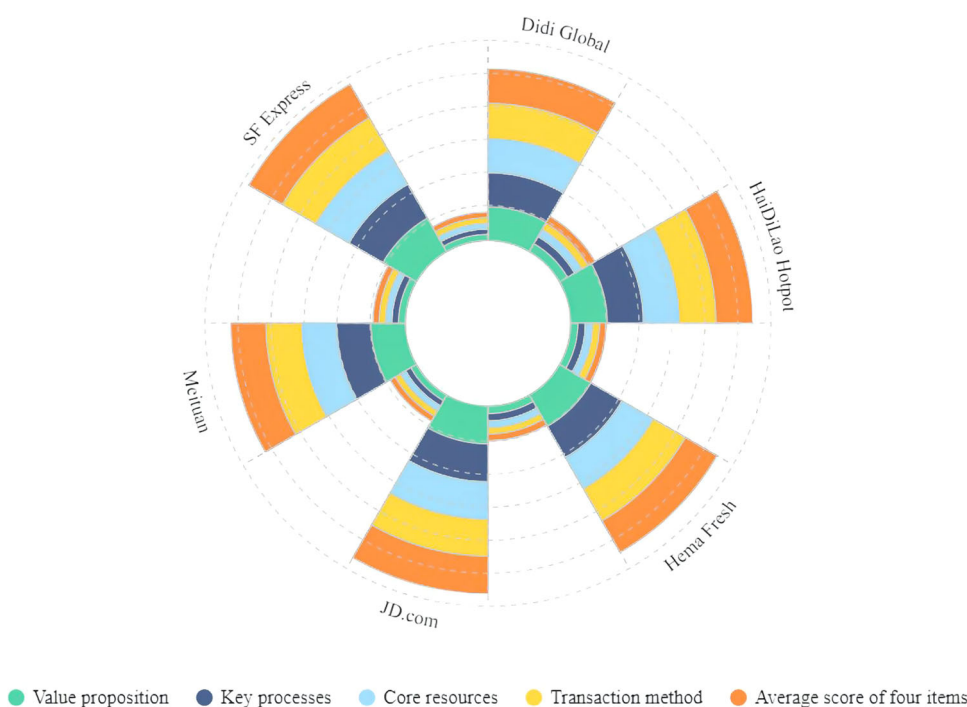
**Hypothesis verification.** Table 4 summarizes that customers' recognition of the six firms' business model innovation was high in

all four dimensions, with the average rating equal to or greater than 5.7. Regarding the mean ratings, the respondents' ranking was as follows: transaction methods (5.819) > key processes (5.753) > core resources (5.728) > value proposition (5.718). The standard deviations were between 1.011 and 1.169, suggesting that the data were generally centered around the mean. The consumers demonstrated high recognition of the firms' innovation in the area of transaction methods regarding improving the value of time as the mean for transaction methods (5.819) was greater than that of the total scale as well as the means of the other three dimensions (i.e., key processes, core resources, and value proposition). Widespread application of diversified transaction methods such as mobile transaction in China is closely related to consumers' work and life. They break the restrictions of time and space on consumer payment, bring great convenience to consumers, and reshape their shopping habits. At the same time, it has freed merchants from being restricted by terminal equipment, greatly improved transaction speed, and reduced transaction costs. The mean for key processes was 5.753. Fast shipment and a swift response to reviews and feedback satisfied consumers' need for quick access to high-quality products or services. The mean for the core resource dimension was 5.728, indicating that enterprises and their partners integrated resources with a "value of time" orientation, compressed the service processes, and formed a resource layout that "saves time for consumers", which was widely recognized by consumers. The mean for value proposition was 5.718, indicating that enterprises proposed the service tenet of "time saving" from the perspective of consumer "value of time". But its score was lower than the average of the four dimensions, and the standard deviation was higher than other indicators, indicating that there is a certain degree of variability in consumer approval.

Figure 2 is a frequency distribution of customer perceived value scores, which includes the four dimensions of time-value-oriented business model innovation. The statistics show that in the value proposition dimension, 89.01% of customers scored above 4 points; in the key process dimension, 89.35% of customers scored above 4 points; in the core resource dimension, 90.39% of customers scored above 4 points; and in the transaction method dimension, 91.43% of customers scored above 4 points. It is evident that the vast majority of customers gave high ratings,



**Fig. 2 Scoring range of four dimensions.** The horizontal axis shows the scoring intervals and the vertical axis shows the number of people in each interval.



**Fig. 3 Consumer perceived value of the six case companies.** The inner ring of this figure represents the standard deviation of the four dimensions, and the outer ring is their average. The rings represent the numbers 1-6 from the inside to the outside.

perceiving high customer value from the time-value-oriented business model innovation.

Combining the statistical analysis of Table 4 and Fig. 2, the hypotheses 1-4 proposed in this paper are validated, namely: Innovations in value propositions, key processes, core resources, and transaction methods based on time value in the business model of life services enterprises contribute to enhancing customer perceived value.

Based on the comparative analysis of consumer evaluations of the six case companies (see Supplementary Table S1 and Fig. 3), it was found that consumers’ assessments of the value of time aspect differed among the six case companies. The majority of evaluations were for Meituan and JD.com, followed by Hema Fresh, Didi, and SF Express, with fewer evaluations for Hai Di Lao. Specifically, consumers generally gave high evaluations to the transaction methods of the six companies, with SF Express

receiving the highest average score (6.104), followed closely by Hema Fresh, JD.com, and HaiDiLao. Meituan and Didi were ranked lowest. Due to the introduction of their own payment systems, Meituan and Didi recommend payment methods to consumers, which indirectly affects transaction speed. Furthermore, in terms of key processes and core resources, consumers generally gave high evaluations to JD.com and SF Express (MJD = 6.020&5.950; MSF = 6.210&6.095). Due to the deep cultivation of the next day delivery system by JD.com and SF Express, ensuring timely delivery. The guarantee of key processes by enterprises corresponds to the establishment and emphasis on core resources. These two dimensions complement each other in creating the value of time. In the value proposition, SF Express and JD.com still outperformed other companies (MJD = 5.974; MSF = 6.121). Leveraging their positioning and promotion, SF Express and JD.com deeply embedded the “time-saving”

proposition in the minds of consumers. Overall, from various aspects, consumers' evaluations of SF Express were higher than the other five companies (MSF = 6.133, MJD = 5.949, MHaiDiLao = 5.761, MHema Fresh = 5.759, MMeituan = 5.526, MDidi = 5.441). Didi received a lower score, which can be attributed to the nature of its service. Compared to industries such as express delivery and fresh food, Didi's ride-hailing service has higher consumer involvement and a stronger perception of time. Without the value-added service in waiting time, the perceived waiting time in Didi's service may lead to deteriorating consumer emotions.

**Comparative analysis.** Based on the data obtained from the survey questionnaire, further analysis was conducted on the data differences between the six companies by conducting independent sample *t*-tests with the remaining five companies (see Supplementary Table S2).

Based on the results, the firms could be categorized into high-, medium-, and low-rated groups. Low-rated firms were Meituan and Didi Global. Meituan's ratings were significantly lower than those of the other five firms in general, as well as in each dimension. Particularly, the ratings for value proposition and key processes were lower than the other firms' by 0.342 and 0.358, respectively. Didi Global also had lower ratings when compared with the other firms; the differences between the ratings for value proposition and core resources were the greatest; that is, the means were lower by 0.467 and 0.409, respectively. This could be due to higher consumer expectations for Meituan and Didi Global in terms of immediacy, as well as the presence of more uncertainties in their operation. On the other hand, the ratings for JD.com and SF Express were the highest. JD.com received the highest ratings across all six companies. The ratings for the value proposition and key processes were 0.316 and 0.330 higher, respectively. SF Express' overall and individual ratings were higher than the other firms' means by at least 0.3, with key processes being the highest (0.542). These reflect the professionalism of the two companies and the recognition of consumers, and the key process of algorithm optimization based on digital technology can be used as the key point for enterprises to optimize business and save time. The ratings for HaiDiLao Hotpot and Hema Fresh showed no difference compared to the other firms' means ( $\text{sig} > 0.05$ ), at an equal level among six companies. In summary, the independent sample *t*-test results were consistent with the findings of the preliminary analysis. In the overall high score situation, consumers were more satisfied with JD and SF's business model innovation based on time value. From the difference in four aspects rating, it was also seen that consumers tended to pay greater attention to the value proposition and key processes in time-value based business model innovation, which suggested that future enterprises should lay out segmented areas, clarify value propositions, and innovate key processes when innovating.

## Conclusion and discussion

**Conclusion.** This study focuses on the core issue of "what is the time-value-oriented business model innovation path and its impact on customer perceived value". Firstly, this paper carefully selects six life services enterprises and explores their experiences in business model innovation guided by the value of time, discovering a path for business model innovation oriented by the value of time. Secondly, through the previous literature review, this paper proposes a hypothetical relationship between the path of business model innovation under the time-value orientation in life services enterprises and customer perceived value. Finally, this paper verifies this hypothetical relationship through empirical

testing and compares the differences in business model innovation among different types of lifestyle service enterprises. It is expected that the findings of this research will provide a comprehensive understanding of how companies can satisfy customers' needs regarding the value of time and finally enhance customers' perceived value.

The conclusions are as follows.

(1) From the perspective of the value of time, different elements exhibit diverse characteristics in specific business model innovation paths. These include proposing the value proposition of time, establishing time-oriented standardized processes, leveraging advantages such as big data and brand, and integrating online and offline transactions as innovative paths.

(2) In general, the business model innovation based on the value of time can effectively enhance customer perceived value. Customers show relatively high satisfaction. There is a high level of alignment between customer psychological perception and company innovation.

(3) The six representative life service companies generally perform well in various dimensions of business model innovation. However, there are still heterogeneities in specific sub-dimensions. This perceived heterogeneity can be attributed to differences in industry characteristics, and the perceived importance of the value of time varies across different elements depending on the industry. For example, consumers' evaluations of SF Express are higher than the other five companies, reflecting their need for "fast and secure delivery" in the express delivery industry.

Therefore, in the future, companies should fully recognize the importance of the value of time and pay attention to business model innovation to improve customer satisfaction, enhance brand reputation, and increase customer loyalty.

**Discussion.** This study provides valuable management insights for businesses, policymakers and managers in dealing with crises and enhancing organizational innovation capabilities. In the context of increasing customer demand for the value of time, managers need to transform their enterprise's business models based on the value of time. The specific implications are as follows:

(1) Enterprises need to undergo diversified transformations to cater to the increasingly strong time demands of consumers.

In terms of value proposition, in the post-pandemic era, customers' demand for the value of time becomes prominent. Companies should timely adjust their value propositions to focus on "value of time". They should not only propose the value proposition but also continuously innovate this concept and possess greater competitive advantages compared to their competitors.

In key processes, companies should establish standardized processes guided by time orientation to achieve higher convenience advantages over their competitors, while also improving service quality. This can be done by optimizing the customer's purchasing process or service flow to enhance service efficiency and cater to customers' time-value demands.

Regarding core resources, brand building, big data mining and analysis are areas of focus for future enterprises. Collaboration with partners should be strengthened, core resources should be integrated continuously, and a comprehensive supply chain management system should be established.

In terms of transaction methods, the life service industry has already made effective transformations in integrating online and offline transactions. However, continuous optimization is still needed, focusing on diversification, convenience, flexibility, and comprehensiveness of transaction and payment methods to achieve the ultimate value realization.

(2) Enterprises need to dynamically track changes in consumer demand for the value of time and engage in value co-creation with consumers to achieve continuous innovation in their business models.

In the new era, the uncertainty of the external environment poses significant challenges for companies. Timely responding to customer demands is the foundation for survival and development. In the face of increasingly prominent customer demands for the value of time, companies must understand the sensitivity and connotation of customer demands for the value of time in a dynamic, timely, and accurate manner.

Establishing an information exchange platform for communication and feedback with customers, constructing diverse channels to obtain real-time customer needs, and continuously innovating business models based on these new demands are necessary to reduce operational risks, enhance risk resilience, and ultimately achieve continuous growth in customer satisfaction and company performance.

**Limitations and suggestions for future research.** This study has two limitations. First is the exploration of the approaches to business model innovation. This study selected six representative life services firms for analysis. The findings could be insufficient to yield statistically significant conclusions. Therefore, future research should include data from more firms to verify and supplement the theoretical framework and conclusions presented in this paper. The second is the business model evaluation. A sound business model improves performance, enhances competitive advantages, creates customer perceived value, and generates greater customer loyalty. Therefore, future studies should combine the evaluation of enterprises and customer expectations to identify the influence of each dimension of business model innovation on corporate performance and customer perceived value.

Furthermore, future research could involve verification through a broader range of consumers, allowing the research conclusions to be extended to more enterprises, thereby facilitating business model innovation under the guidance of the value of time. Thirdly, future studies could attempt to explore the uniqueness of the time-value-oriented business model innovation paths of different types of life service enterprises, based on their differentiated characteristics.

### Data availability

The raw data from the questionnaires of this study have been enclosed. For inquiries about the interview data or further information, please contact the corresponding author Y.S.

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### Author contributions

XL designed the research and wrote the manuscript. SZ (Shengshi Zhou) collected literature. YS provided the data and cleared it. XL and YS performed the case and empirical analysis. YS, YL and SZ (Shan Zhuang) did the additional tests. All authors rewrote sections of the manuscript, contributed to manuscript revision, read, and approved the submitted version.

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### Competing interests

The authors declare no competing interests.

### Ethical approval

This research does not involve any human subjects and animal testing performed by any of the authors.

### Informed consent

This research does not involve any human subjects and animal testing performed by any of the authors.

### Additional information

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