

Research and Implementation of an Integrated Application Cloud Platform for Home Decoration Design Services

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Abstract

This paper analyzes a series of typical problems currently existing in home decoration design, such as unsuitable service models, non-unified design platforms, and non-centralized design resources, and proposes an integrated application solution for home decoration design services based on cloud services. Based on cloud platform architecture and adopting unified permissions and design tools, centralized management of enterprise design resources is achieved. The implementation of the cloud platform and its promotion and application outcomes demonstrate that it can effectively drive innovation in internet-based home decoration design models, deliver a brand-new experience for home decoration design services, and significantly enhance the allocation efficiency of enterprise resource supply chains.

Full Text

Research and Implementation of an Integrated Application Cloud Platform for Home Decoration Design Services

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Abstract This paper analyzes a series of typical problems currently existing in home decoration design, such as unsuitable service models, non-unified design platforms, and scattered design resources, and proposes an integrated application solution for home decoration design services based on cloud services. Based on a cloud-platform architecture, the solution adopts unified permissions and design tools to realize centralized management of enterprise design resources. The implementation and promotional application results of the cloud platform demonstrate that it can effectively promote innovation in Internet-based home decoration design models, bring an entirely new experience to home decoration design services, and significantly improve the allocation efficiency of enterprise resource supply chains.

[Keywords] cloud service; home decoration design; resource management

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1 Introduction

In recent years, with the development of the commercial residential housing market and the improvement of people's living standards, the residential interior decoration industry has developed rapidly. In terms of both total industry

scale and concentration, there are enormous opportunities and room for growth. Over the past five years, driven by the Internet, the traditional home decoration industry has undergone tremendous shocks, and the market landscape has changed greatly. In the harsh competitive environment, major home decoration companies have formulated strategies one after another to adapt to industry trends.

In the mid- to high-end home decoration market, people pay increasing attention to improvements in quality of life and to the expression of home individuality, and design has gradually become the core competitiveness of home decoration enterprises. Especially against the background of continuously shrinking profits in home decoration building materials and construction, the role of design in home decoration has become increasingly prominent. However, many technical and managerial factors have restricted the smooth advancement and implementation of enterprise strategies, mainly as follows:

- (1) The integration function of design platforms is weak. At present, designers generally use CAD and 3DMax to produce design schemes for clients. However, the 3D Max three-dimensional models contain only geometric data and cannot integrate related information such as material prices, processes, and quotas. Therefore, they cannot provide valuable data for the later construction stage and project management stage. Design and construction management cannot be effectively integrated, the advantages of centralized company resources cannot be embodied, and the business strategy of integrated design and construction is affected.
- (2) Design resources are scattered. Design schemes are often held by designers; companies lack effective control over design results. Designers' achievements cannot be drawn on or fully reused, and design results cannot be formed into enterprise knowledge assets, affecting the enterprise's process of scaling up and industrialization.
- (3) The degree of informatization and standardization of enterprise data is not high. Factors such as insufficient standardization of enterprise image libraries (main materials, movable furniture, accessories, etc.), non-unified design tools (CAD, 3DMax, hand drawings, etc.), and non-unified drawing standards are not conducive to enterprise brand marketing or the promotion of proprietary household products.

2 Architectural Design of the Integrated Application Cloud Platform for Home Decoration Design Services

Against the background of "Internet+," with support from cloud technology, BIM technology, big data, and other technologies, an integrated application cloud platform for home decoration design services is developed, overturning the traditional home decoration model with an Internet-based mode of thinking. Through the cloud platform, the resources of material suppliers, design companies, and decoration companies can be integrated and managed, making

connections among all participants more efficient and realizing disintermediation and de-channelization, thereby reducing waste, improving production efficiency, and increasing enterprise profits. The cloud-platform architecture is shown in Figure 1.

(1) Platform hierarchy

From the bottom layer to the top layer, it can be divided in sequence into three service layers: the BIM integrated data service layer, the platform service layer, and the business application layer.

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Figure 1. Architecture of the home decoration design service cloud platform

Figure 1: Figure 1. Architecture of the home decoration design service cloud platform

Figure 1 Architecture of the home decoration design service cloud platform

BIM integrated data service layer: The BIM integrated data service layer is the core system for data collection, interaction, and sharing deployed on the server side, including the database persistence layer, system integration layer, and data interaction layer. It adopts an SOA software architecture to ensure unified integration support service functions for all business data.

Platform service layer: The platform service layer is the core layer of the entire home decoration design cloud platform, providing a security assurance system and operation-and-maintenance system for platform operation. In addition to the engine support of the underlying platform services, it also includes drawing/document systems, business application integration management, business permission integration management, and so on.

Business application layer: This is the unified access portal for BIM models and associated documents. All functions are implemented via Web methods based on Internet/Intranet browsing technologies, including design-tool applications, design management, and scheme management.

(2) Platform characteristics

Unified permissions: By defining various application roles in the system and integrating logged-in users, various functional permissions, and roles, designers,

business management layers, business decision-making layers, home decoration manufacturers, and end users can all integrate management processes, various resources, and corresponding data through this portal; operate different applications; realize collaborative management of data including BIM models, graphic images, and documents; and enable information transmission and digital hand-over of BIM data among project participants and across multiple business stages.

Unified design tools: The platform provides BIM-based home decoration cloud design tools, enabling easy implementation of apartment layout, home furnishings, ceramic tiles, ceilings, and water-and-electricity design. The design process is simplified: one only needs to drag products from the product library into the design area, and the model can be rendered in real time.

Transparent pricing: By leveraging the advantages of “Internet +,” the platform enables transparent quotation of material costs and labor costs across the whole industry. In a sound platform and environment, it effectively solves latent industry rules in the home decoration sector such as information asymmetry, nontransparent quotations, high rebates, and kickbacks, truly achieving the goal of using “Internet +” to overturn the current state of the industry and transform it.

Intelligent schemes: Through technical means, the home decoration design cloud platform quantifies indicators for the overall design. For different types of products, it can match products and realize presentation of the overall style. At the same time, it can recommend multiple products of different brands within a certain range, allowing consumers to choose freely, thereby ensuring the objectivity and fairness of recommendations at the mechanism level. In addition, the platform can also carry out intelligent price comparison, dimension measurement, and rendering-effect presentation.

3 Functional Research on the Integrated Application Cloud Platform for Home Decoration Design Services

3.1 Home decoration design portal

The home decoration design portal provides users with a window for learning about decoration information. It attracts users to register through the decoration quotation system and finished-scheme library, improves user stickiness through online design, and enhances user satisfaction through platform supervision.

Furthermore, with the design platform homepage as the link, it realizes unified information acquisition among the designer layer, business management layer, business decision-making layer, home decoration manufacturers, and end users, facilitating real-time information sharing and communication. Permissions are filtered according to business roles, and users automatically enter the corresponding unit portal or secondary portal. In the BIM portal, functions such as

personal dashboards in planning, task messages, and digital dashboards can be completed.

Figure 2. Home decoration design portal entrance

Figure 2: Figure 2. Home decoration design portal entrance

Figure 2 Home decoration design portal entrance

3.2 Quota and main-material management

The quota and main-material library is an important component of home decoration design. It provides data support for home decoration design, including quota management, labor management, material management, main-material management, product management, and so on. Data operations performed in the quota and main-material library are all reflected in the visual design client. The quota and main-material library consists of product data established independently by enterprises and home-furnishing suppliers; designers distributed in different locations can share in-library material information within the scope of authorization.

Main-material management is used to provide all product data. Product information includes: product number, product category, product name, product model, product size, model off-ground height, model status, material, series, unit, purchase price, selling price, supplier, brand, inventory status, and so on.

Figure 3 Quota Database

Figure 4 Main-Material Database

3.3 Design-Scheme Management

Designers fill in complete design-scheme information according to the rules, thereby completing the creation of a design scheme. The basic information includes the scheme name, applicable user group and apartment type, scheme drawings and images, walkthrough animation, and a brief introduction to the scheme. As design-scheme data becomes increasingly abundant, a large design-scheme database will be generated, forming a core enterprise information asset. Through authorization management of the design-scheme database, it is ensured that suitable people can query suitable design schemes at suitable times.

This module also includes a floor-plan database maintenance function. The floor-plan database stores all floor-plan information, including: floor-plan name, floor-plan area, floor-plan type, actual address (city, district, community name, and automatically converted longitude and latitude information), floor-plan images, and floor-plan models.

As a measure to facilitate customers, this platform also provides a design package function. The package database displays a list of all package information

on the platform. Administrator users can, under this function, create, import, edit, filter, and delete packages; at the same time, each package item can be associated with products, main materials, and quotas.

Figure 5 Design-Scheme Database

3.4 Project Management

Project management provides data support for enterprise users, including the management of project information, customer information, project process nodes, and so on.

Through the project management module, all schemes of the designer can be maintained. The scheme contents include: scheme name, last modified time, geographic location information, renderings, construction drawings, quotations, etc.

Figure 6 Package database

Figure 3: Figure 6 Package database

Figure 6 Package database

Figure 7 Design scheme

Figure 4: Figure 7 Design scheme

Figure 7 Design scheme

Another important function of this module is sign-off management. Under this function, users can carry out order signing, construction, construction acceptance, and confirmation of order completion.

3.5 Cloud Design Tools

Designers can use cloud design tools to complete project designs. The design process is simplified: the designer only needs to drag products from the product library into the design area, and the model can be rendered in real time. At the same time, real-time linkage among product data, quota data, main-material data, quotations, and drawing output can be realized. While bringing customers a brand-new experience, this also greatly shortens the design communication cycle.

Figure 8 Sign-off management

Figure 5: Figure 8 Sign-off management

Figure 8 Sign-off management

Figure 9 Tile paving design

Figure 9 Tile paving design

Figure 6: Figure 9 Tile paving design

Figure 10 Automatic quotation sheet style

Figure 7: Figure 10 Automatic quotation sheet style

Figure 10 Automatic quotation sheet style

design tools include home design, tile-laying design, ceiling design, plumbing and electrical design, and other functions, enabling one-stop service and one-click quantity calculation, one-click rendering, and one-click drawing output. After the designer completes a scheme, the system automatically compiles the decoration list; after submission, the system directly generates a quotation sheet based on the decoration list.

4 Conclusions and Prospects

At present, the platform has completed development and has already established cooperative relationships with several Internet home-decoration and home-furnishing brands. It is using new-media platforms, offline exchange salons, online forums, and other activities to carry out promotion, gradually cultivating customers' brand loyalty.

The home-decoration design cloud platform proposes a one-stop design model, transforming the traditional one-to-one model between designers and customers into a platform-based integrated service model. It realizes an overturning of the traditional home-decoration profit model and effectively solves latent industry rules such as information asymmetry, opaque quotations, customers' required advance payments, high rebates, and kickbacks, making decoration transparent, simple, and highly cost-effective.

The cloud-architecture-based integrated application for home-decoration services will provide the industry with big data for home-decoration design, upgrade the industry service chain, and improve the service level and management level of the entire industry. In the future, the home-decoration design cloud platform plans to further improve supply-chain system design, open up installation entrances and logistics entrances, improve the efficiency of supply-chain resource allocation, and ultimately realize the integration of the home-decoration industry and the smart-home industry.

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Research on the Integrated Cloud Platform of House Decoration Design Services and Its Implementation

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Abstract: The paper lists serious typical problems existed in the design of house decoration, including inapplicable service model, dis-uniformed design platform and non-centralized design resources, and puts forward an integrated cloud-based service and application solution of house decoration as well. Based on the cloud-platform architecture, unified authority and collaborative design tools are adopted to achieve the centralized management of enterprise design resources. The implementation of cloud platform and its application popularization have proven that the cloud platform is able to promote the innovation of Internet house design pattern effectively, to bring new experience for house decoration design services, and to improve the efficiency of enterprise resource supply chain configuration significantly.

Key Words: Cloud Service; House Decoration Design; Resource Management

Figures

Source: ChinaXiv. Machine translation. Verify with the original.

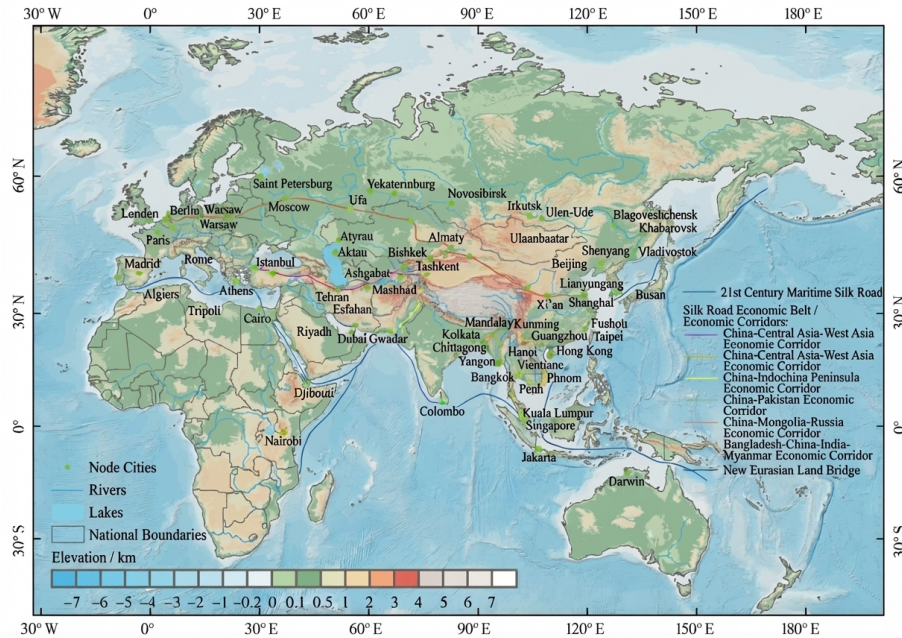


Figure 8: Figure 1



Figure 9: Figure 2

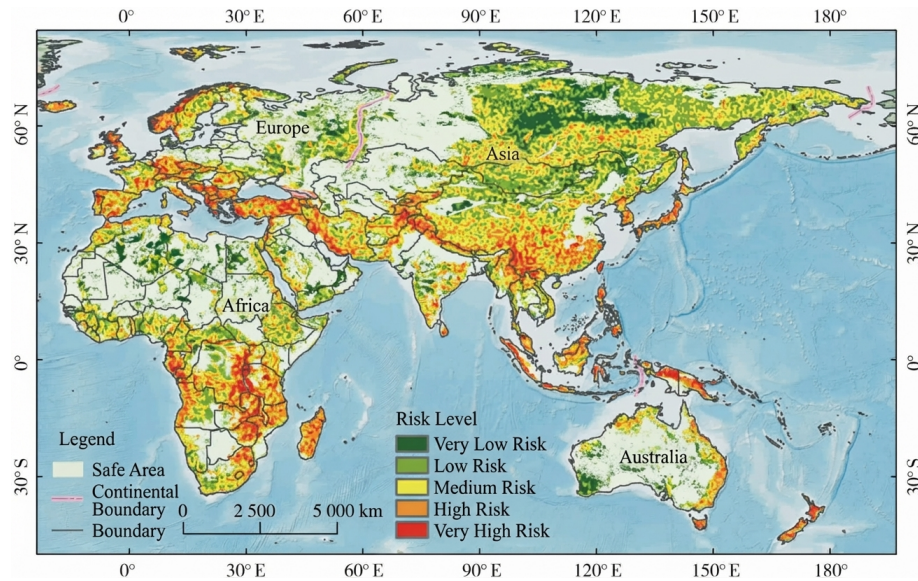


Figure 10: Figure 3

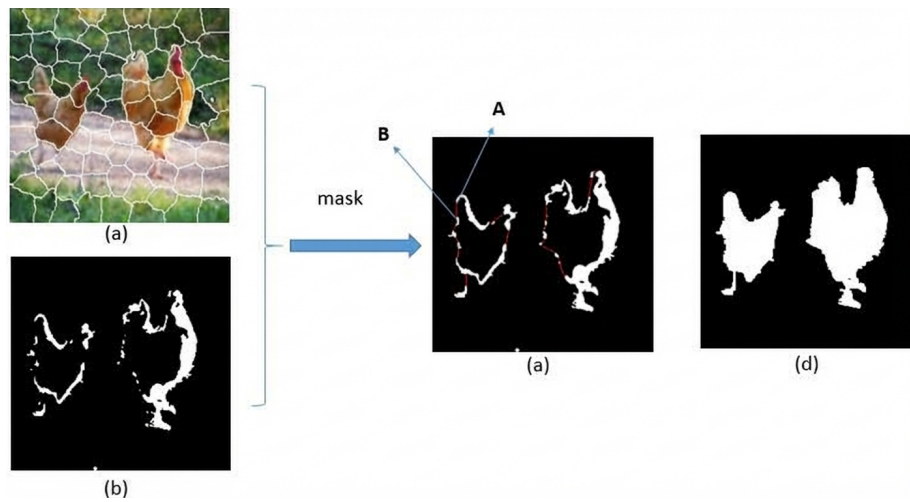


Figure 11: Figure 4

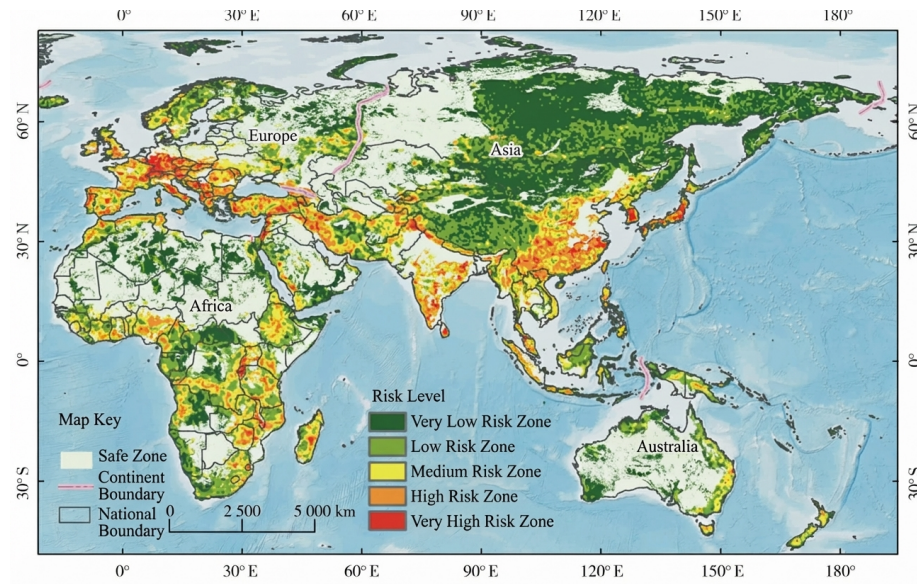


Figure 12: Figure 5

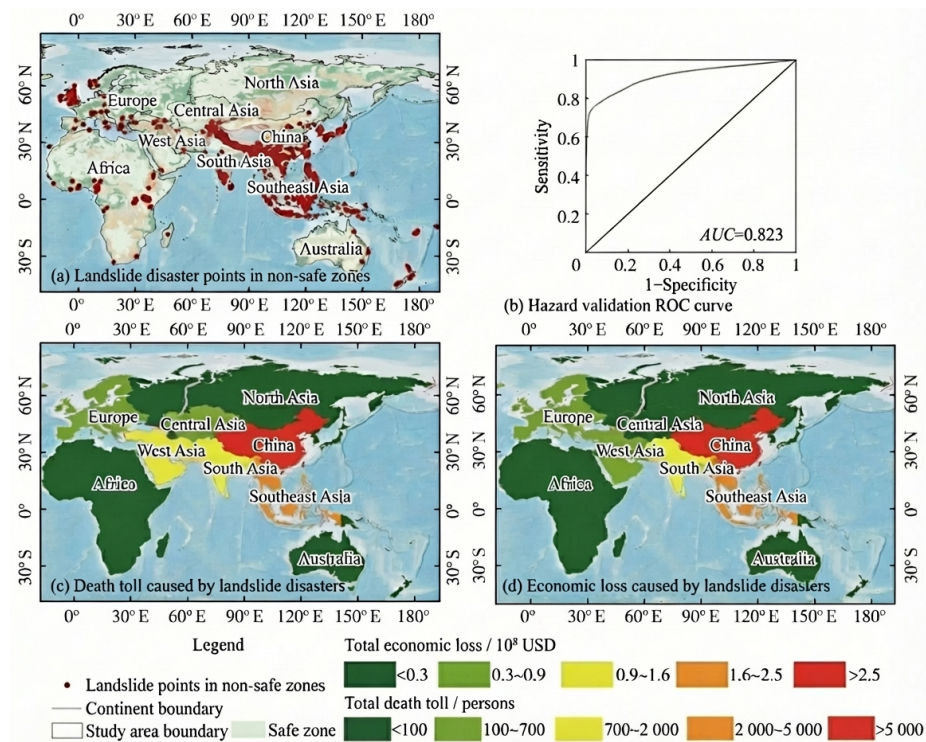


Figure 13: Figure 6

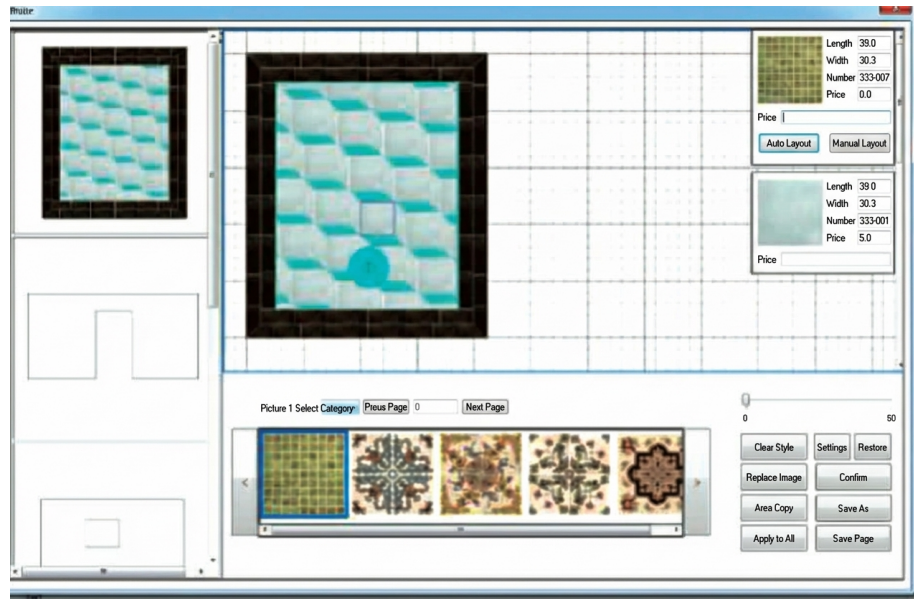


Figure 14: Figure 7

System Home Role Set Fav Slot Intelligence Biell Service Development Placement Supplement Prod Cert Order Mgt Earth Ocean Torti Curt Miss Ren Logout									
Query Name, Is Enter Search Add Coge Import Built Coge									
#	Cage No.	Cage Name	Unit	Unit	Service Provider	Create Time	Status		
1	Standard 0-5000	Standard 0-5000 Package - a cage	599.00	YuanPiece	All, JD, Tencent...		View	Associate Set	Associate Order
2	Silver 0-3000	Silver 0-3000, 18:1 Ratio	3990.00	YuanPiece	All, JD, Tencent...		View	Associate Set	Associate Order
3	Gold 0-6000	Gold 0-6000 - C57N Package	599.00	YuanPiece	All, JD, Tencent...		View	Associate Set	Associate Order
4	Diamond 0-1000	Diamond 0-1000 HanB017	1899.00	YuanPiece	All, JD, Tencent...		View	Associate Set	Associate Order

Showing 1 to 4 of 4 entries Show 10 entries

Figure 15: Figure 8

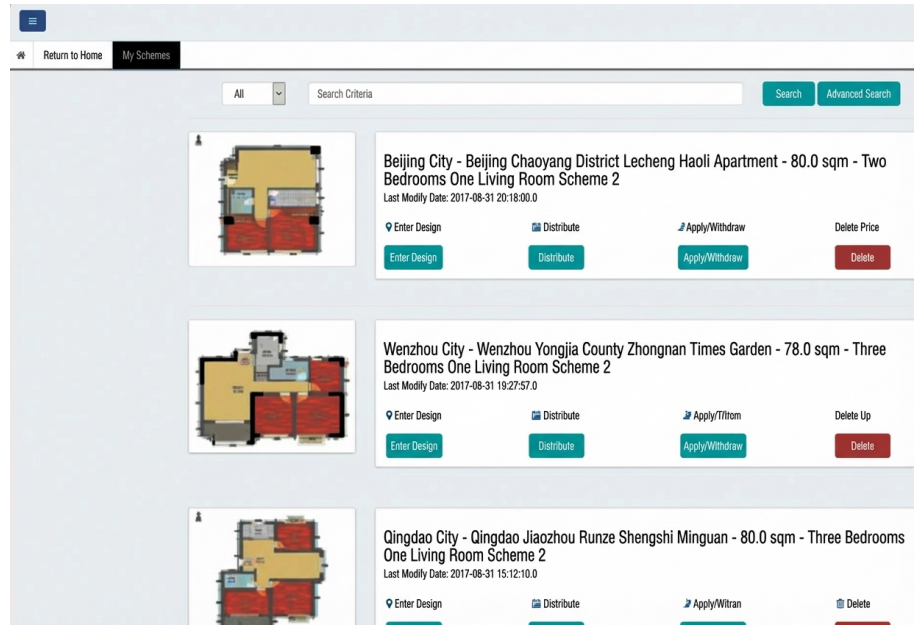


Figure 16: Figure 9



Project No.:

Project Address:

Home Consultant:

Customer Name:

Store:

Phone:

Phone:

Built-up Area: 66.0

Phone:

TOTAL PROJECT PRICE:

32630.22

TOTAL ENGINEERING ITEMS:

15783.18

No.	Category	Quota Code	Quota Name	Unit	Measurement Rules	Craftsmanship & Material Description	Item Category	Unit Price	Engineering Quantity	Subtotal	Remarks
Tem											
1	Demolition & Modification Works	SMILE-CG026	Removal of original wall paint	sq.m	1. Rule: Calculated by sq.m. 2. Note: Calculated based on actual project quantity.	1. Craftsmanship: Manual removal of original wall surface layer and base layer. 2. Material: Garbage bags, labor and machinery. 3. Note: Not including removal of wall putty, base course plaster and cement mortar protection layer.	Standard	60	63.95	3837	
2	Demolition & Modification Works	SMILE-CG032	Demolition of lightweight partition wall (incl. latex paint, putty)	sq.m	1. Rule: Calculated by sq.m. 2. Note: (1) According to the construction drawing area. (2) Excluding removal of wooden keel. Measured by actual dismantled area.	1. Craftsmanship: Manual demolition of partition (unable to protect), demolition of latex paint, demolition of wall putty, wooden keel framework (including keel and cover plate) and packaging. 2. Material: Garbage bags, labor and machinery. 3. Note: Manual demolition	Standard	450	63.95	2877.75	

Figure 17: Figure 10