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Research on the Optimisation of Order-Splitting Model for Small and Medium-sized Custom Furniture Enterprises: An Empirical Analysis Based on In-depth Interviews

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ABSTRACT

This study focuses on the models and processes of order splitting in six small and medium-sized custom furniture companies in China. Through a literature review to identify the shortcomings of existing research and in-depth interviews with six small and medium-sized custom furniture companies, this paper analyses the main pain points and optimisation paths of the order splitting process. The study found that small and medium-sized enterprises have problems with order processing, such as insufficient information technology, a lack of standardised modules, and inefficient cross-departmental collaboration. These problems, to varying degrees, have led to a poor customer experience, resulting in a negative overall reputation for the industry and a high rate of customer complaints, which in turn have affected the industry's overall development. Based on the results of qualitative and visual analysis, this paper proposes practical suggestions for improving the order splitting model. This study not only fills the theoretical gaps in the production and management of the custom furniture industry but also provides empirical evidence for improving the customer experience and operational efficiency of enterprises.

Keywords: *Customised furniture, Split order model, Small and medium-sized enterprises, Process optimisation, Customer experience.*

1 INTRODUCTION

1.1 Research Background

In recent years, China's custom furniture industry has experienced rapid growth, driven by growing consumer demand for personalised, functional, and lifestyle-oriented home solutions(Institute, 2023). Unlike traditional mass production, custom furniture requires companies to respond to individual customer needs through flexible design, efficient manufacturing, and precise delivery systems (Xu, 2020). Within this context, order splitting has become a key operational component (Figure 1).

Large enterprises in China's furniture industry have benefited from significant investments in information systems, standardised modules, and digital platforms. These capabilities have enabled them to adopt relatively mature order splitting models, ensuring efficiency and reducing error rates (Xiong, 2020a). In contrast, small and medium-sized enterprises (SMEs), which comprise a large portion of

China's furniture industry, typically have limited capital, weak IT infrastructure, and constrained human capital (Xie, 2019). Consequently, order splitting practices among SMEs vary, varying in their reliance on manual labour, semi-digital processes, and partial standardisation. Differences in order splitting models among SMEs are not merely technical issues; they also have profound implications for production efficiency, delivery time, error reduction, and customer satisfaction (Liang, 2021).

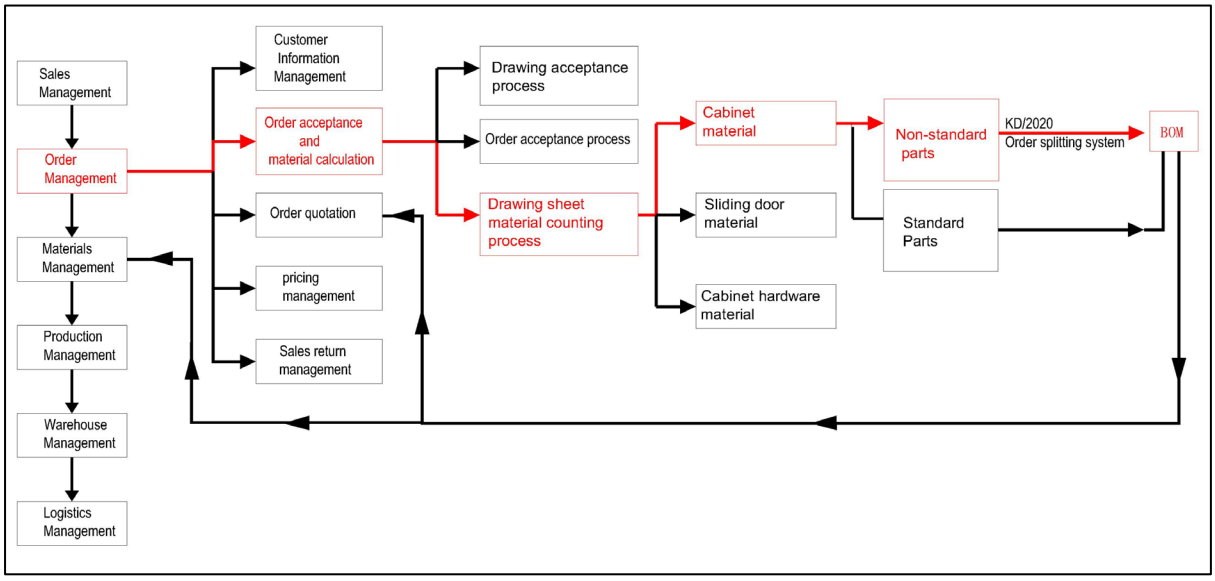

Figure 1 Order splitting process of the panel furniture production process (Source: Cai, 2025, Copyright Consent: Permissible to Publish)

1.2 Problem Statement

While the custom furniture industry has garnered increasing scholarly attention, most research still focuses on the digital transformation of large enterprises or advanced manufacturing systems (Yao, 2018). In contrast, the operational practices of Chinese SMEs remain underexplored. This gap is problematic because SMEs face unique challenges that cannot be simply addressed by downsizing solutions developed for large enterprises. In practice, SMEs often encounter the following difficulties:

1. The volume of orders is substantial, resulting in a significant workload for order splitting

Large-scale personalised custom production has become a key model for furniture production. However, current personalised custom production suffers from high product batch sizes, and a large number of orders still rely on manual management and integration, including order splitting and quotation processing (Qin, 2023). Order splitting software uses various algorithms and rules to generate bill of materials files, which contain information such as panel size, material, quantity, texture, edge banding information, model code, process routing, packaging planning, and panel weight (Wang, 2024). As can be seen, after a production order is split, the amount of data required increases exponentially, resulting in a staggering workload.

2. The Order Module and Splitting Structure are Complex

In custom furniture production, the batch-based market is becoming increasingly refined, with an increasing demand for small-batch, high-variety, and time-sensitive goods. This, coupled with increasing uncertainty in customer demand, has led to an increase in the total number of items in customer orders, while demand for individual items has decreased (Wang, 2012). Custom furniture

companies offer products that cover nearly every space in a home, with a wide variety of module sizes and types. Design software includes a vast library of modules, some pre-configured and some allowing designers to freely create, providing designers with more options when designing for clients (Xie, 2021). Consequently, the order module is complex, and the splitting structure is even more complex. 3. The numerous order types and the data related to order splitting are complex.

Due to the complex and diverse order modules and high degree of personalisation for custom furniture, each successful customer order for custom furniture is uploaded to the order splitting system. The factory's process department uses order splitting software to break down each cabinet or piece of furniture into individual panels, calculate the hardware types and quantities, restore the processing information for each panel, and calculate the specifications and quantities of raw materials such as edge banding. This software then compares these with established processing rules, identifying designs that don't conform to these rules and implementing design corrections and improvements (Liu, 2021).

Production orders involve numerous uncertainties, such as type, quantity, style, and delivery date. These factors, influenced by the demand for personalised products, result in a complex and diverse structure for customised home furnishing products, resulting in complex order splitting data and a high risk of errors and omissions (Xiong, 2020b). Custom panel furniture customer demands are trending toward personalisation, diversification, small batches, and a wide variety of products. The ability to quickly split production orders and generate a bill of materials (BOM) tailored to the individual needs of panel furniture customers is crucial for providing timely product quotes, shortening delivery times, and rapidly responding to customer orders, thereby improving the company's information technology capabilities and core market competitiveness (Zhou, 2015).

These issues lead to inefficiencies, reducing the competitiveness of small and medium-sized enterprises (SMEs) and limiting their ability to meet customers' growing expectations for speed, precision, and personalisation. From an academic perspective, this also reflects a research gap: while order splitting has been recognised as a key determinant of mass customisation performance (Liu, 2021), there is a lack of understanding of the differences in SMEs' approaches, the specific challenges they face, and how to optimise their practices within resource constraints.

1.3 Research Questions

Based on the above background and problem statement, this study intends to explore the order splitting model adopted by small and medium-sized custom furniture enterprises in China. This study aims to answer the following questions:

1. What are the main characteristics of the order splitting model adopted by small and medium-sized enterprises in China's custom furniture industry?
2. How can we develop a more effective order splitting model to improve the customer experience of small and medium-sized custom furniture enterprises in China?

2. LITERATURE REVIEW

2.1 Order Splitting Models of Small and Medium-Sized Custom Furniture Enterprises in China

In recent years, China's custom furniture industry has developed rapidly. In particular, with the diversification and personalisation of consumer demand, small and medium-sized enterprises have become a vital component of the industry (Xu, 2020). Against this backdrop, the order splitting model

has gradually become a key factor in whether enterprises can efficiently fulfil orders and maintain market competitiveness.

2.1.1 Basic Definition and Characteristics of the Order-Splitting Model

The order splitting model refers to the process by which an enterprise converts a customer order into an executable production task, including analysing the design plan, generating a bill of materials (BOM), allocating processing steps, and integrating with information systems (Guo, 2018). Large enterprises typically rely on information platforms and modular design to implement a relatively standardised order splitting model; however, small and medium-sized enterprises, due to resource constraints, often adopt a manual or semi-information-based model (Ning, 2022).

2.1.2 Classification of Order Splitting Models in SMEs

Existing research indicates that Chinese SMEs primarily employ the following types of order splitting models:

1. Manual Experience-Based: Relying on the personal experience of designers and craftsmen to split orders, this process is flexible but prone to errors.
2. Semi-Informatisation-Based: Using some design software or ERP modules for assistance, but with low system integration and information silos (Hui, 2019);
3. Modularisation/Standardisation-Oriented: Attempting to introduce standard modules into some products, but overall coverage is limited;
4. Platform-Based Collaboration-Based (a minority of enterprises): Integrating design, production, and management through the use of cloud platforms or digital tools, but penetration is low (Ma et al., 2021).

2.1.3 Current Status and Challenges of Order Splitting Models in SMEs

Overall, the order splitting model used by SMEs is still in its exploratory stage, with a significant gap compared to large enterprises. Its main characteristics include:

1. Process diversity, the models adopted by different enterprises vary greatly, and there is a lack of unified standards (Cai et al., 2024).
2. Insufficient level of informatisation, most small and medium-sized enterprises still remain at a low level of informatisation, resulting in low efficiency (Li, 2018).
3. Strong dependence on manpower: over-reliance on the experience of key employees and lack of replicable processes (Cai et al., 2024);

In summary, small and medium-sized custom furniture enterprises have the typical characteristics of "diversity, low informatisation, and experience dependence" in the order splitting model, which provides a background for subsequent research on their process pain points and optimisation strategies (Ying et al., 2025).

2.2 Pain points of the order splitting process

Although the order splitting model is crucial to the operational efficiency and customer satisfaction of custom furniture enterprises, in actual operation, especially in small and medium-sized enterprises, there are many pain points in the order splitting process. Among them, the most critical ones are the following:

2.2.1 Poor information transmission, Insufficient standardisation

The lack of a unified information platform between the design, production, and order management departments leads to data transmission relying on manual or local software, forming "information islands". This poor communication increases the error rate and rework costs (Hui, 2019). Small and medium-sized enterprises generally lack standardised order splitting processes and operating specifications. Different designers have different plans, which makes it difficult to split similar orders when splitting, making it difficult to achieve economies of scale (Ying, 2019).

2.2.2 Insufficient technology and system support

Many small and medium-sized enterprises do not have the conditions to apply ERP, MES, and other systems, or only use some of their functions, resulting in the inability to share and update information in real time (Ma et al., 2021). The lack of technology further amplifies the inefficiency and uncertainty of manual operations.

2.2.3 Risk of human dependence and knowledge loss

The order splitting process of small and medium-sized enterprises is highly dependent on experienced employees. Once the core personnel leave, it may lead to process interruption or a significant decrease in efficiency (Qian, 2023).

3 METHODOLOGIES

This chapter will explain the methodology and research design used in this study. The research methods primarily consist of a literature review and in-depth interviews. The former serves to build a theoretical and practical foundation for the research, while the latter serves to empirically explore the differences and pain points of order splitting models among China's small and medium-sized custom furniture companies.

3.1 Literature Review

The purpose of this literature review is to systematically review the current state of research on order splitting models in the custom furniture industry and identify research gaps and practical challenges faced by small and medium-sized enterprises in this field.

The topic focuses on order splitting models for small and medium-sized custom furniture companies, covering aspects such as order management, process optimisation, information system applications, and customer experience. Literature was sourced from domestic and international academic databases, including CNKI, Web of Science, and Google Scholar. Both Chinese and English literature were included to ensure a seamless integration of theory and practice.

The research process began with identifying search keywords such as "custom furniture," "order splitting model," and "order splitting process." The timeframe was set to focus on key research findings from 2010 to date, encompassing custom furniture, order splitting, or small and medium-sized enterprise management processes.

3.1.1 There are three main methods for literature analysis

1. Theme classification: such as "model characteristics", "process pain points", "informatisation and digital application", and "optimisation and innovation";

2. Difference comparison: comparing the order splitting models of six small and medium-sized enterprises;
3. Research gap identification: clarifying the shortcomings of research on order splitting in small and medium-sized enterprises, and providing entry points for subsequent empirical research.

3.1.2 Output results

1. Sorting out the characteristics and limitations of the order splitting model of small and medium-sized enterprises;
2. Summarising the focus and differences of domestic and foreign research;
3. Identifying research gaps and providing theoretical support for interview design. The main process of literature research is shown in Figure 2.

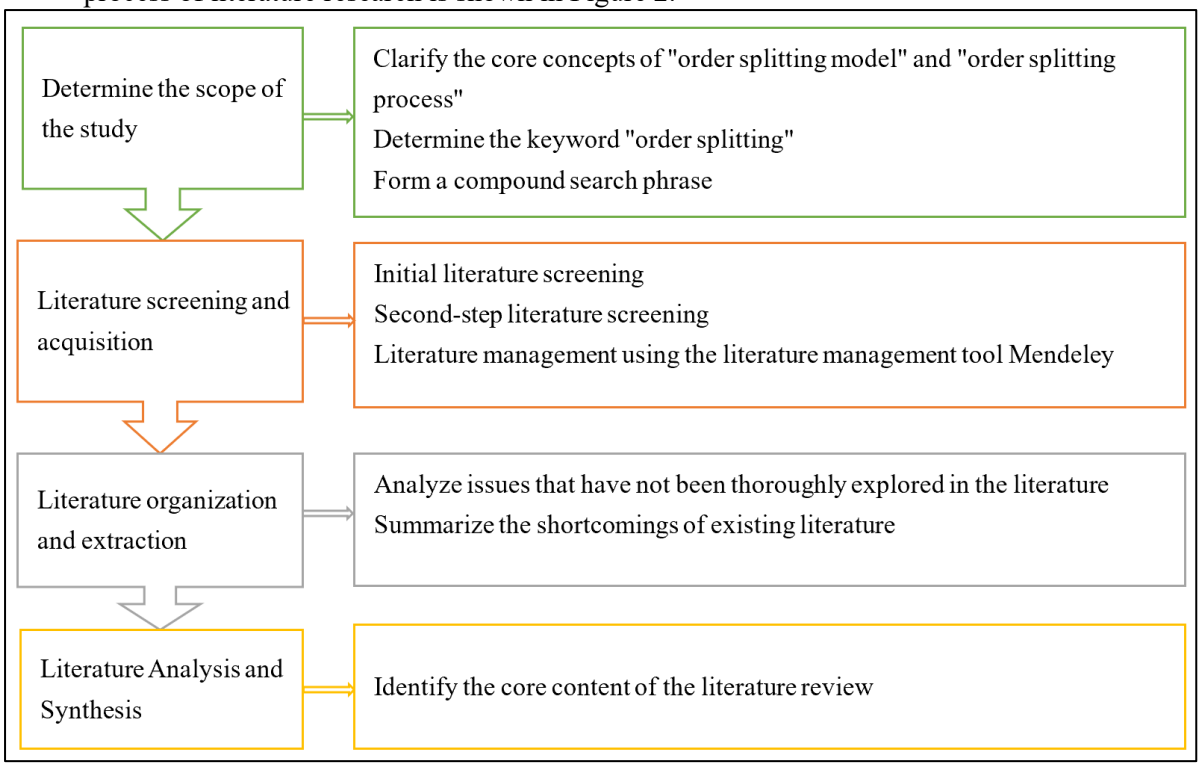

Figure 2 The main process of literature research (Source: Cai, 2025, Copyright Consent: Permissible to Publish)

3.2 Deep-in Interview

3.2.1 Research Preliminary Preparation

The research objective was to obtain first-hand data from small and medium-sized custom furniture companies through in-depth interviews, gaining a deeper understanding of their actual practices, pain points, and optimisation needs in the order splitting process.

The research subjects were six small and medium-sized custom furniture companies (three medium-sized and three small). Interviewees included personnel from the design, production, and order management departments.

Interview Type: Semi-structured, in-depth interviews.

Interview Outline: Focused on four core themes:

Theme 1: The company's existing order splitting model and operational procedures; Theme 2: The main pain points and challenges in the order splitting process; Theme 3: The application of information systems and digital tools in order splitting; Theme 4: Needs and suggestions for optimising the order splitting process. Specific interview questions were as follows:

1. What is your company's order splitting model and process?
2. Are there standardised design modules?
3. Are there design specifications to support the order splitting process?
4. What percentage of order splitting is automated? What are the main challenges faced?
5. What are the advantages of your company's order splitting process?
6. What are the most common errors or challenges encountered in the order splitting process?
7. What mistakes lead to customer complaints or affect customer satisfaction?
8. How can we improve the customer experience?
9. What areas do you think can be improved in your company's current order splitting process?
10. What suggestions do you have for upgrading the order splitting software?
11. To your knowledge, are there any advanced order splitting models in the industry that are worth learning from? Which companies are using them? How do they split orders?
12. What do you think are the most critical areas for improvement in optimising the order splitting process across the industry? (For example, automation, data integration, intelligent algorithms, management collaboration, etc.)

3.2.2 Data Collection and Processing

We interviewed 1-3 individuals from each company, with the number of interviewers determined by the company's contract splitting model. If all questions could be answered by one person, we interviewed only one person. If multiple interviews were necessary, we conducted additional interviews. The interviews were audio-recorded and transcribed. The data was anonymised to ensure research ethics compliance.

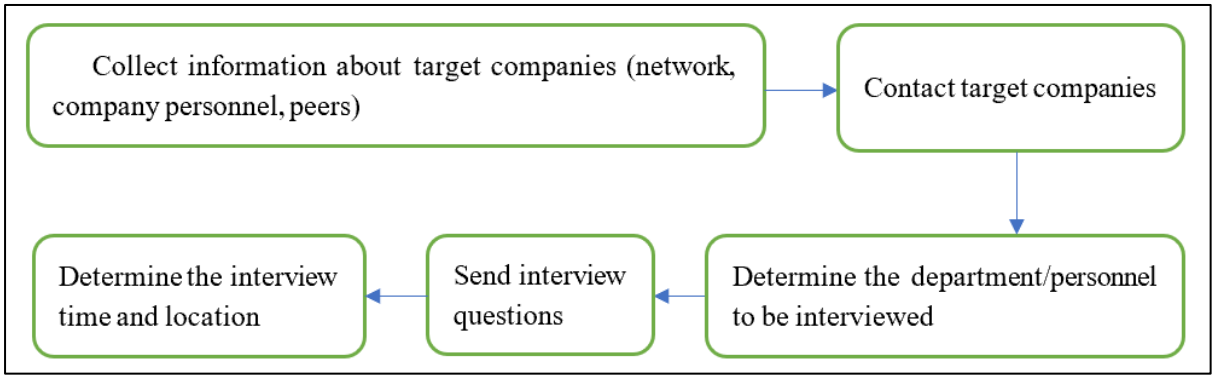

Figure 3 Confirmation process for interviewing company personnel (Source: Cai, 2025, Copyright Consent: Permissible to Publish)

Table 1 Interview Company Information Form (Cai,2025)

Scale	Interview date	Company	Interviewer/ Department	Annual output value
Medium-sized enterprises	May 7, 2025	Kefan Home Furnishing Co., Ltd. (Hereafter referred to as Kefan)	Mo Fujian/Demolition Department	600
	April 8, 2025	Guangdong Saier Risheng Home Technology Co., Ltd. (Hereafter referred to as Saier)	Zhou Wenming/ Production Department	300
	June 17, 2025	Guangzhou Yadan Cabinet Industry Co., Ltd (Hereafter referred to as Yadan)	Liu Bin/Process Technology Center	200
Small-sized enterprises	May 19, 2025	Royal Home Furnishing Holdings Limited (Hereafter referred to as Royal)	Mr. Cai/Order Management Department	99
	May 27, 2025	Guangzhou Weiyi Home Furnishing Co., Ltd. (Hereafter referred to as Weiyi)	Chen Jian/ Production Department	8
	April 25, 2025	Meilijia Decoration Engineering Co., Ltd (Hereafter referred to as Meilijia)	Mo Jiachun/ Order Management Department	4

Note: Medium-sized enterprises are those with an annual output value of 100-1000 million, and small enterprises are those with an annual output value of less than 100 million. The annual output value unit in the table is million RMB.

3.2.3 Data Analysis Methods

(1) Coding and Classification

NVivo software was used to openly code the interview texts to form nodes and themes.

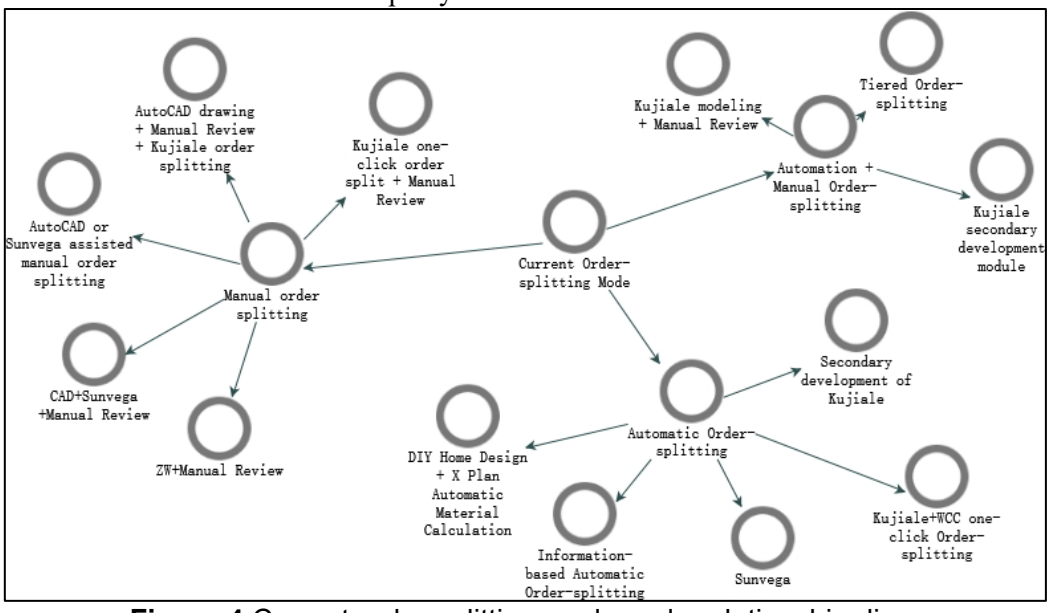

Figure 4 Current order-splitting mode node relationship diagram
(Source: Cai, 2025, Copyright Consent: Permissible to Publish)

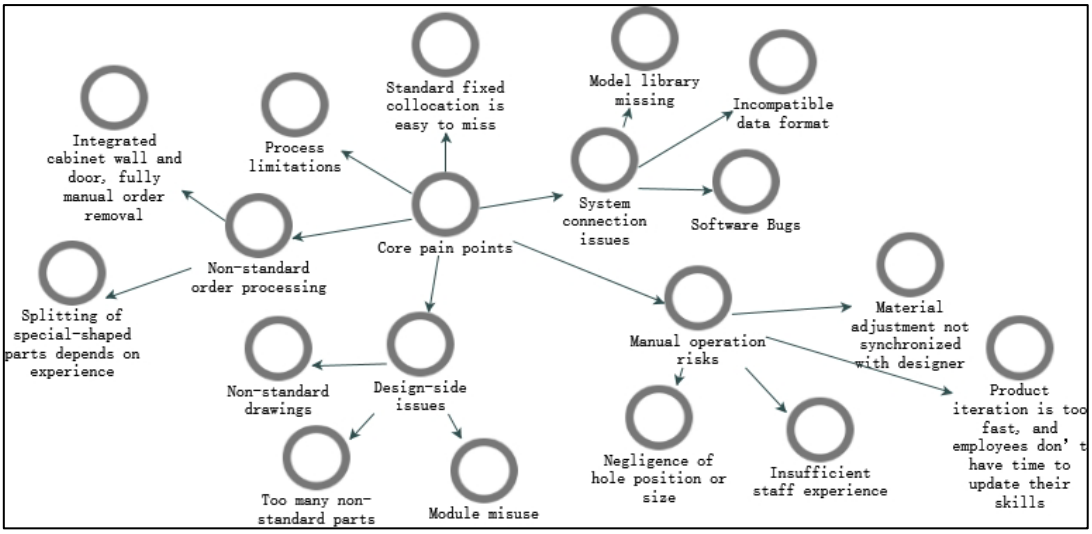

Figure 5 Relationship diagram of the core pain points of order-splitting (Source: Cai, 2025, Copyright Consent: Permissible to Publish)

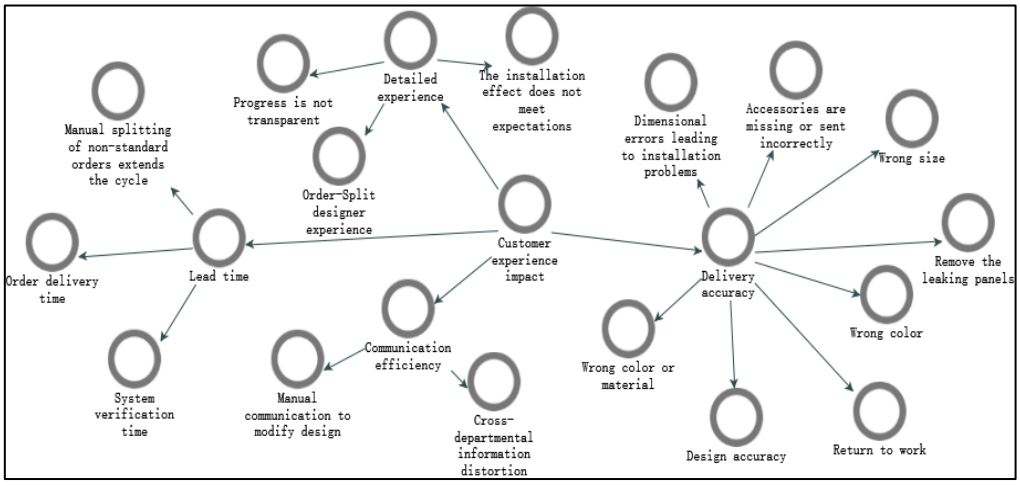

Figure 6 Customer experience impact node relationship diagram (Source: Cai, 2025, Copyright Consent: Permissible to Publish)

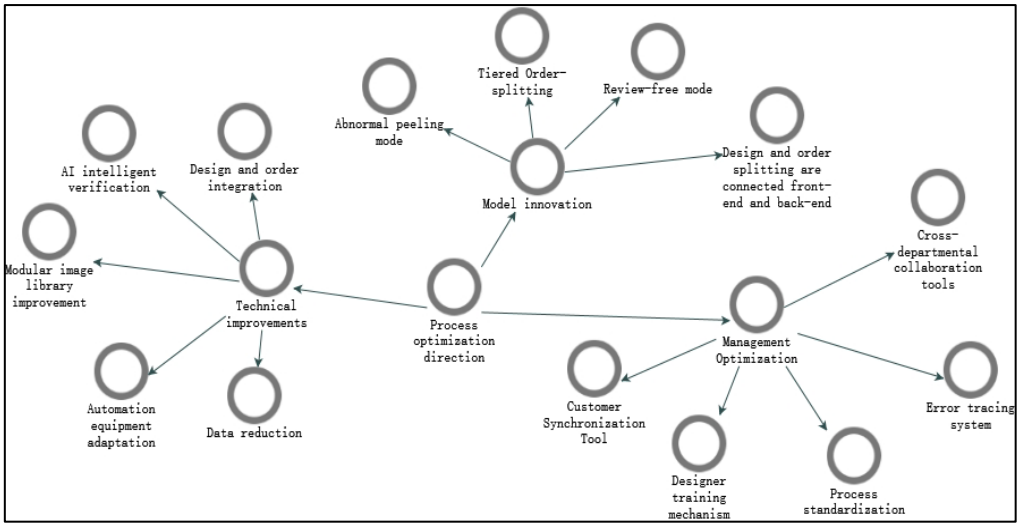

Figure 7 Optimisation direction of the order-splitting process (Source: Cai, 2025, Copyright Consent: Permissible to Publish)

(2) Comparative Analysis

Establish a comparison table of the order splitting processes of the six companies (e.g., model characteristics, informationisation level, and pain points); Conduct a horizontal comparison of different companies.

Table 2 Comparison of automated order splitting rates among various enterprises

Scale	Company	Automatic order splitting rate (%)	Annual output value （million）
Medium-sized enterprises	Kefan	90.0(Cabinet)	600
	Saier	55.0(C-level)	300
	Yadan	95.0	200
Small-sized enterprises	Royal	95.0	99
	Weiyi	75.0	4
	Meilijia	0.0	8

(3) The main pain points of each enterprise

Table 3 Summary table of major bottlenecks and problem types of each enterprise

Scale	Company	Main bottlenecks and problem types	Core manifestations of the problem
Medium-sized enterprises	Kefan	System Technology: Integrated cabinet, wall, and door systems lack automation modules. Manual Operation: Designer turnover leading to order errors and miscommunication. Process Management: Rapid product iterations and lagging employee skills integration.	Complex orders (integration) rely entirely on manual labour; personnel stability affects process stability.
	Saier	System technology: Complex shapes (arcs/bends) cannot be automated; underlying logic limitations in the order splitting software (module re-enablement required). Manual operation: Excessive manual intervention leads to occasional errors.	The equipment processing capacity does not match the design requirements; the manual process under the hierarchical order splitting model becomes an efficiency and quality bottleneck.
	Yadan	System Technology: Software functionality lacks differentiation, making it difficult to meet non-standard requirements. External Environment: Industry competition (over appearance/materials) has led to a surge in non-standard orders. Manual Operation: Non-standard orders rely heavily on the experience of order splitters.	Market demand conflicts with system standardisation capabilities; the system completely fails in extreme customisation scenarios.
Small-sized enterprises	Royal	System technology: Insufficient software stability (occasional data loss); non-standard orders require manual CAD splitting. Manual operation: Designers lose hole location data when assembling designs.	Insufficient system robustness; non-standard front-end design breaks the system's verification capabilities
	Weiyi	System Technology: No standardised modules or design specifications; no system integration (data transfer is entirely manual); Manual Operation: Inconsistent drawing annotations; varying designer experience leads to inconsistent results. Process Management: No error tracking or optimisation mechanisms.	Complete reliance on manual experience, no system support; no standardised process, poor consistency of results
	Meilijia	System Technology: Special models/processes cannot be automatically split; the module library does not cover all product categories. Process Management: Customer proposals are repeatedly revised, increasing the workload of splitting orders.	Basic software functions cannot meet personalised needs; insufficient front-end communication leads to repeated back-end processes.

(4) Visual analysis

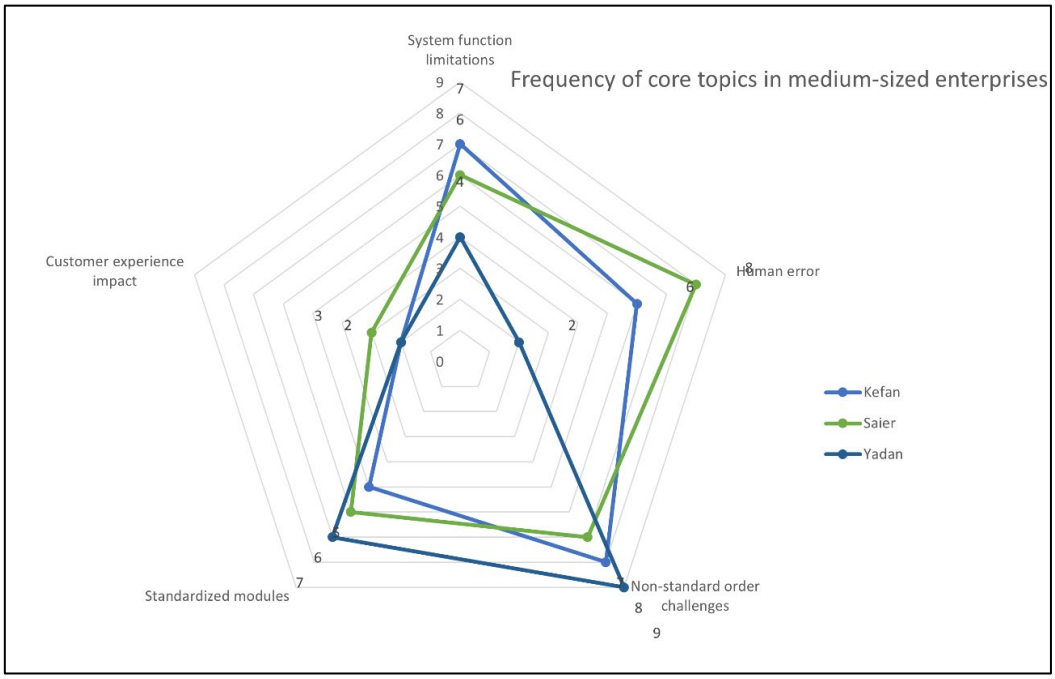

Figure 8 Frequency of core topics in medium-sized enterprises
(Source: Cai, 2025, Copyright Consent: Permissible to Publish)

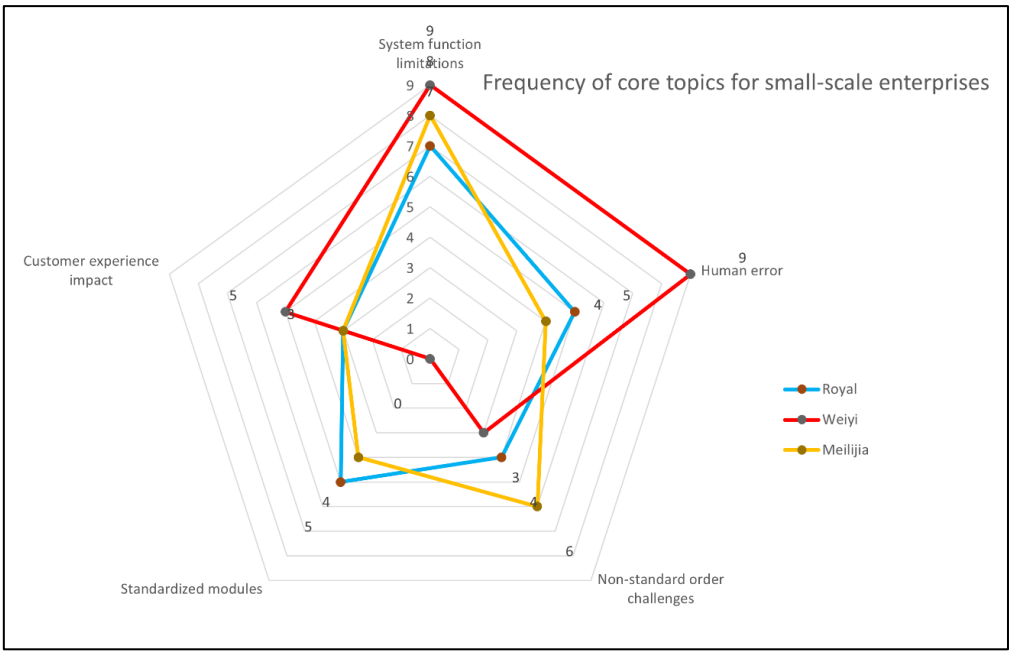

Figure 9 Frequency of core topics for small-scale enterprises
(Source: Cai, 2025, Copyright Consent: Permissible to Publish)

(5) Output

Differences in order splitting models among the six companies

Company	Core features of the order splitting model	Special processes/technical applications	Typical pain points
Kefan	The cabinet automation rate is 90%, but the cabinet wall and door integration orders are all manually split, and personnel turnover can easily lead to fluctuations in error rates.	There is no particularly outstanding special technology application, and complex orders are mainly processed manually.	Complex orders (cabinet wall door integration) drag down overall efficiency, and staff turnover affects quality and stability.
Saier	Adopting "A/B/C graded order splitting", the automation rate of grade C is 55%, and the splitting rate of grade A (10-15%) is fully manual, which is prone to occasional errors.	Hierarchical order splitting mode, adapting to orders of different complexity	Manual processes (A-level orders) become a quality shortcoming, making errors difficult to control.
Yadan	The automation rate is 95%, standard orders are error-free, and non-standard orders are handled by relying on the experience of senior employees. The internal competition in the industry has led to a surge in non-standard orders.	Standardised modules cover a wide range and are highly efficient in responding to standard orders.	The industry's internal competition has led to a surge in non-standard orders, which rely on manual processing and affect overall efficiency.
Royal	The automated order splitting rate is 95%, and details (such as hardware accessories) need to be manually reviewed. The system interface is connected to improve the efficiency of the entire process.	Highly dependent on the OMS system and 3D home model library	Designers tend to lose hole position data when assembling shapes, resulting in an inability to assemble on-site
Weiyi	Purely manual order splitting, 0% automation rate, no standardised process, and inconsistent order splitting results with the design	High degree of design freedom to meet extreme customisation needs	No standardised process, low efficiency and quality, poor consistency of results
Meilijia	The automation rate of Coolhome is 75%. Special shapes require manual CAD splitting. Special shapes and customer plans often need to be changed, which is inefficient.	Flexible adaptation of multiple software (Coolhome, CAD) to cope with special shapes	Repeated customer proposals lead to low efficiency, and insufficient software functions limit the efficiency of complex modelling processing.

The six companies face three common pain points in the order splitting model: First, the processing of non-standard orders generally relies on manual labour. Whether it is Kefan's cabinet wall door integration order, Saier Risheng's A-level high-difficulty order, or the non-standard needs of Yadan, Royal, and Meilijia, manual intervention is required at key links, which not only reduces order splitting

efficiency but also increases the risk of errors due to the uncertainty of manual judgment (such as Royal The second issue is an imbalance between standardisation capabilities and customisation needs. Companies with a solid foundation for standardisation (such as Yadan and Royal) face customisation demands that transcend module boundaries, but the advantages of standardisation are lost, forcing them to switch to manual processing. Companies lacking standardisation (such as Weiyi) face inconsistent order splitting results due to a lack of unified processes, making it difficult to ensure efficiency and quality. Third, personnel factors significantly impact order splitting quality. Kefan's error rate fluctuates due to staff turnover, while Yadan relies on experienced employees to handle non-standard orders. Royal, Saier Risheng, and Meilijia are also limited by staff operating standards and experience. Even with a high degree of automation, they cannot completely avoid problems caused by human operations. Personnel capabilities and stability have become common obstacles to order-splitting quality.

The six companies have different focuses on the personalised problems of their order splitting models: while the cabinet automation rate of Kefan reaches 90%, integrated cabinet, wall and door orders need to be handled entirely manually, and personnel turnover easily causes fluctuations in error rates, and complex orders reduce overall efficiency; Saier Risheng adopts "A/B/C graded order splitting", but errors in grade A fully manual orders are very sporadic, and the manual link becomes a quality shortcoming; although Yada has a high automation rate for standard orders, the industry's internal competition has led to a surge in non-standard orders, and reliance on manual processing affects overall efficiency; Royal is highly dependent on the system, but there is a problem that designers easily lose hole position data when assembling shapes, resulting in the inability to assemble on site; Weiyi uses pure manual splitting without standardised processes, and the splitting results are inconsistent, with both efficiency and quality low; some orders of Meilijia rely on Coolhome's automated splitting, but special shapes require manual CAD processing, and customer plans are repeatedly revised. Insufficient software functions also limit the efficiency of complex shape processing.

4 FINDING AND DISCUSSION

4.1 Interview results

Table 1 Comparison of pain points in the order splitting process for six small and medium-sized enterprises

Company	Informatisation level	Standardised modules	Error rate	Collaboration efficiency
Kefan	High	Yes	Medium	Medium
Saier	Medium	Yes	Medium	Medium
Yadan	High	Yes	Low	High
Royal	High	Yes	Low	High
Weiyi	Medium	No	High	Low
Meilijia	Low	Yes	High	Low

4.2 Comparison with literature

This study's findings echo the perspective of "modularisation and information system synergy" proposed by Liu Weixin (Liu, 2022). Furthermore, the study found that the challenge facing SMEs lies in a lack of resources to advance informatisation, which aligns with Shen Jianhong (Shen, 2010)description of the predicament faced by SMEs in the manufacturing sector. Thus, the optimal approach should emphasise the introduction of low-cost informatisation tools and the gradual development of standardised modules to adapt to the realities of SMEs.

5 CONCLUSIONS

Through in-depth interviews and comparative analysis, this study summarises three major problems faced by small and medium-sized custom furniture companies in the order splitting model:

1. Inadequate information systems lead to low process efficiency.
2. Lack of standardised modules makes task splitting complex.
3. Low efficiency of cross-departmental collaboration and impaired customer experience.

To address these issues, the study proposes:

1. Gradually introduce information systems;
2. Build a modular design database;
3. Optimise cross-departmental communication mechanisms.

The theoretical contribution of this paper is to enrich the research on the order splitting model of customised furniture for small and medium-sized enterprises; its practical significance is to provide enterprises with an operational improvement path. Future research can further combine large-sample questionnaires with case tracking to verify the universality of the research conclusions.

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AUTHOR CONTRIBUTIONS

Cai Xifeng, as the main author, played a role in data search, analysis, and writing, while S'harin Mokhtar, as the second author, acted as a supervisor, and Siti Salwa, as the third author, acted as a co-supervisor.

CONFLICT OF INTEREST

The author declares no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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