Urban Renewal Project Management in China
中国城市更新项目管理

—— Full-Life-Cycle Practice and Value Reconstruction

全生命周期实践与价值重构

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01 Full-Life-Cycle Management Framework

1.1 Pre-Decision Stage: Due Diligence and Systematic Planning
前期决策阶段：尽职调查与系统策划

(1) Due Diligence 尽职调查

Due diligence is a risk assessment and value verification process prior to investment decision-making.

尽职调查是投资决策前的风险排查与价值验证过程。

The goal of due diligence is to comprehensively identify potential risks, verify project feasibility, conduct reasonable valuation, and provide a basis for transaction structure design. Its depth, scope, and complexity directly determine the success or failure of the project.

尽职调查目标是全面识别潜在风险、验证项目可行性、合理估值并为交易结构设计提供依据，其深度、广度、复杂性直接决定了项目成败。

Neglecting any key risk point (especially legal ownership, environment, and demolition) may lead the project to a deadlock or huge losses.

忽视任何一个关键风险点（尤其是法律权属、环境、拆迁），都可能导致项目陷入僵局或巨额亏损。

01 Full-Life-Cycle Management Framework

(2) Systematic Planning 系统策划

Accurate Investment Calculation
精准投资测算

Value Discovery and Shaping
价值发现与塑造

Investment Promotion Strategy and Brand Introduction
招商策略与品牌导入

Value Anchoring
价值锚定

Systematic Planning Process 系统策划过程

01 Full-Life-Cycle Management Framework

1.2 Implementation Stage: Efficient Collaboration and Precise Implementation
实施阶段：高效协同与精准落地

(1) Efficient Collaboration: Efficient collaboration needs to take "organizational structure as the framework, communication mechanism as the blood, and interest coordination as the core" to establish a "normalized and all-channel" communication mechanism.

高效协同：高效协同需以 “组织架构为骨架、沟通机制为血脉、利益协调为核心”， 建立 “常态化、全渠道” 沟通机制。

(2) Precise Implementation: Precise implementation should be based on "goal decomposition as the foundation, schedule/quality/safety as the bottom line, cost risk as the boundary, and supported by digitalization and rule of law".

精准落地： 精准落地需以 “目标拆解为基础,进度、质量、安全为底线、成本风险为边界，数字化与法治化支撑”。

01 Full-Life-Cycle Management Framework

1.3 Operation Stage: Long-Term Operation and Value Appreciation Paradigm Shifts in Urban Renewal

运营阶段：长效运营与价值增值

(1) Long-term Operation Mechanism Pre-operation Design: Mixed functions, innovative revenue models, and full-life-cycle facility maintenance plans.

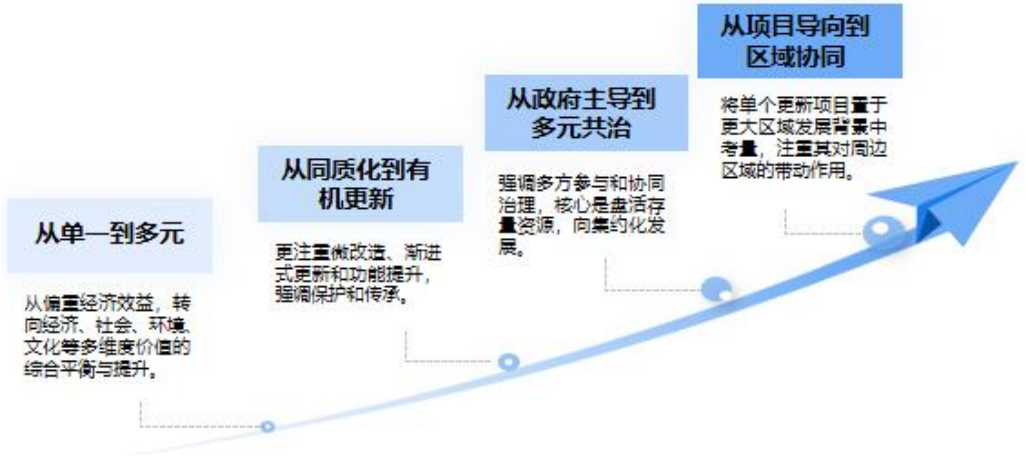
运营前置设计：功能混合、收益模型创新、设施全周期维护计划。

Intelligent Operation and Maintenance System: Real-time monitoring of energy consumption, equipment status, and community operation conditions.

智慧运维体系：实时监测能耗、设备状态、社区 运营状况。

(2) Value Reconstruction: A comprehensive process.

价值重构：一个综合性的过程。



02 Core Concepts and Practical Strategies

Core Management Concepts 核心管理理念

management philosophy
管理理念

Global Project Management
全域项目管理

01

Overall Planning to Lock Goals
整体策划锁定目标

02

Begin with the End in Mind
以终为始

03

Operational Thinking
运营思维

04

02 Core Concepts and Practical Strategies

2.1 Global Project Management: Global Coordination Methodology

全域项目管理：全域统筹方法论

"Global project management" breaks through the limitations of a single project and a single stage. It integrates spatial resources, time nodes, multiple subjects, and factor resources with "system thinking", and builds a full-cycle coordination system of "planning guidance - multi-line collaboration - dynamic adaptation - value closed loop".

“全域项目管理”突破单一项目、单一阶段的局限，以“系统思维”整合空间资源、时间节点、多元主体与要素资源，构建“规划引领 - 多线协同 - 动态适配 - 价值闭环”的全周期统筹体系。

Its core goal is to solve pain points such as "fragmented transformation, resource waste, and emphasis on construction over operation", and realize the in-depth leap of urban renewal from "physical renewal" to "ecological revitalization".

其核心目标是破解“碎片化改造、资源内耗、重建设轻运营”等痛点，实现城市更新从“物理更新”到“生态焕活”的深层跨越。

02 Core Concepts and Practical Strategies

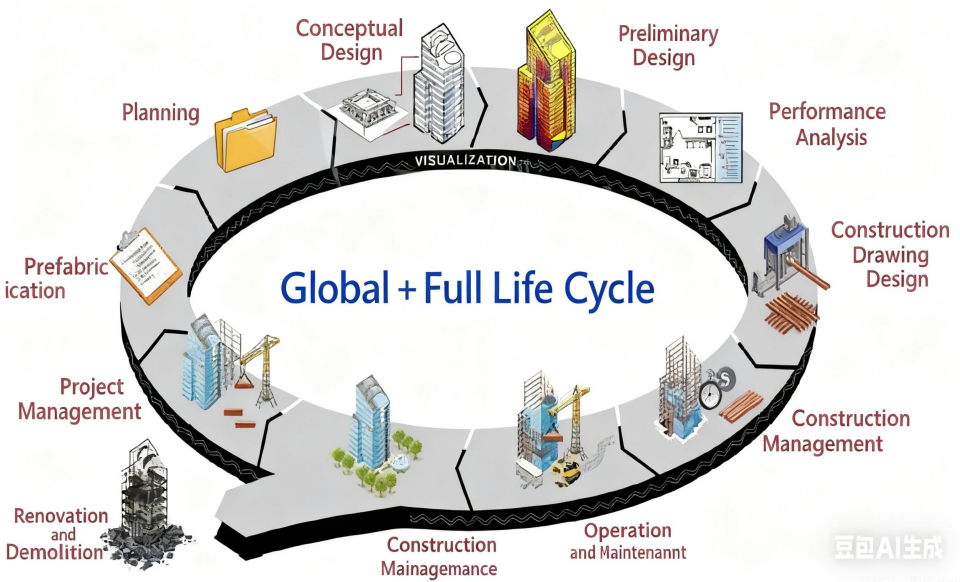
Underlying Logic of Global Coordination: Building a "Four-Dimensional Integration" Coordination Framework 全域统筹的底层逻辑：构建 “四维一体” 统筹框架

√ **Vertical Connection:** From "single-point transformation" to "regional linkage".
纵向关联：从 “单点改造” 到 “区域联动”。

√ **Horizontal Collaboration:** From "single leadership" to "diversified governance".
横向协同：从 “单一主导” 到 “多元共治”。

√ **Timeline Overlay:** From "stage isolation" to "full-cycle connection".
时序叠加：从 “阶段割裂” 到 “全周期衔接”。

√ **Value Dimension:** From "short-term benefits" to "long-term appreciation".价值维度：从 “短期效益” 到 “长期增值”。

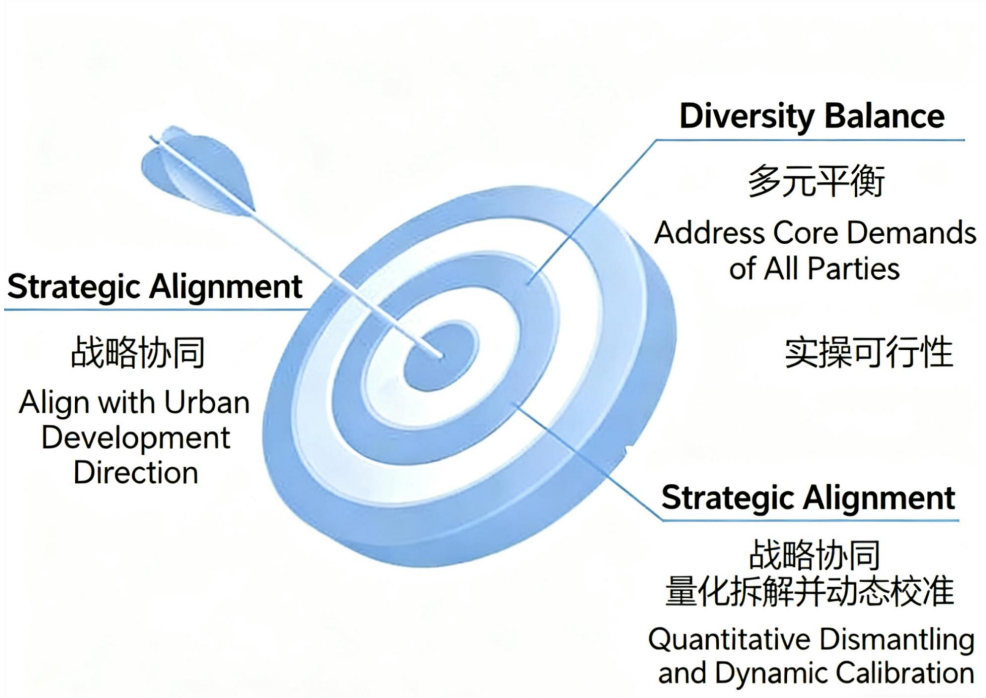


02 Core Concepts and Practical Strategies

2.2 Overall Planning to Lock Goals 整体策划锁定目标

Unlike the single goal of general engineering projects (e.g., "completion on schedule"), overall planning is a key link "from strategy to execution". Goal locking is the core proposition of planning — it determines the project's value orientation, resource allocation, and final success or failure.

整体策划不同于一般工程项目的单一目标（如 “按时竣工”），它是 “从战略到执行” 的关键衔接环节，而**目标锁定**是策划的核心命题 —— 它决定了项目的价值导向、资源配置与最终成败。



02 Core Concepts and Practical Strategies

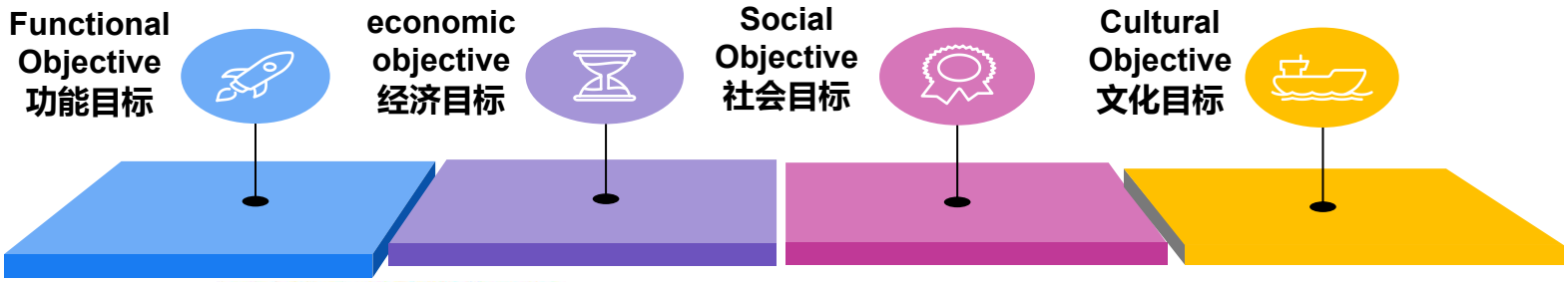
2.2 Overall Planning to Lock Goals 整体策划锁定目标

Underlying Logic of Goal Locking: Anchoring the "Threefold Value Coordinates" by Aligning with Top-Level Urban Development Strategies, Matching Differences in Regional Functional Positioning, and Responding to Core Demands of Diversified Subjects.

目标锁定的底层逻辑：锚定 “三重价值坐标”，对接城市发展顶层战略、匹配区域功能定位差异、回应多元主体核心诉求。

Core Dimensions of Goal Locking: Establishing a "Functional, Economic, Social, and Cultural" Four-Dimensional Goal System to Ensure Goals Are Comprehensive and Implementable.

目标锁定的核心维度：构建 “功能、经济、社会、文化“ 四维目标体系，确保目标全面且可落地。



02 Core Concepts and Practical Strategies

2.3 Begin-with-the-End-in-Mind Goal Orientation 以终为始的目标导向

The Begin-with-the-End-in-Mind goal orientation essentially lies in achieving "sustainable development" through the reverse construction of the goal-value chain.

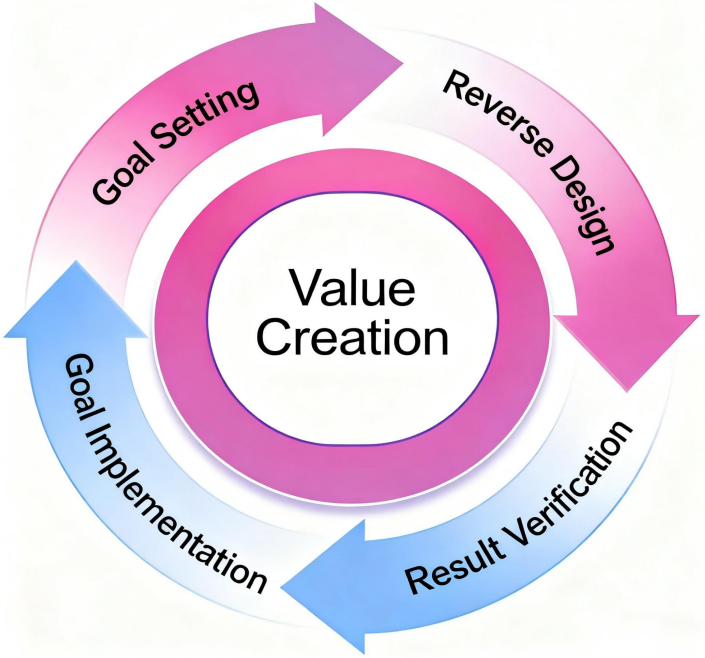
“以终为始” 的目标导向，本质是通过目标 - 价值链的逆向构建实现 “可持续发展”。

(1) Goal-Oriented Implementation Path: From "Goal Prioritization" to "Reverse Design", Process Control, and Result Verification.

目标导向的实施路径：从 “目标前置” 到 “逆向设计”、过程管控、结果验证。

(2) Core Challenges and Coping Strategies of Goal Orientation: Goal Conflicts, Goal Deviation, and Goal Implementation.

目标导向的核心挑战与破解策略：目标冲突、目标偏离、目标落地。

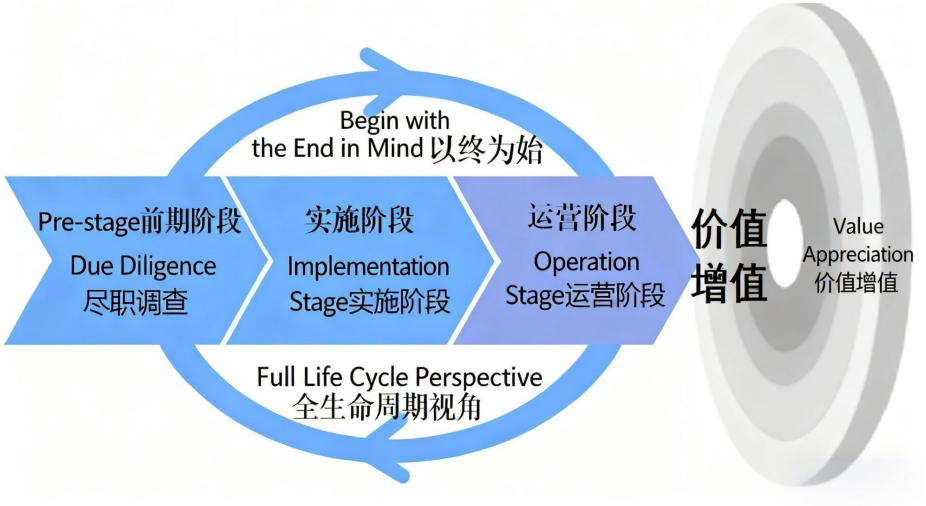


02 Core Concepts and Practical Strategies

2.4 In-Depth Embedding of Operational Thinking 运营思维的深度植入

Operation and Maintenance Thinking emphasizes "long-term sustainable operation" as its core goal, integrates the operational logic of the entire project lifecycle throughout the entire process of planning, construction, and management, and ultimately achieves multiple goals including the enhancement of urban space value, the satisfaction of people's livelihood needs, and the optimization of social governance.

运维思维强调以 “长期可持续运营” 为核心目标，将项目全生命周期的运营逻辑贯穿于规划、建设、管理的全流程，最终实现城市空间价值提升、民生需求满足与社会治理优化的多重目标。



02 Core Concepts and Practical Strategies

2.4 In-Depth Embedding of Operational Thinking 运营思维的深度植入

(1) Core Connotation of Operation and Maintenance Thinking: 运维思维的核心内涵

- **Full Lifecycle Perspective**
  全生命周期视角
- **Orientation towards User Needs**
  用户需求导向
- **Sustainable Development**
  可持续发展

(2) Key Application Dimensions of Operation and Maintenance Thinking in Urban Renewal Project Management: 运维思维在城市更新项目管理中的关键应用维度

- **Planning Phase: Reverse Definition of Renovation Objectives Based on "Operational Scenarios" 规划阶段：以 “运营场景” 反向定义改造目标**
- **Construction Phase: Constraining Engineering Implementation Based on "Operational Feasibility" 建设阶段：以 “运营可行性” 约束工程实施**
- **Operation Phase: Achieving Sustainable Development through "Dynamic Monitoring and Iteration"运营阶段：以 “动态监测与迭代” 实现可持续发展**

03 Typical Cases and Trend Outlook

3.1 Project Background 项目背景

First built in the Song Dynasty, West Main Street of Baoding City has a length of approximately 846 meters. During the Ming and Qing Dynasties, it served as the core axis of the Zhili Governor-General's Office and functioned as a transportation and trade hub known as the "Thoroughfare Connecting Nine Provinces" in northern China. Currently, it houses 24 cultural heritage conservation units, including the Xianliang Shrine and Xiesheng Printing Bureau—both of which are among the birthplaces of the red revolution.

保定市西大街始建于宋代，长度约846米，明清时期作为直隶总督署核心轴线，是北方“九省通衢”的商贸枢纽。现存24处文保单位（含贤良祠、协生印书局等红色革命策源地）。

03 Typical Cases and Trend Outlook

3.1 Project Background 项目背景

By 2020, it had faced three core contradictions:至2020年，其面临三大核心矛盾：

- (1) Dilapidated Buildings and Facilities Seventy percent of the traditional buildings on West Main Street had wall cracks and decayed wooden structures; 85% of the infrastructure (including electricity, water supply and drainage systems) was aged. During the rainy season, there were 32 waterlogging points, and the power capacity was only 1600 kVA. 建筑与设施破旧：西大街70%传统建筑存在墙体开裂、木结构腐朽；85%基础设施（电力、给排水）老化，雨季积水点达32处，电力容量仅1600kVA。
- (2) Conflict Between Safety and Architectural Style There was a lack of fire-fighting facilities (with no dedicated fire-fighting water tanks), posing significant fire risks; traditional craftsmanship has been lost, and previous renovations were uniform and identical, causing the historical architectural style to gradually fade. 安全与风貌冲突：消防设施缺失（无专用消防水池），火灾隐患较大；传统工艺失传，历次修缮“千篇一律”，历史风貌逐渐模糊。
- (3) Imbalance Between Business Formats and Positioning Sixty percent of the stores were low-end business formats such as bicycle repair; only two time-honored brands remained—Daoxiangcun and Wanbaotang; the utilization rate of historical buildings was merely 35%. 业态与定位失衡：60%商铺为自行车维修等低端业态，仅存稻香村、万宝堂2家老字号；历史建筑利用率仅35%。

03 Typical Cases and Trend Outlook

3.2 Systematic Planning in the Preparatory Phase: Focused on the Multi-Dimensional Value Remolding of Historical Culture, Tourism Economy, and Urban Image Enhancement

前期阶段系统策划：历史文化、旅游经济、城市形象提升的多维价值重塑

(1) Historical and Cultural Value 历史文化价值

From "Fragmented Conservation" to "Living Inheritance"从“碎片保护”到“活态传承”

The project reshapes the historical depth of "Zhili First Street" through the "restoration of spatial pattern + reconstruction of cultural scenes".项目通过“空间格局恢复+文化场景再造”，重塑“直隶第一街”的历史厚度：

Restoration of Spatial Layout: Based on the "Map of Baoding Prefecture City" from the Qing Dynasty, the traditional layout of "shops in the front and workshops at the back, with courtyard houses (siheyuan)" has been restored. A total of 82 gate towers and over 300 brick carvings have been repaired, bringing back to life the commercial street scene of this "thoroughfare connecting nine provinces." 空间格局恢复：依据清代《保定府城图》，复原“前店后坊、四合院落”传统布局，修复门楼82处、砖雕300余处，重现“九省通衢”的商贸街景。

03 Typical Cases and Trend Outlook

(2) Urban Economic Impetus 城市经济动能

From "Low-End Business Formats" to "Cultural Tourism Engine"从“低端业态”到“文旅引擎”

Cultural Scene Reconstruction: The nation's first "museum cluster" district has been established, encompassing five cultural heritage sites including the Xianliang Ancestral Temple and Xiesheng Printing House. In collaboration with the Office of the Governor-General of Zhili and the Memorial Museum of the Work-Study Movement in France for National Salvation, we have developed a tour route themed "Intangible Cultural Heritage Experience + Revolutionary Education," which receives 2,000 study tour groups annually.

文化场景再造：建成全国首个“博物馆聚集”街区（含贤良祠、协生印书局等5处文保单位）；与直隶总督署、留法勤工俭学纪念馆联动，打造“非遗体验+红色研学”线路，年接待研学团队2000批次。

03 Typical Cases and Trend Outlook

(3) Social Governance Innovation 社会治理创新

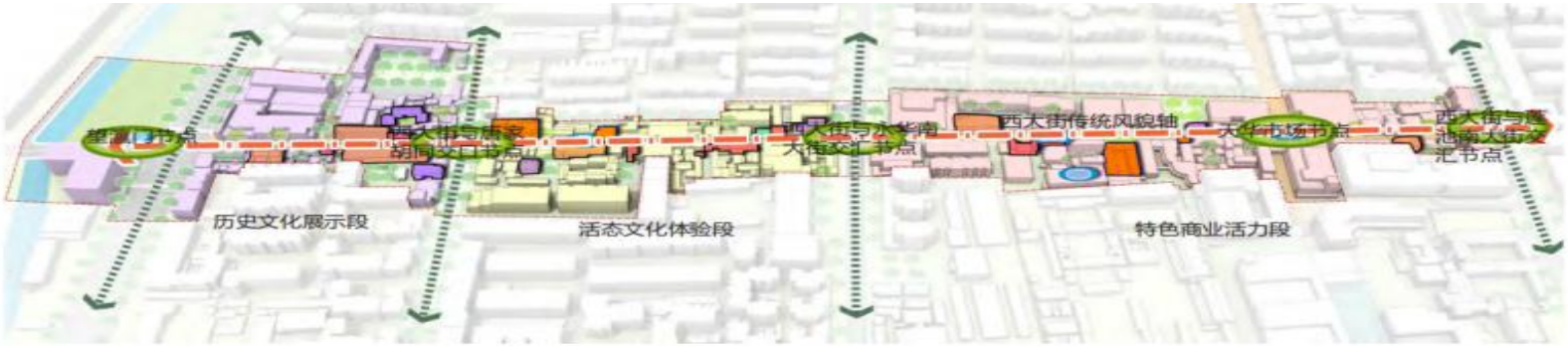
From "Government-Led" to "Multi-Subject Co-Governance"从“政府主导”到“多元共治”

The project has established a co-governance mechanism involving "operators + merchant alliance + residents' council", developed the "Ancient City Steward" Mini Program, and realized three core functions.项目建立“运营商+商户联盟+居民议事会”共治机制，开发“古城管家”小程序，实现三大功能：

1）Merchant Management: Credit Evaluation, Online Reminders for Rent Payment 商户管理：信用评价、租金缴纳线上提醒；

2）Tourist Services: Complaint Response, Navigation Map 游客服务：投诉响应、导览地图；

3）Resident Participation: Voting on Environmental Improvement, Collection and Adoption of Opinions 居民参与：环境整治投票、意见征集采纳。



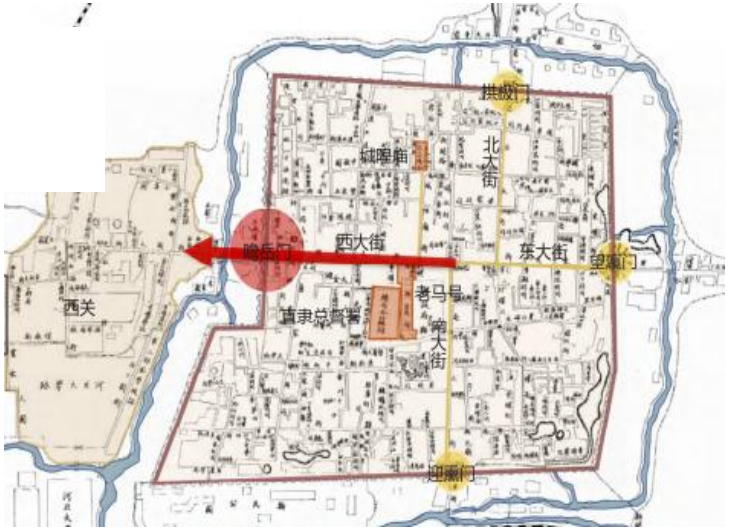
03 Typical Cases and Trend Outlook

(4) Holistic Project Planning全域项目策划

From "Protection" to "Historical and Cultural Ancient City". 从“西大街保护”到“历史文化古城”

Through the Baoding National Historical and Cultural City Planning it strengthens the protection of concentrated areas with traditional styles in the historical urban area and further highlights the traditional layout of the historical urban area. 通过《保定市历史文化名城规划》强化保护历史城区传统风貌集中成片的地段，进一步突显历史城区的传统格局。

By integrating the historical and cultural districts of Baoding West Street, Baoding East Street, the Hedao Shu (Waterway Administration) historical and cultural district, and Baoding Chenghuang Temple Street, along with cultural relic buildings or historical structures such as the Office of the Governor-General of Zhili, Huai Army Ancestral Hall, Daci Pavilion (Grand Compassion Temple), Military Academy Memorial Museum, and the Memorial Museum of the Work-Study Movement in France for National Salvation, a comprehensive transformation has been achieved. This approach combines specific sites, connecting routes, and broader areas to revitalize the historical ancient city of Baoding, presenting its "old face with a brand-new look."统筹保定市西大街历史文化街区、保定市东大街历史文化街区、河道署历史文化街区、保定市城隍庙街，以及总督署、淮军公所、大慈阁、军校纪念馆、留法勤工俭学纪念馆等文物建筑或历史建筑，形成点、线、面组合的保定市历史古城的“旧貌换新颜”。



3.3 Construction Implementation: Technological and Mechanism Innovations for Full-Cycle Management 建设实施：全周期管理的技术与机制创新

(1) Project Financing: Diversified Funding Sources and Risk Control as the "Dual Safeguard Mechanism"
项目融资：多元资金与风险控制的“双保险”
The project adopted a diversified financing model of "government + social (capital) + subsidy" and innovated the mechanism of "jointly managed fund account + operation right pledge"
项目通过“政府+社会+补助”多元融资，并创新“资金共管账户+经营权质押”机制。
(2) Design and Construction Management: "Dual-Path Integration" of Traditional Craftsmanship and Modern Technology 设计和施工管理：传统工艺与现代技术的“双轨融合”

- **Dynamic Renewal: Risk Mitigation through "Hierarchical Protection + Progressive Implementation" 动态化更新：“分级保护+渐进实施”的风险规避**
- **Intelligent Monitoring: Precision Maintenance via "Data-Driven + Full-Cycle Management" 智慧化监测：“数据驱动+全周期管理”的精准养护**
- **Risk Control Mechanism: Secure Advancement with "Jointly Managed Fund Account + Operation Right Pledge" 风险控制机制：“资金共管账户”+“经营权质押”的安全推进**

03 Typical Cases and Trend Outlook

(3) Design and Construction Management: Dynamic Control of Three Core Objectives. 设计和施工管理：三大目标动态控制

Control dimensions 控制维度	key measures 关键措施	Effectiveness 成 效
Quality control 质量控制	Through rigorous qualification verification, optimized material selection, and a sample-led approach, the project achieved first-pass success in all specialized inspections.资质核查、材料选型、样板引领、专项验收等。	The construction qualifications are precisely matched to the project scope, with inspection coverage encompassing over 10 items including witnessed sampling testing and steel structure flaw detection.施工资质专业匹配，检测覆盖见证取样、钢结构探伤等10余项内容。
Schedule Control 进度控制	The construction period for Phase I of the project is 259 calendar days. The contract stipulates a liquidated damages penalty of 0.1% of the contract price per day for delays.一期工程工期259天，合同约定逾期违约金（每日0.1%合同价）。	All six critical project milestones were completed 7 days ahead of schedule, with zero delays attributable to procurement/tendering processes.6处重点节点均提前7天完成，未发生因招标延误导致的工期滞后。
Cost Control 造价控制	The budget for Phase I construction tender is RMB 105.3753 million, with bid evaluation conducted via the 'Comprehensive Scoring Method'.一期施工标预算10537.53万元，评标采用“综合评分法”。	The final settlement amount for Phase I is RMB 104.80 million (representing a 0.55% reduction from the approved budget), with a fund utilization compliance rate of 98%.一期结算价10480万元（较预算下浮0.55%），资金使用规范率98%。

03 Typical Cases and Trend Outlook

3.4 Operation Phase: Transformation of Urban Economic Impetus from "Low-End Business Formats" to "Cultural Tourism Engine" 运营阶段：城市经济动能从“低端业态”到“文旅引擎”

(2) Operational Effectiveness: West Main Street has become a new cultural and tourism growth pole in Baoding. **运营成效：**西大街成为保定文旅新增长极

indicator 指标	Before the update (2020year）更新前	After the update更新后（2024年）	Growth rate 增幅
Annual Tourist Volume (in 10,000 Person-Trips)年游客量（万人次）	80	640	It has driven the occupancy rate of surrounding hotels to rise from 50% to 92%,and the catering revenue to increase by four times.带动周边酒店入住率从50%提升至92%，餐饮收入增长4倍。
Shop Rent商铺租金（元/㎡·月）	30	120	300%
Employment Positions就业岗位（个）	500	2300	360%
Annual Output Value of Intangible Cultural Heritage (ICH) Workshops 非遗工坊年产值（万元）	1200	8200	583%
Resident Satisfaction 居民满意度	58%	94%	There is a 94% approval rate for environmental improvement, and the number of complaints via the "Ancient City Steward" Mini Program has decreased by 80%.环境改善认可度94%，“古城管家”小程序投诉量下降80%。

03 Typical Cases and Trend Outlook

3.4 Operation Phase: Transformation of Urban Economic Impetus from "Low-End Business Formats" to "Cultural Tourism Engine"

运营阶段：城市经济动能从“低端业态”到“文旅引擎”

(1) Project Management Process: Implementation Guarantee with "Three-Phase Management and Control + Key Systems".

项目管理过程：三阶段管控+关键制度”的执行保障。

Implement Full-Cycle Management and Control Covering "Precision Design - Construction Implementation - Acceptance and Handover" .

执行“精准设计-工程实施-验收移交”全周期管控。

3.4 Operation Phase: Transformation of Urban Economic Impetus from "Low-End Business Formats" to "Cultural Tourism Engine"

运营阶段：城市经济动能从“低端业态”到“文旅引擎”

(2) Operational Effectiveness: 运营成效

West Main Street has become a new cultural and tourism growth pole in Baoding.

It has successively been awarded "National-level Nighttime Culture and Tourism Consumption Aggregation Zone," "National-level Tourism and Leisure Block," "3A-level Tourist Attraction," and "2024 China Urban Renewal and Existing Building Renovation Typical Case," among 16 honors.

西大街成为保定文旅新增长极，先后荣获“国家级夜间文化和旅游消费集聚区”、“国家级旅游休闲街区”、“国家3A级旅游景区”、“2024中国城市更新和既有建筑改造典型案例”等16项荣誉。


河北省文化和旅游厅

河北省文化和旅游厅
关于公布第二批省级夜间文化和旅游消费集聚区名单的通知

1	唐山市路南区唐山茶
2	张家口市崇礼区大舞台冬小镇旅游景区
3	保定市莲池区西大街文旅街区
4	廊坊市开发区梦廊坊戏剧公园


中华人民共和国文化和旅游部
政府信息公开
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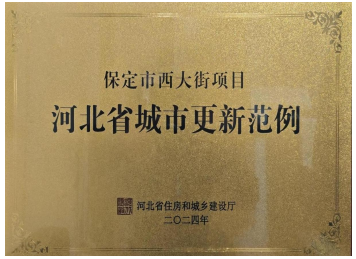
首页 > 产业发展

关于第三批国家级夜间文化和旅游消费集聚区名单的公示

序号	所在省（区、市）	申报对象
1	北京市	东城区隆福寺文化街区
2		石景山区首钢园
3		通州区北京（通州）大运河文化旅游景区中区
4	天津市	河东区鲁3创意街区
5		武清区武清阁建设商圈
6		滨海新区航母主题公园
7	河北省	唐山市河头老街
8		保定市西大街
9		廊坊市梦廊坊戏剧公园


保定市西大街项目
河北省城市更新范例
河北省住房和城乡建设厅
二〇二四年

永诚项目管理
YONGCHENG PROJECT MANAGEMENT

THANKS

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AI-Enabled Engineering Consulting in China: From Digitalization to Intelligent Transformation

AI赋能工程咨询的中国实践——从数字化到智能化跃迁

Presenter: Cui Liming
汇报人：崔立明

Beijing Xiaoli Technology Co., Ltd.
北京小栗科技有限公司

小栗科技
XIAOLI TECHNOLOGY

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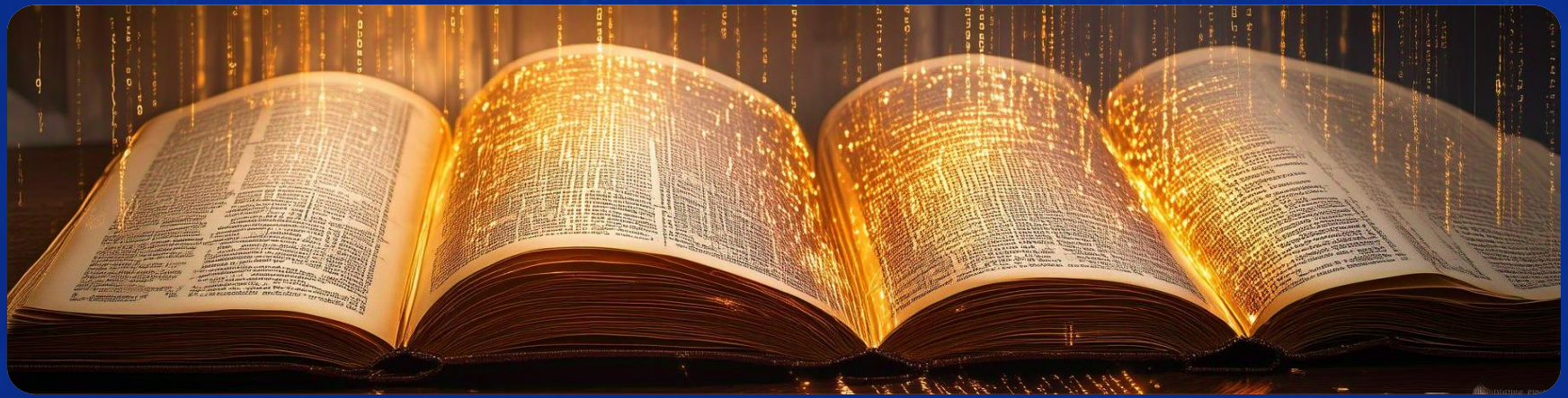
Part1

Review of the Digital Development of Engineering Management in China

中国工程管理数字化发展回顾



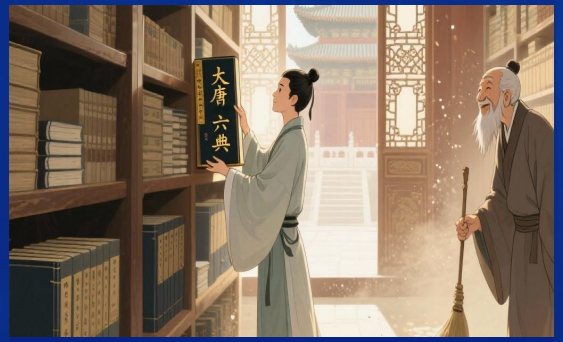
Digital Standards for Early Engineering Management in China
中国早期工程管理数字化规范

The origin of digital standards
数字化规范的起源

The Artificers' Record, which appeared in the 5th century BC, can be regarded as China's earliest "engineering technical standard system."

《考工记》，出现公元前5世纪，堪称中国最早的“工程技术标准体系”

The Historical Evolution of Project Management in China
中国工程项目管理历史演变



"The Six Codes of the Tang Dynasty"

The Codification of Administrative Law for National Project Management

《大唐六典》
国家工程管理的行政法典化

"Yingzao Fashi"

The First Encyclopedia of Architectural Quota Standards

《营造法式》
首部建筑定额标准百科全书

"Engineering Practice Regulations"

The Budget Control System for Official Architecture

《工程做法则例》
官方建筑的预算管控体系

THistorical Genes of Digitalization in China's Modern Engineering
中国现代工程数字化的历史基因

“Four Classics”

collectively established the conceptual framework of ancient Chinese engineering management through Broussonetia papyrifera, forming the "standard-administrative-technical-economic" system.

“四部典籍”
共同构建了中国古代工程管理的思维体系
“标准—行政—技术—经济”

“Core Idea”

"Quantitative standards, controllable processes, data-driven" precisely constitute the historical DNA of modern engineering digitization.

“核心思想”
“量化规范、流程可控、数据驱动”
正是现代工程数字化的历史基因

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Part2

AI Empowers Engineering Consulting Application Scenarios in Practice

AI赋能工程咨询应用场景实践

Investment Scale and Growth of China's Infrastructure Construction in the Past 30 Years

近30年中国基础建设投资规模及增长情况

After 30 years of construction, China has established a massive infrastructure system. Infrastructure investment grew from 411.8 billion in 1995 to 24.9 trillion (RMB)in 2024 , with cumulative investments reaching approximately 256 trillion over the three decades. This includes about 107 trillion in water conservancy and environmental sectors, around 96 trillion in transportation and warehousing industries, and approximately 53 trillionin electricity, gas, and water supply sectors.

经过30年的建设，中国形成了庞大的基础设施。基建投资额从 1995 年的 4118 亿增长至 2024 年 24.9 万亿（RMB），30 年内累计投资额达约 256 万亿，其中水利及环境行业约 107 万亿，交通及仓储行业约 96 万亿，电力燃气及供水行业约 53 万亿。

Scale and Growth of China's Engineering Consulting Industry from 2022 to 2024

2022~2024年中国工程咨询产业规模及增长情况

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Scale and Growth of China's Engineering Consulting Industry (2022-2024)

Year	Revenue Scale (RMB Billion)	YOY Growth Rate
2022	15,298	Baseline Year (No YOY comparison)
2023	14,450	-5.54%
2024	15,211	+5.27%

According to the "2024 Statistical Bulletin on Construction Cost Consulting" issued by China's Ministry of Housing and Urban-Rural Development, the revenue scale of China's cost consulting industry exceeded 1.5 trillion (RMB), accounting for 6% of infrastructure investment.

根据：中国住建部发布的《2024年工程造价咨询统计公报》,中国造价咨询营收规模突破1.5万亿（RMB），占基建投资的6%。

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Application Case 1:
Smart Construction Site Safety Monitoring System

应用案例一：智慧工地安全监测系统

Pain Point Diagnosis
痛点诊断

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The Shenzhen-Zhongshan Corridor Immersed Tube Installation Project requires millimeter-level positioning accuracy (±3mm), with the average miss rate of traditional manual crack inspections reaching 12%.

深圳深中通道沉管安装工程要求毫米级定位精度（±3mm），传统人工巡检裂缝平均漏检率达12%。

In the Shenzhen-Zhongshan Corridor Immersed Tube Installation Project, missed crack inspections extended the rework cycle. Based on a weekly estimate of 120 person-hours, the cost per instance increased by 18%, severely impacting project cost control.

在深圳深中通道沉管安装工程里，裂缝漏检使得返工周期延长，基于周均120人·工时测算，单次成本增加了18%，严重影响了工程成本控制。

Technical Solution
技术方案

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Defect Identification
缺陷识别

In the technical architecture, defect identification using a U-Net segmentation network on 4K images can achieve crack detection at a precision of 0.2mm, providing a high-precision method for detecting small cracks, thus enhancing safety monitoring on smart construction sites.

技术架构中的缺陷识别，4K影像经U - Net分割网络可实现0.2mm级裂缝识别，能精准检测到微小裂缝，为智慧工地安全监测提供了高精度的裂缝检测手段。

Safety Compliance Detection
安全合规检测

The safety equipment recognition model, improved based on YOLOv5, achieves an accuracy rate of 95.2% in detecting behaviors such as not wearing safety helmets or reflective vests, effectively identifying the safety equipment compliance of construction site personnel and ensuring their safety.

基于YOLOv5改进的安全装备识别模型，对未佩戴安全帽/反光衣行为检测准确率达95.2%，可有效识别工地人员安全装备佩戴情况，保障工地人员的安全合规。

Hardware Deployment
硬件部署

Hardware deployment includes fixed monitoring nodes and mobile monitoring units. Fixed monitoring nodes use Hikvision DS-2CD3 series cameras with an IVSS intelligent analysis platform, while mobile monitoring units consist of DJI M300 RTK drones equipped with Zenmuse H20T gimbals (for thermal imaging-assisted crack detection).

硬件部署包括固定监控节点和移动监测单元，固定监控节点采用海康威视DS - 2CD3系列摄像机+IVSS智能分析平台，移动监测单元是大疆M300 RTK无人机搭载禅思H20T云台（热成像辅助裂缝检测）。

Implementation Benefits
实施效益

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01

Inspection Efficiency Improvement
巡检效率提升

After implementing the smart construction site safety monitoring system, the weekly inspection hours per person decreased from 120 hours to 29.5 hours, a reduction of 75.4%. This greatly improved the efficiency of inspection work and saved a significant amount of labor time costs.

实施智慧工地安全监测系统后，单人周巡检工时由120h降至29.5h，降幅达75.4%，大大提高了巡检工作的效率，节省了大量的人力时间成本。

02

Quality Improvement
质量改善

After the system was implemented, the crack omission rate decreased from 8% to 3.2%, effectively reducing the occurrence of undetected cracks, improving project quality, and minimizing potential safety hazards and rework costs due to crack issues.

系统实施后，裂缝漏检率由8%降至3.2%，有效降低了裂缝漏检情况的发生，提高了工程质量，减少了因裂缝问题可能带来的安全隐患和返工成本。

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Application Case 2:
Intelligent Collaborative Design for Airport Engineering

应用案例二：机场工程智能协同设计

Pain Point Diagnosis
痛点诊断

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Collision Conflicts in Multi-Disciplinary BIM Collaboration
多专业BIM协同存在碰撞冲突

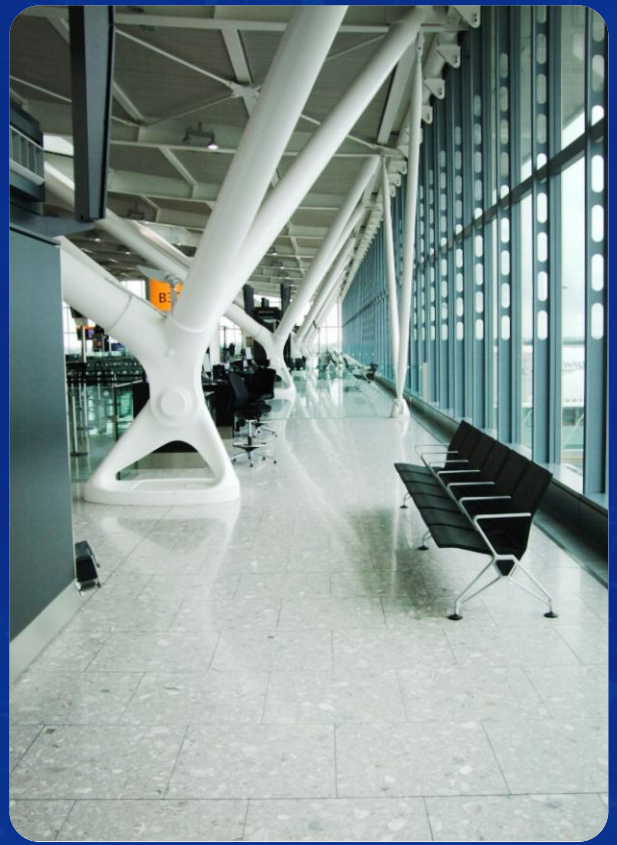
某国际机场（案例数据取自顺丰鄂州机场主体工程）在多专业BIM协同中存在35.7%的碰撞冲突，这严重影响了工程设计的顺利进行，可能导致后续施工出现问题，增加额外的成本和时间。

Time-Consuming Traditional CAD to BIM Format Conversion
传统CAD - BIM格式转换耗时久

传统CAD - BIM格式转换耗时占设计周期32.1%，大量的时间被耗费在格式转换上，使得设计周期延长，降低了设计效率，影响了整个工程的进度安排。

Frequent Structural Design Iterations Leading to Material Waste
结构设计迭代次数多致建材损耗

结构设计阶段平均迭代次数≥5轮，因设计变更导致的建材损耗率达15.3%，频繁的设计迭代不仅增加了成本，还造成了资源的浪费，不利于工程的经济效益。



Technical Solution
技术方案

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BIM Semantic Analysis
BIM语义解析

An automatic extraction model for building elements based on the Transformer architecture achieves an identification accuracy of F1 = 0.91 for doors, windows, pipelines, etc. This model can accurately extract key elements from building information, providing strong support for subsequent design and analysis.

基于Transformer架构的建筑元素自动提取模型，对门窗、管线等识别精度F1 = 0.91。该模型能够准确地从建筑信息中提取关键元素，为后续的设计和分析提供有力支持。

Structural Optimization
结构优化

By applying an improved NSGA-II algorithm with a population size of 500 and 300 iterations, Pareto front solutions are generated under the constraints of a strength coefficient ≥ 1.8 and cost ≤ budget. This effectively optimizes structural design, balancing strength and cost.

应用改进型NSGA - II算法，种群规模500，迭代300代，在强度系数≥1.8、成本≤预算约束下生成Pareto前沿解，可有效优化结构设计，平衡强度和成本。

Toolchain
工具链

Utilizing Revit parametric modeling combined with the Glodon BIM5D clash detection engine (supporting the IFC4.3 standard), these tools work together to enhance the accuracy and coordination of designs, promptly identifying and resolving conflicts in the design.

采用Revit参数化建模 + 广联达BIM5D冲突检测引擎（支持IFC4.3标准），这些工具相互配合，能够提高设计的准确性和协同性，及时发现并解决设计中的冲突。

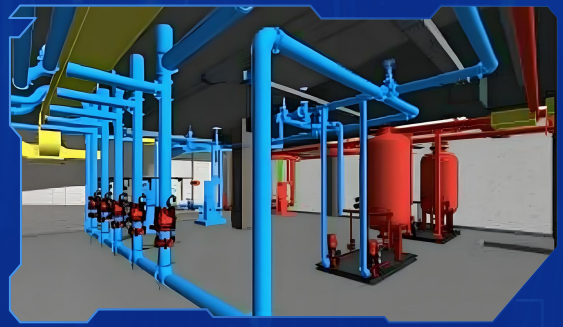
Technical Solution
技术方案

小栗科技 XIAOLI TECHNOLOGY

01 AI-assisted Design Cloud Platform
AI辅助设计云平台

Through prompts, real-life photos, SU model diagrams, and hand-drawn sketches, quickly generate planning intention diagrams, creative concept diagrams, and design renderings.

通过提示词和实景照片、SU模型图、手绘草稿，快速生成规划意向图、创意概念图、设计效果图。



02 AI-automated BIM modeling
AI自动化BIM建模

Through AI algorithms, automatically identify CAD drawings, quickly generate BIM models with consistent drawings and models, achieve multi-disciplinary collaborative design, and support subsequent quantity calculation, drawing review, and operation and maintenance.

通过AI算法，自动识别CAD图纸、快速生成图模一致的BIM模型，实现多专业协同设计，并支持后续算量、图审及运维。

03 Full Lifecycle Management
AI结构设计与优化

Based on generative design and machine learning, automatically generate structural solutions for Broussonetia papyrifera that meet mechanical performance, material cost, and regulatory requirements.

基于生成式设计和机器学习，自动生成满足力学性能、材料成本及规范要求的结构方案。

Implementation Benefits
实施效益

Design Cycle Compression
设计周期压缩

The design cycle was compressed by 41.2% (97 calendar days ahead of the original schedule), significantly reducing the time required for engineering design. This allowed the project to enter the construction phase more quickly, enhancing the overall progress of the project.

设计周期压缩41.2%（较原计划提前97个自然日），大大缩短了工程设计所需的时间，使得项目能够更快地进入施工阶段，提高了整体工程的推进速度。

Reduction in Construction Material Waste Rate
建材浪费率降低

By optimizing the concrete reinforcement plan, the construction material waste rate was reduced to 11.2% (a decrease of 27.5%), effectively minimizing resource waste, lowering project costs, and improving the economic efficiency of the project.

通过优化混凝土配筋方案，建材浪费率降低至11.2%（↓27.5%），有效减少了资源的浪费，降低了工程成本，提高了工程的经济效益。

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Application Case 3: Intelligent Cost Control in Construction Projects

案例三：建设工程智能造价管控

Pain Point Diagnosis
痛点诊断

Traditional Bill of Quantities Review is Time-Consuming
传统工程量清单编审耗时久

The traditional review of the bill of quantities requires engineers to spend an average of 4.8 hours per thousand list items, occupying a significant amount of time and affecting work efficiency, making it difficult for engineers to focus more on other important construction-related tasks.

传统工程量清单编审需消耗工程师日均4.8h/千条清单条目，大量时间被占用，影响工作效率，使得工程师难以将更多精力投入到其他重要的建设工程相关事务中。

High Human Error Rate Leads to Budget Overruns
人工错误率高致预算超支

In case projects, high error rates during the manual review of the bill of quantities led to measurement errors, resulting in budget overruns of 19.3% (compared to the total contract amount), causing significant economic losses to the project.

案例项目因人工在工程量清单编审过程中错误率高，导致计量错误，进而造成预算超支19.3%（对标合同总额），给项目带来了较大的经济损失。

Technical Solution
技术方案

小栗科技 XIAOLI TECHNOLOGY

Automated List Compilation
自动化清单编制

Automated list compilation uses the Xiaoli AI cost robot combined with the Glodon intelligent cost review system, employing advanced technology to replace manual list compilation, improving efficiency and accuracy while reducing human errors.

自动化清单编制采用基于小栗AI造价机器人+广联达智能造价审核系统，利用先进的技术手段替代人工进行清单编制，提高了编制的效率和准确性，减少人为错误。

Intelligent Review
智能审核

The intelligent review is based on an AI cost model, constructing a GB50500 - 2023 standard knowledge graph (including 12 categories and 876 rules) to drive a compliance review engine, which can accurately review according to standards, ensuring the compliance of the list.

智能审核基于AI造价大模型，构建GB50500 - 2023规范知识图谱（含12大类876条规则）驱动合规审查引擎，能够依据规范准确审查，保障清单的合规性。

Implementation Process
实施流程

The implementation process involves interfacing with the Shanghai Steel Union commodity database to obtain real-time prices, followed by AI pre-review, and then annotation by cost engineers to ensure the scientific and accurate control of costs.

实施流程为对接上海钢联大宗商品数据库获取实时价格，然后进行AI预审，接着由造价师标注，，确保造价管控的科学性和准确性。

Technical Solution
技术方案

Glodon & Xiaoli AIToolchain
广联达&小栗AI工具链

The Glodon & Xiaoli AI toolchain automates the process from blueprints to budgeting, increasing efficiency by 2 to 3 times.

广联达&小栗AI工具链实现从图纸到预算的自动化流程，提高效率2~3倍。

Reduced Quantity Takeoff Time
算量时间缩短

Using BIM modeling for quantity takeoff, the construction area of 10,000 square meters reduced the quantity takeoff time from 7 days to 3 days.

通过BIM建模算量，建筑面积1万平方米，算量时间从7天缩短至3天。

Reduced Cost Error
成本误差降低

Cost error decreased from 5% to 1.5%.

成本误差从5%降低至1.5%。

Implementation Benefits
实施效益

Improved List Review Efficiency
清单编审效率提升

The efficiency of list review has improved from the original 4 hours per thousand items to 1.6 hours per thousand items, increasing operational efficiency by 300%, significantly saving engineers' time and enabling them to complete list reviews more efficiently, accelerating project progress.

清单编审效率从原来的4h/千条提升到1.6h/千条，操作效率提高了300%，大大节省了工程师的时间，使他们能更高效地完成清单编审工作，加快项目进程。

Reduced Settlement Deviation Rate and Compressed Audit Cycle
结算偏差率降低且审计周期压缩

By automatically intercepting non-compliant items, the settlement deviation rate was reduced from 3% to 1.5%, while the audit cycle was compressed by 67%, effectively controlling project costs, improving fund utilization efficiency, and ensuring the project's economic benefits.

通过违规项自动拦截，结算偏差率由3%降至1.5%，同时审计周期压缩67%，有效控制了项目成本，提高了资金使用效率，保障了项目的经济效益。

Benchmark Projects in China's Engineering Digitalization
中国工程数字化标杆项目实践

小栗科技 XIAOLI TECHNOLOGY

Shenzhen-Zhongshan Link Project Digital 5G Base Station + Digital Twin System

Features: Control the installation error of immersed tube by ± 3mm.

深中通道项目数字5G基站+数字孪生系统

特点：沉管安装误差控制±3mm。

SF Airport BIM Full-Process Management

Features: As a 3D design+process coordination platform, the design cycle is shortened by 40% and conflicts are reduced by 60%.

顺丰机场BIM全过程管理

特点：为三维设计+过程协调平台，设计周期缩短40%，冲突减少60%。

Xiongan New Area Digital Supervision

Robots automatically review bidding documents, increasing audit efficiency by 300% and reducing violation rates by 85%.

雄安新区数字化监管

机器人自动审核招投标文件，审计效率提升300%，违规率下降85%。

Core Achievements in the Digitalization of the Construction Industry
中国建筑产业数字化核心成就

小栗科技 XIAOLI TECHNOLOGY

Domain	Key Indicators	Current Situation in China	Data Sources
Business Coverage	Digitalization Penetration	100% (Covers Planning/Design/Bidding/Construction/Operation & Maintenance)	*Construction Industry Digitalization White Paper* 2025
Technical Tools	BIM Technology Adoption Rate	Top-grade enterprises: 100%; First-grade enterprises: 85%	MOHURD Annual Assessment 2024
Cost Control	Digital Costing Software Penetration	90% (Local software like **Glodon** holds >70% market share)	iResearch *Engineering Software Report*
Efficiency Gain	Reduction in Design Cycle	40% (via BIM Collaboration Platform)	SF Express Airport Project Measured Data
Safety Incidents	Decline in Accident Rates	90% (IoT + AI Early Warning)	Xiongan New Area Regulatory Platform Data

Digital Transformation vs. Intelligent Leap
数字化转型 vs 智能化跃迁

Value of Digital Transformation
数字化转型价值

Data Standardization and Process Automation, Value Increased by 2 Times.

数据标准化、流程自动化，价值提升2倍。

Value of Intelligent Leap
智能化跃迁价值

AI Understanding, Generation, and Decision-Making Capabilities, Value Increased by 10 to 100 Times.

AI理解、生成、决策能力，价值提升10倍至100倍。

Evolution Path: Tool - Production - Management Closed Loop
方法路径：工具—生产—管理闭环

小栗科技 XIAOLI TECHNOLOGY

Evolution Path of Technological Tools
技术工具进化路径

From CAD to BIM to Platform Integration, Achieving Multi-System Integration and Solving Data Fragmentation Issues.

从CAD到BIM再到平台集成，实现多系统集成，解决数据割裂问题。

Productivity Revolution Ladder
生产力革命阶梯

From Cast-in-Place to Prefabrication to Robotic Operations, Achieving a Leap from Human Dependency to Machine Autonomy.

从现浇到装配式(装配率40%)，再到机器人作业，实现人力依赖到机器自主的跨越。

Reconstruction of Production Relations
生产关系重构

From Decentralized Management to Data Collaboration to Intelligent Decision-Making, Achieving Full-Chain Data Interconnection and AI-Assisted Decision-Making.

从分散管理到数据协同，再到智能决策，实现全链条数据互通和AI辅助决策。

Intelligent Spiral Reconstruction
智能化螺旋式重构

Intelligence: It is the spiral reconstruction of tool carriers, work methods, and organizational mechanisms. Missing any link breaks the closed loop.

智能化：是工具载体、作业方式、组织机制三者的螺旋式重构，缺一环则闭环断。

Tools 工具

Technology provides new tools.

Production生产

The upgrade of production methods forces management transformation.

生产方式升级倒逼管理变革

Management 管理

Intelligent management feeds back into technology optimization.

管理智能化反哺技术优化

Core Challenges Faced
面对的核心挑战

Data Island Problem:
数据孤岛问题：

Data Integration and Unification: Eliminate data islands, establish a standardized governance system, and ensure the integrity and consistency of AI training data.

数据整合统一： 消除数据孤岛，建立标准化治理体系，确保AI训练数据的完整性与一致性。

Agility Challenge:
敏捷挑战：

System Platform Streamlining: Integrate complex platforms, simplify operational processes, achieve automated unified management, and improve efficiency.

系统平台精简： 整合繁杂平台，简化操作流程，实现自动化统一管理，提升效率。

Talent Scarcity:
人才稀缺：

Organizational Capability Reshaping: Encourage employees to master AI toolchains (such as prompt engineering and model fine-tuning) and strengthen cross-domain knowledge integration.

组织能力重塑：鼓励员工掌握AI工具链（如Prompt工程、模型微调），强化跨领域知识融合。

小栗科技
XIAOLI TECHNOLOGY

There is a Chinese idiom that says Conversant with both ancient and modern learning

中国有句成语“博古通今”！

AI is no longer merely a productivity tool, but a "second brain" akin to homo sapiens—an intelligent partner capable of dynamic learning, collaboration, and evolution.

AI已不是简单的生产力工具，而是人类的“第二大脑”，
一个能动态学习、协作、进化的智能伙伴。

Welcome to China!
欢迎大家来中国！

崔立明小栗科技

中国大陆 北京

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ON THE FULL LIFECYCLE INVESTMENT CONTROL OF IPD PROJECT MANAGEMENT

论IPD项目管理全生命周期投资管控

Presenter: Yingchao Han

YINGCHAO HAN

韩英超，国家注册造价工程师，天津理工大学IPPCE研究所外聘导师及研究生企业导师，注册建造师，工程建设纠纷调解员，EPC总咨询师；工程造价专家辅助人联盟成员，国宏新型城镇化发展联盟理事、特聘专家；山西瀚芳建设管理有限公司董事长，海天工程咨询有限公司忻州分公司总经理，在天津理工大学IPPCE研究所所长、尹皇智库研究院创始人、中国民航大学学术院长尹贻林教授的指导下，主要研究方向：建设项目全生命周期全过程投资管控、建设项目BIM技术综合价值交付、造价工程师及建设项目的首席经济学家、低

More Information about the speaker:Class1 Cost Engineer, External Instructor of IPPCE Research Institute of Tianjin Polytechnic University, Constructor, Mediator of Engineering Disputes, Member of the Union of Auxiliary Personnel of Experts in Engineering Costing.Council Member and Specially-Appointed Expert of the Guohong Alliance for New Urbanization Development, Chairman of Shanxi Hanfang Construction Management Co.,and General Manager of Xinzhou Branch of Haitian Engineering Consulting Co., Ltd.

Under the guidance of Prof. Yin Yilin, Director of IPPCE Research Institute of Tianjin Polytechnic University, his main research directions are: investment control and management of the whole process of the whole life cycle of a construction project, integrated value delivery of BIM technology for construction projects, and cost engineers are the chief economists of construction projects.Council Member and Specially-Appointed Expert of the Guohong Alliance for New Urbanization Development.Integrated Development of

IPD Project Management
【IPD项目管理】

IPD (Integrated Project Delivery) project management is an integrated product development method that achieves a market demand-oriented integrated product development management model through cross-functional team collaboration, full lifecycle management, and concurrent engineering. It emphasizes multi-party collaboration, shared risks, and shared benefits, with the aim of establishing a comprehensive consulting function system and a cost engineer-led concurrent economic accounting system throughout the entire project lifecycle investment control.

IPD（Integrated Project Delivery，集成项目交付）项目管理是一种集成产品开发（Integrated Product Development, IPD）方法，通过跨职能团队合作、全生命周期管理、并行工程等手段实现以市场需求为导向的集成化产品开发管理模式。强调多方协作、风险共担和利益共享,主旨在项目全生命周期投资管控建立总咨询师职能体系和造价工程师主导的并行经济核算系统。

Chief Consultant
【总咨询师】

Establish a comprehensive consultant functional system (IPMT - Integrated Portfolio Management Team), integrating team resources and information to begin efficient collaboration during the preparation phase, ultimately enhancing the overall value of the project throughout its entire lifecycle (including investment, design, quality, cost, schedule, contracts, information, and sustainability). This involves optimizing resources, reducing costs, and improving quality and efficiency (effectiveness, efficiency, and performance).

建立总咨询师职能体系（IPMT (Integrated Portfolio Management Team, 集成组合管理团队)），整合团队资源和信息，筹备阶段开始高效协同，最终提升项目全生命周期整体价值（包括投资、设计、质量、成本、进度、合同、信息和可持续性）。开源节流、提质增效（效益、效率、效能）。

Chief Economist
【首席经济学家】

PD project management investment control is a value-oriented decision-making process, which conducts value assessment based on market demand and business objectives, rather than solely considering technology or cost. From the initiation of the project, the source and method of funding are determined. The flow of funds is controlled throughout the funding planning, raising, operation, accounting, and operation and maintenance processes, and a full lifecycle funding plan is established. The estimation serves as the target, while the budget serves as the limit. Through budgeting, settlement, final accounts, and operation and maintenance calculations, the project's full lifecycle funding targets are dynamically controlled. The economic operation status is analyzed, calculated, and reviewed by the cost engineer, who is also the chief economist.

PD项目管理投资管控是价值导向决策，基于市场需求和商业目标进行价值评估，而非单一技术或成本考量。立项开始，确定资金来源及方式，在资金计划、筹措、运行、核算、运维中控制资金流向，确定全生命周期资金计划方案。估算为目标、概算为限额，通过预算、结算、决算、运维测算，动态控制项目全生命周期资金目标。其经济运行状况由造价工程师分析、测算、审核，造价工程师是首席经济学家。

Dispute review
【争议评审】

During the project planning stage, a three-member dispute review panel consisting of a construction lawyer and a senior cost engineer is established. The cross-functional team recommends the team leader, while the contractor and the contractor each recommend one team member. The policy serves as the guide, the law as the core, the norms as the premise, the facts as the basis, with a people-oriented approach, collaborative empathy, timely guidance, to avoid disputes, save costs, and enhance efficiency

项目策划阶段设立由建工律师和资深造价工程师组成的争议评审三人组，跨职能团队推荐组长，发包方、承包方各推荐一名组员。政策为导向，法律为棕绳，规范为前提，事实为依据，以人为本，协同共情，及时疏导，避免纠纷，节支增效。

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IIPD (Integrated Project Delivery) project management is a method of Integrated Product Development (IPD), which achieves a market-driven integrated product development management model through cross-functional team collaboration, full lifecycle management, concurrent engineering, and other means. In the field of construction project management, it is an advanced project delivery model that emphasizes multi-party collaboration, risk sharing, and benefit sharing. The main purpose is to establish a general consultant functional system and a parallel economic accounting system led by cost engineers throughout the project lifecycle.

PD（Integrated Project Delivery，集成项目交付）项目管理是一种集成产品开发（Integrated Product Development, IPD）方法，通过跨职能团队合作、全生命周期管理、并行工程等手段实现以市场需求为导向的集成化产品开发管理模式。在建设项目管理领域，是一种强调多方协作、风险共担和利益共享的先进项目交付模式。主旨为在项目全生命周期建立总咨询师职能体系和造价工程师主导的并行经济核算系统。

VS

PD emphasizes the formation of cross-functional teams (such as R&D, marketing, sales, production, and other departments) that participate in decision-making from the early stages of a project to ensure that the needs of all links are fully integrated. The core of this approach is to establish an IPMT (Integrated Portfolio Management Team) team with all stakeholders (such as the contracting party, project management team, functional management team, contractor, etc.), jointly set project goals, share risks and rewards, and utilize advanced technologies and tools for project coordination and communication. It not only breaks down traditional departmental barriers but also achieves more efficient decision-making and execution through diversified professional knowledge and skills.

PD强调组建跨职能团队（如研发、市场、销售、生产等部门），在项目初期就共同参与决策，确保各环节需求被充分整合。其核心是将所有利益相关者（如发包方、项目管理团队、职能管理团队、承包商等）建立IPMT (Integrated Portfolio Management Team, 集成组合管理团队)团队，共同制定项目目标、共享风险和奖励，并利用先进的技术和工具进行项目协调和沟通。它不仅打破了传统的部门壁垒，还通过多元化的专业知识和技能，实现了更高效的决策和执行。

THE CORE CONCEPT OF IPD PROJECT MANAGEMENT DIFFERS FROM TRADITIONAL PROJECT MANAGEMENT

01 IPD项目管理的核心理念与传统项目管理的区别

The core concept of IPD project management

（一）IPD项目管理的核心理念

1	2	3	4	5	6
Early participation from multiple parties 多方早期参与	Sharing risks and benefits 风险与利益共享	Collaborative decision-making mechanism 协同决策机制	Information transparency 信息透明化	Highly unified goals 目标高度统一	Strict fund management 资金管理严谨
Key stakeholders such as the owner, project management team, designer, contractor, subcontractor, and supplier jointly participate in decision-making during the project preparation stage. 业主、项目管理团队、设计师、承包商、分包商、供应商等关键方在项目筹备阶段即共同参与决策	All parties are bound by an agreement to share common goals, risks, and rewards 各方通过协议绑定共同目标，风险共担、奖励共享	Establish a chief consultant functional system for centralized management, with key decisions requiring consensus from multiple parties 建立总咨询师职能体系，集中管理，关键决策需通过多方共识	Relying on technologies such as BIM, we can achieve real-time data sharing and reduce information silos. 依托BIM等技术实现数据实时共享，减少信息孤岛。	The contract stipulates the core indicators of the project, and all members are responsible for achieving the goals. 合同约定项目核心指标，所有成员为目标负责。	Establish a system for cost planning, accounting, and revenue and expenditure alignment, share financial data, and avoid financial risks 建立成本计划、核算、收支对应体系，财务数据共享，避免财务风险

01 CORE PRINCIPLES OF IPD PROJECT MANAGEMENT AND DIFFERENCES FROM TRADITIONAL PROJECT MANAGEMENT

01 IPD项目管理的核心理念与传统项目管理的区别

Differents Between IPD Project Management and Traditional Project Management

（二）IPD项目管理与传统项目管理的区别

DBB Project Management
DBB项目管理

Linear phased model, owner or design-led decision-making, execution based on drawings, instructions, and specifications, task completion and product delivery; adversarial contracts, independent risk bearing, full-process cost phase management, frequent changes prone to cost overruns, potential use of BIM,fragmented information.

线性阶段性模式，业主或设计主导决策，按照图纸、指令、规范要求去做，完成任务交付，产品交付；合同对立，独立承担风险，全过程造价阶段管理，变更频繁、易超概，可能使用BIM，信息分散。

EPC Project Management
EPC项目管理

Single integrated management model, owner-led, delivering value and functionality per client requirements and functional needs;opposing interests with relative collaboration, each party bearing risks, construction optimization, single integrated management throughout the process,target cost constraints, BIM information sharing,centralized information.

单一集成管理模式，业主主导，按照发包人要求、功能需求去做，价值功能交付；利益对立，相对协作，各自承担风险，施工优化，全过程单一集成管理，目标成本约束，BIM信息共享，信息集中。

IPD Project Management
IPD项目管理

Integrated Product Development Management Parallel joint integration model, multi-party collaborative decision-making, adapting to market demands, seeking market equilibrium, aligning with environmental ecosystems, and providing full lifecycle services. Emphasizes shared objectives and risk- sharing, early optimization, and rigid target co constraints. BIM serves as the collaboration core, enabling real-time data sharing and team synergy to pursue project success.

集成化产品开发管理并行的联合集成模式，多方协同决策，适应市场需求，寻求市场平衡，适应环境生态圈，全生命周期服务。强调目标利益共享和风险共担，早期优化，目标成本刚性约束。BIM 为协同核心，数据实施共享，团队共同努力，追求项目成功。

02 ADVANTAGES AND APPLICABLE SCENARIOS OF IPD PROJECT MANAGEMENT

02 IPD 项目管理的优势及适用场景

Adcantages of IPD Project Management

一、IPD 项目管理的优势

The Integrated Portfolio Management Team (IPMT) oversees strategic direction, investment decisions, portfolio management, resource allocation, and technical review of decisions.Team collaboration fosters mutual success, reduces litigation rates,promotes long-term partnerships, and ensures sustainahle relationships.

由IPMT（Integrated Portfolio Management Team，集成组合管理团队）：负责战略方向、投资决策、组合管理、资源分配,及决策技术评审。团队协作共赢，降低诉讼率，促进长期合作，关系可持续。

IPD project management significantly enhances product development efficiency through concurrent engineering and cross-functional team collaboration. Concurrent engineering reduces rework, clarifies critical paths, and shortens development cycles, while cross-functional teamwork improves decision-making and execution efficiency, enabling faster new product launches.

IPD项目管理通过并行工程和跨职能团队合作，大幅提高产品开发的效率。并行工程减少返工，关键路径更清晰，缩短开发周期，而跨职能团队合作可提高决策和执行效率，更快速地推出新产品。

IPD project management leverages cross-functional team collaboration, enabling departments to participate early in product development and provide specialized recommendations to resolve potential issues. By implementing full lifecycle management with advanced technical expertise, it ensures phased optimization, mitigates design flaws, and enhances overall product quality.

IPD项目管理通过跨职能团队协作，各职能部门在产品开发早期参与，提出专业性建议和意见，解决潜在问题；全生命周期管理专业技术前置，确保阶段优化，规避设计缺陷，提高产品的整体质量。

IPD project management enables enterprises to rapidly respond to market demands, integrate into the market environment, drive new technologies, and enhance competitiveness by optimizing product development processes and improving team collaboration efficiency.

IPD项目管理通过优化产品开发流程和提高团队协作效率，使企业快速地响应市场需求，融入市场环境，推动新技术，增强竞争力。

IPD Project Management: Comprehensive funding plan across the entire lifecycle with phased control. Resource optimization through unified planning of R&D, production, and other stages to reduce trial-and-error costs. Early contractor involvement optimizes design, minimizes changes, and prevents waste. Shared risk and shared savings among teams enhance cost-effectiveness.

IPD项目管理全生命周期资金总体计划，分段控制。资源优化，统一规划研发、生产等环节，降低试错成本。早期承包商介入优化设计，减少变更，避免浪费。团队风险共担、共享节约收益，提升性价比。

IPD项目管理是一种公平透明高效集成的先进管理方法。

IPD project management is an advanced management approach characterized by fairness, transparency, efficiency, and integration.

02 ADVANTAGES AND APPLICABLE SCENARIOS OF IPD PROJECT MANAGEME

02 IPD 项目管理的优势及适用场景

（二）IPD Project Management Application Scenarios

IPD 项目管理适用场景

IPD project management is particularly well-suited for the following types of projects:

IPD 项目管理尤其适合以下类型项目：

For example: hospitals, laboratories, large-scale infrastructure projects, comprehensive land management initiatives

如：医院、实验室、大型基础设施、土地综合治理

Requires integration of multiple technologies: such as the low-altitude economy

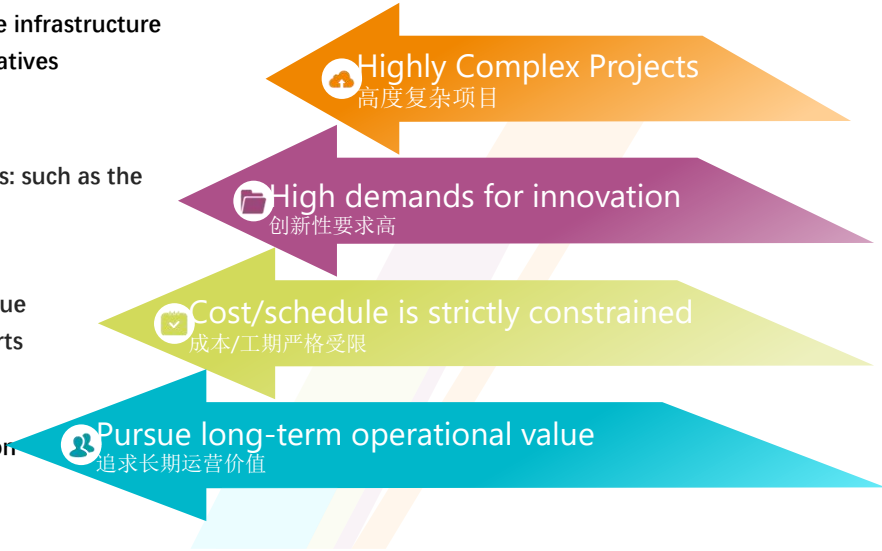
需要整合多种技术：例如低空经济

For example: disaster relief, emergency rescue operations, and other emergency response efforts

如：救灾、抢险等应急抢险

For example: green buildings, smart construction

如：绿色建筑、智能建造



03 IPD项目管理的实施流程 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT

IPD project management integrates portfolio management through cross-functional team collaboration, full lifecycle management, and concurrent engineering.

IPD 项目管理通过跨职能团队合作、全生命周期管理、并行工程等手段集成组合项目管理。

Cross-functional team collaboratio

（一）跨职能团队协同：

跨职能团队合作是核心要素之一，是IPD项目管理的基石，通过将不同职能部门的人员整合到一个团队中，打破了信息孤岛，促进了知识共享与协作。这样的团队通常包括策划、造价、设计、质量、建造、法律、财务（研发、市场、供应链、财务）等多个部门的代表，各自带来专业视角和经验。

通过资格审核确定总咨询师，建立总咨询师职能体系，组建（IPMT (Integrated Portfolio Management Team)）集成组合管理团队，通过整合团队资源和信息，从项目筹备阶段开始实现高效协同，最终提升项目全生命周期整体价值（包括投资、设计、质量、成本、进度、合同、信息和可持续性）。开源节流、提质增效（效益、效率、效能）。建立决策评审机制（DCF）、对PDT进行技术评审（RT）。见IPE流程概览图

跨职能团队IPMT (Integrated Portfolio Management Team, 集成组合管理团队)以总咨询师为核心领导，成立联合项目管理办公室（JPO），由PDT项目管理团队（管理层）和CDP职能管理团队（执行层）构成。统筹管理、协调沟通、目标控制。见项目目标控制图

Cross-functional team collaboration

（一）跨职能团队协同：

Cross-functional teamwork is one of the core elements and the cornerstone of IPD project management. By integrating personnel from different functional departments into a single team, it breaks down information silos and promotes knowledge sharing and collaboration. Such teams typically include representatives from multiple departments such as planning, cost estimation, design, quality, construction, legal, and finance (R&D, marketing, supply chain, finance), each contributing their specialized perspectives and expertise.

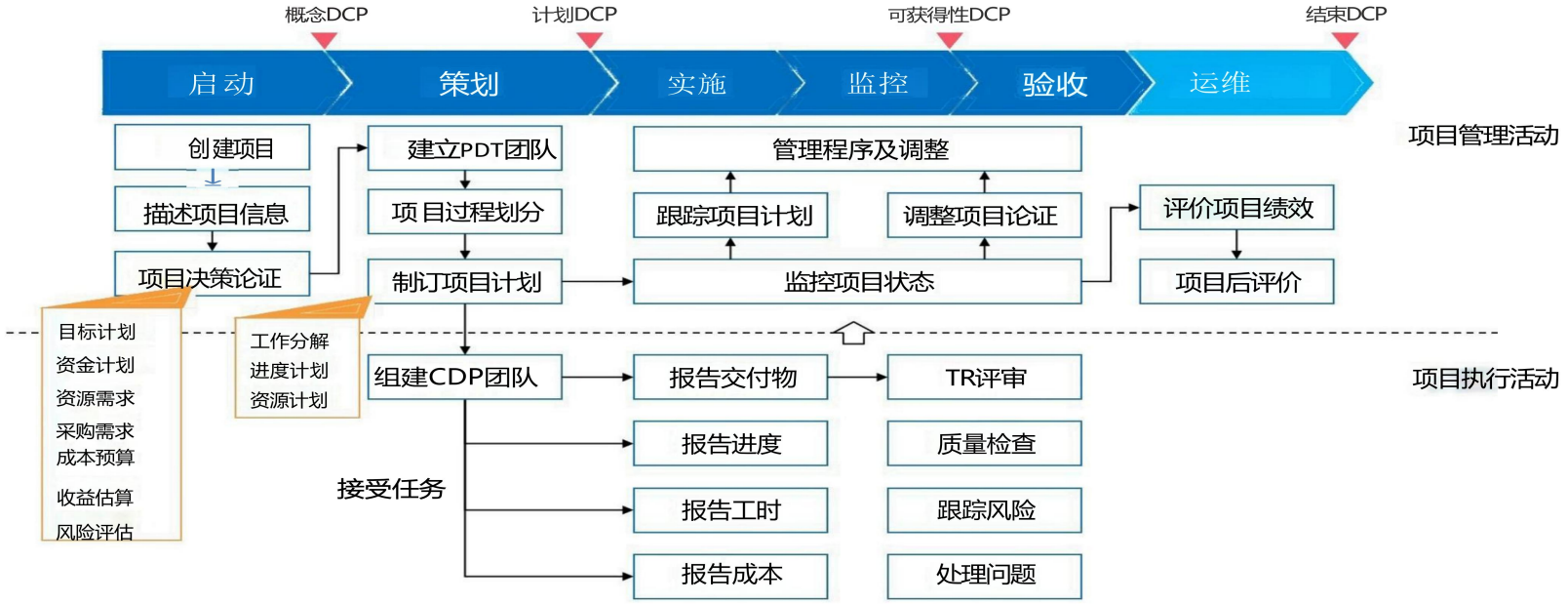
The Chief Consultant is selected through qualification review, establishing a Chief Consultant functional system. An Integrated Portfolio Management Team (IPMT) is formed to integrate team resources and information, enabling efficient collaboration from the project preparation stage to ultimately enhance overall value across the project lifecycle (including investment, design, quality, cost, schedule, contracts, information, and sustainability). Cut costs and increase revenue while improving quality and efficiency (benefits, efficiency, effectiveness). Establish a Decision-Making Review Process (DCP) and conduct technical reviews (RT) for the Project Design Team (PDT). See IPD Process Overview Diagram.

The cross-functional Integrated Portfolio Management Team (IPMT) is led by the Chief Consultant and establishes a Joint Project Office (JPO). This office comprises the PDT Project Management Team (management level) and the CDP Functional Management Team (execution level). It oversees management, coordinates communication, and controls objectives. See the Project Objective Control Chart.

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT

IPD项目管理的实施流程

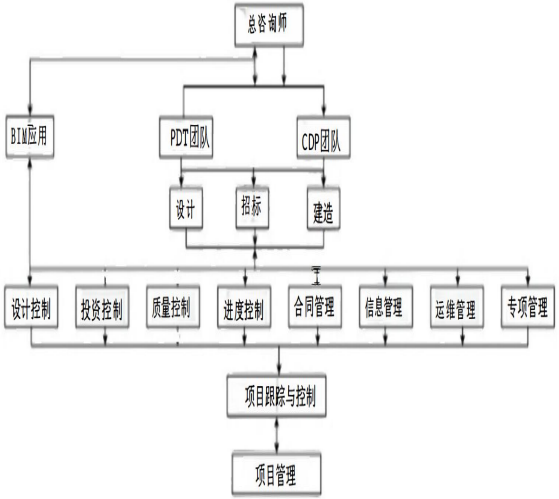
IPD项目管理流程概览



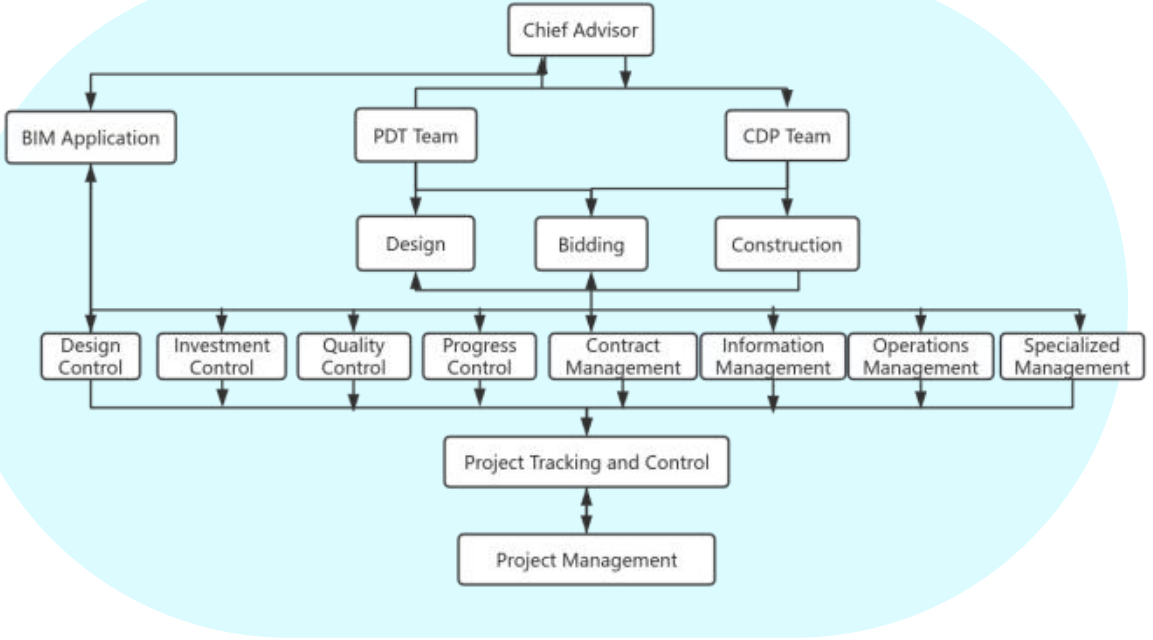
03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT

IPD

项目目标管理图



Project Objective Management Chart

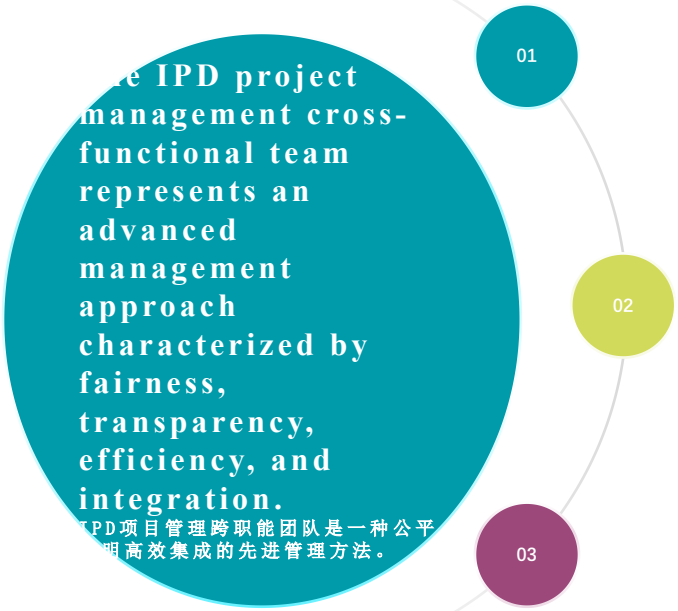


BIM"一站式"联动服务

BIM One-Stop Integrated Services

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT

03 IPD项目管理的实施流程



Knowledge Sharing and Collaboration

知识共享与协作

Cross-functional teams ensure information flows swiftly through regular meetings and communication mechanisms. This knowledge sharing not only enhances overall team efficiency but also prevents redundant work and errors.

跨职能团队通过定期的会议和沟通机制，使得信息能够在团队内迅速传递。这样的知识共享不仅提高了团队的整体效率，还能避免重复劳动和错误。

High-Efficiency Decision-Making and Execution

高效决策与执行

In cross-functional teams, representatives from various departments can directly participate in the decision-making process, enabling faster and more effective decisions. This efficient decision-making mechanism not only shortens project cycles but also increases project success rates.

跨职能团队中，各职能部门的代表能够直接参与决策过程，使得决策更为迅速和有效。这种高效的决策机制不仅缩短了项目周期，还能提高项目的成功率。

Functional Deployment and Organizational Structure

职能部署与建制

Project Initiation Establishes Organizational Structure (JPO), with the PDT Project Management Team planning the project. Responsible for top-level design, construction implementation, functional configuration, as well as social benefits, economic returns, and natural impacts. The task concludes upon successful project acceptance and handover. The CDP functional management team maintains the project. Starting from project inception, they progressively assume responsibilities based on functional requirements, handling construction, security, daily operations, and maintenance. This includes: construction and manufacturing, process flows, equipment safety, green space maintenance, property management, etc. Personnel are fully deployed upon successful project acceptance and handover, with responsibilities extending throughout the product's entire lifecycle.

项目起始建立组织机构（JPO），由PDT项目管理团队策划项目，负责顶层设计、建设落地、功能配置以及社会效益、经济收益和自然效应等，项目验收合格、交付后任务结束；CDF职能管理团队维护项目，自项目设立根据功能需求逐步进场，负责建造、安保、日常运营及养护等：比如：建设制造、工艺流程、设备安全、绿地养护、物业管理等，项目验收合格交付时人员配置齐全，任务直至产品全寿命。

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT

03 IPD项目管理的实施流程

Full Lifecycle Management
（二）全生命周期管理

1. Fundamental Theory of IPD Project Management Throughout the Entire Lifecycle

1. IPD项目管理全生命周期基本理论

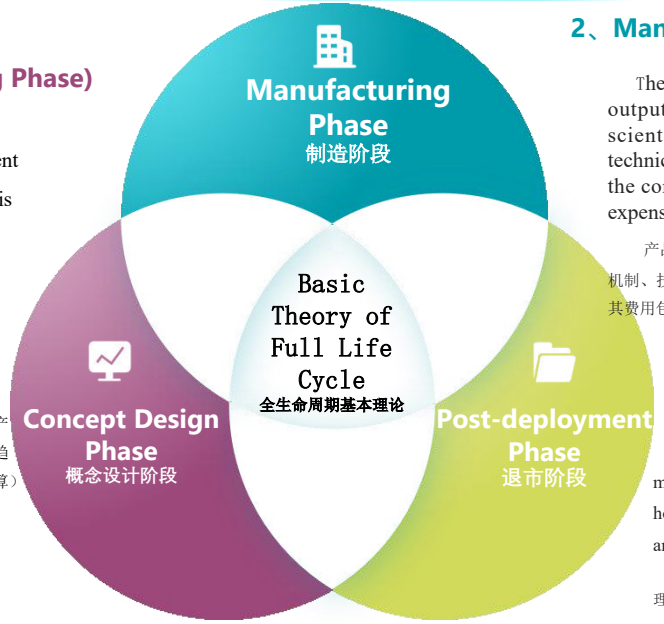
Another key feature of IPD project management is its full lifecycle approach, which emphasizes comprehensive oversight from concept design and manufacturing through to product discontinuation. This ensures optimization and control at every stage. Covering the entire journey from concept to discontinuation, it reduces iteration cycles and mitigates risks through concurrent engineering. Standardized, systematic processes and tools—such as R&D management systems and BIM (Building Information Modeling)—ensure projects advance according to schedule while enhancing transparency and efficiency.

IPD项目管理中全生命周期管理是另一大特色，它强调对产品从概念设计、制造到退市的全程管理，确保每一个阶段都得到优化和控制。覆盖从概念到退市的全过程，通过并行工程减少迭代次数，降低风险。采用标准化、系统化流程，流程工具（如研发管理系统、BIM建筑信息模型）确保项目按计划推进，提高透明度和效率。

1、Concept Design Phase (Project Planning Phase)
概念设计阶段（项目策划阶段）

During the concept design phase, full lifecycle management emphasizes thorough market research and requirements analysis to ensure product designs meet market demands and customer expectations. This approach enables project teams to better understand market trends and client needs, resulting in more competitive products. It also ensures the feasibility of product funding plans (investment estimates) and projected returns.

在概念设计阶段，全生命周期管理强调详细市场调研和需求分析，确保产品的设计能够满足市场需求和客户期望，确保项目团队能够更好地理解市场趋势和客户需求，设计出更具竞争力的产品，确保产品资金计划投入（投资估算）和预期收益可考性。



2、Manufacturing Phase (Project Construction Phase)
制造阶段（项目建设阶段）

The manufacturing stage of a product determines its value-functional output, defining its quality, performance, and price point. Through scientific and innovative means such as coordination mechanisms, technical solutions, process flows, and material optimization, it forms the commodity's value and use value. Its costs include: manufacturing expenses, financial expenses, and selling expenses.

产品的制造阶段决定产品的价值功能输出，决定产品的质量、性能、价位。通过协调机制、技术方案、工艺流程、材料优选等科学创新的手段形成商品化的价值与使用价值，其费用包括：制造费用、财务费用和销售费用。

3、Post-deployment Phase (Project Operations and Maintenance Phase)
退市阶段（项目运维阶段）

Product discontinuation management is a critical component of full lifecycle management, emphasizing detailed planning and oversight. Key considerations include how to handle inventory of discontinued products, how to notify customers and partners, and what after-sales service arrangements to implement.

产品退市管理是全生命周期管理的重要组成部分，强调详细的规划和管理。例如，如何处理退市产品的库存、如何通知客户和合作伙伴及售后服务方案等，都是需要认真考虑的问题。

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT
03 IPD项目管理的实施流程

（二） 全生命周期管理

（二）Full Lifecycle Management

2. IPD项目管理全生命周期流程控制要点

根据建设产品具有单一性、特殊性、专属性，其全生命周期项目管理独具模式。IPD项目管理中总咨询师职能建制IPMT（Integrated Portfolio Management Team，集成组合管理团队），运用数字技术通过设计控制、投资控制、质量控制、进度控制（四控），实现合同管理、信息管理、运维管理（三管理）的高质量管理，应用国家政策、规范、标准，采用管理程序和经验协调发包方与承包方的关系（一协调）达到项目效益最大化，通过BIM一次建模重复使用“一站式”数字技术创建文明、快捷的全方位项目集成管理模式（见项目管理控制图）

IPD项目管理全生命周期采用总咨询师例会制度。IPMT (Integrated Portfolio Management Team, 集成组合管理团队)编制IPD项目管理规划和专业细则，明确项目的实施目标、范围、责任和工作计划，确保一致性方案，第一次例会相关者参议通过。

建设项目全生命周期以招投标之日和工程竣工验收合格之日为时点，分为项目建设前期、项目建设期、项目运维期。项目管理包括项目建议书、可行性研究报告、投资决策、方案设计、初步设计、招投标、发承包、施工、竣工验收、试运行、竣工验收合格、运营维护的系统服务，每个阶段都具有可持续性、延展性。

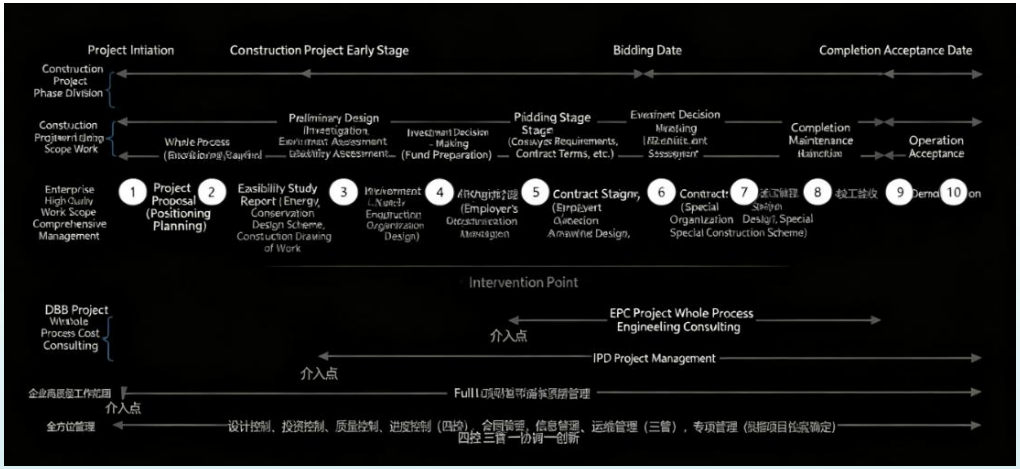
2. Key Process Control Points for the Full Lifecycle of IPD Project Management

Given the singularity, specificity, and exclusivity of construction products, their full lifecycle project management adopts a unique model. Within IPD project management, the Chief Consultant establishes the IPMT (Integrated Portfolio Management Team). Leveraging digital technology, it implements high-quality management through design control, investment control, quality control, and schedule control (the Four Controls), thereby achieving contract management, information management, and operations management (the Three Managements). By applying national policies, regulations, and standards, and employing management procedures and expertise to coordinate relationships between clients and contractors (coordination), it maximizes project benefits. Through BIM's one-time modeling and repeated use of “one-stop” digital technology, it establishes a civilized, efficient, and comprehensive project integration management model (see Project Management Control Chart).

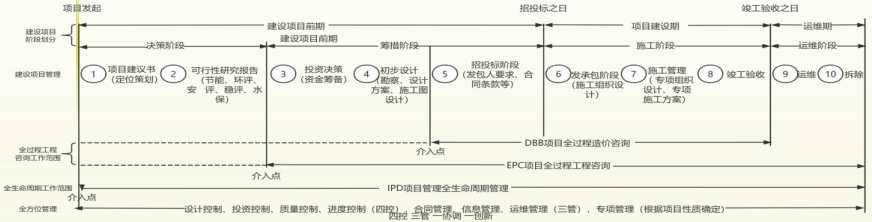
The IPD project management lifecycle employs a Chief Consultant regular meeting system. The IPMT (Integrated Portfolio Management Team) develops the IPD project management plan and specialized guidelines, defining project implementation objectives, scope, responsibilities, and work schedules to ensure consistent solutions. The plan is reviewed and approved by relevant stakeholders at the first regular meeting.

The entire lifecycle of a construction project spans from the date of bidding to the date of successful completion and acceptance, divided into three phases: pre-construction, construction, and operation and maintenance. Project management encompasses systematic services including project proposals, feasibility studies, investment decisions, schematic design, preliminary design, bidding and tendering, contracting, construction, completion acceptance, trial operation, final acceptance, and operational maintenance. Each phase exhibits sustainability and scalability.

03 IPD项目管理的实施流程



项目全生命周期全过程工程咨询流程图



03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT

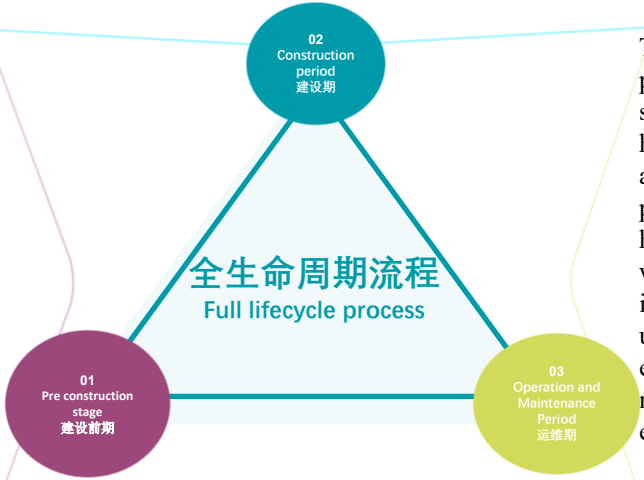
03 IPD项目管理的实施流程

In accordance with the principles of 'comprehensive planning, proactive strategy, implementation and enforcement, and dynamic adjustment', the chief consultant and the Integrated Portfolio Management Team (IPMT) establish a linkage mechanism to coordinate effectively and make dynamic adjustments. The DPT project management team is responsible for managing tasks, determining the design of construction drawings, reviewing the drawings, and optimizing designs; preparing construction organization design, overall project schedule, material and equipment procurement plan, and bidding plans for special project estimated costs (material estimated costs); establishing funding allocation schemes, progress payment plans, quality assurance measures, safety assurance measures, emergency plans, and risk control measures; providing technical support, implementing plan preparation, clarifying responsibilities, and inspecting and supervising project progress. The CDP functional management team is responsible for executing tasks, tracking actual progress based on the overall construction schedule and individual project schedules, paying attention to critical nodes, controlling key procedures, analyzing factors that affect progress, and dynamically adjusting the schedule; improving project functional service performance, implementing operational requirements, equipment maintenance, and handling daily affairs.

本着“整体预案、策划先行、贯彻落实、动态调整”的原则，总咨询师及IPMT (Integrated Portfolio Management Team, 集成组合管理团队)建立联动机制，统筹协调，动态调整。DPT项目管理团队负责管理任务，确定施工图设计，对施工图纸会审，设计优化编制施工组织设计、工程总进度计划、材料设备进场计划、专业工程暂估价（材料暂估价）招标计划；确立资金分配方案、进度款支付计划，质量保证措施、安全保障措施、应急预案及风险管控措施等；提供技术支撑及实施方案编制、交底，检查、监督项目进展情况。CDP职能管理团队负责执行任务，根据总施工进度计划表及单项工程进度计划，跟踪实际进度，关注关键节点，控制关键程序，分析进度影响因素，动态调整进度计划；完善项目功能服务性能、落实实施需求、设备维护及日常事务处理等。

The Integrated Portfolio Management Team (IPMT) plans projects based on national policy guidance, social development, economic needs, regional layout, ecological balance, and other local conditions. It prepares project proposals, follows client requirements and project functional needs, evaluates their feasibility and necessity, and defines project goals and scope, basic tasks, and technical plans. ① Conduct feasibility analyses to assess the technical, economic, and environmental feasibility of the project. ② Carry out preliminary design to determine the basic design scheme of the project.

IPMT (Integrated Portfolio Management Team, 集成组合管理团队)，根据国家政策导向、社会发展、经济需求、区域布局、生态平衡等因地制宜策划项目，编制项目建议书，遵循客户要求和项目功能需求，论证其可行性、必要性，确定项目目标和范围、基本任务和技术方案。①进行可行性分析，评估项目的技术、经济和环境等方面的可行性。②进行初步设计，确定项目的基本设计方案。



The IPMT (Integrated Portfolio Management Team) prepares an operational management implementation service plan, project service plan, and organizes the handover procedures. After the project's completion acceptance by the PDT project management team, the project construction tasks are concluded, and the handover is completed; the CDP manager continues with management, maintenance, and operations, which include a series of tasks such as building maintenance, upkeep, management, and monitoring (such as real estate property management, infrastructure maintenance, and maintenance of industrial building equipment). 1. Overall delivery; 2. Periodic delivery.

IPMT (Integrated Portfolio Management Team, 集成组合管理团队)编制运维管理实施服务方案、项目服务计划、组织办理移交手续。PDT项目管理团队竣工验收后，结束项目建设任务，交接退场；CDP经理接续管理、维护运营，包括建筑维护、保养、管理和监控的一系列工作（如房地产物业管理、基础设施养护、工业建筑设备维护及保养）。①整体交付；②随期交付。

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT

IPD项目管理的实施流程

Concurrent Engineering（三）并行工程

2.Advantages of IPD Project Management and Concurrent Engineering

2.IPD项目管理并行工程的优势

IPD project management and concurrent engineering is one of the key means to improve efficiency. By simultaneously conducting multiple development stages, it reduces the overall product development cycle, enabling companies to respond to market demands more quickly.

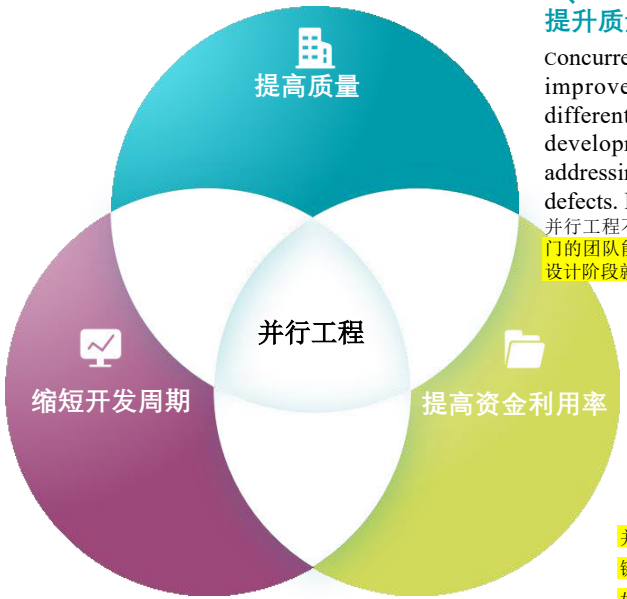
IPD项目管理并行工程是提高效率的关键手段之一，通过同时进行多个开发环节，减少了产品开发的总周期，使企业能够更快速地响应市场需求。

1、Shorten the developmentcycle

缩短开发周期

In traditional project management models, product development is often a linear process, meaning that the next phase only begins after the previous one is completed. In contrast, concurrent engineering significantly shortens the overall product development cycle by carrying out multiple development phases simultaneously. For example, during the product design phase, the R&D team can conduct design verification and production preparation concurrently with the manufacturing team, thereby reducing development time.

在传统的项目管理模式中，产品开发往往是一个线性过程，即一个环节完成后才开始下一个环节。而并行工程则通过将多个开发环节同时进行，大大缩短了产品开发的总周期。例如，在产品设计阶段，研发团队可以与制造团队同时进行设计验证和生产准备，从而减少了开发时间。



2、Improve quality

提升质量

Concurrent engineering not only shortens development cycles but also improves product quality. In concurrent engineering, teams from different functional departments can participate in the early stages of development, providing their professional advice and opinions, thus addressing potential issues during the design phase, preventing quality defects. Early intervention and correction enhance the product's quality.

并行工程不仅能够缩短开发周期，还能提高产品质量。在并行工程中，不同职能部门的团队能够在开发的早期阶段就参与进来，提出各自的专业建议和意见，从而在设计阶段就解决潜在的问题，防治质量缺陷，早期的干预和修正提高了产品的质量

3、Improve the utilization of funds

提高资金利用率

Parallel collaboration reduces later modifications and rework, saves project costs, avoids financial losses, clarifies the critical path, shortens the construction period, reduces capital occupation time, and saves construction costs. (For example, synchronizing the installation of equipment on-site.)

并行协作减少后期的修改和返工，节约工程成本，避免经济损失，关键路径更清晰，工期缩短，资金占用时间缩短，节约建造成本。（比如设备同步进场安装）。

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT IPD项目管理的实施流程

（三） Concurrent Engineering 并行工程

01

The cost engineer is the chief economist of the construction project.
造价工程师是建设项目的首席经济学家

IPD project management investment control is a value-oriented decision-making process, which is based on market demand and business objectives for value evaluation, rather than solely on technical or cost considerations. Starting from the project proposal, it determines the source and method of funds, controls the cash flow in project funding planning, raising, operation, accounting, and operation & maintenance, and establishes a full lifecycle funding plan. It uses investment estimation as the control target, design estimation as the budget limit, and dynamically controls the project's full lifecycle funding objectives through investment estimation, design estimation, budgeting (forming the contracted price), completion settlement (progress payment accounting), final settlement, and operation & maintenance measurement, according to the project schedule. Detailed explanations are attached.

IPD项目管理投资管控是价值导向决策，是基于市场需求和商业目标进行价值评估，而非单一技术或成本考量。从项目建议书开始，确定资金来源及方式，在项目资金计划、筹措、运行、核算、运维中控制资金流向，确定全生命周期资金计划方案。以投资估算为控制目标、设计概算为限额设计，根据项目进度通过投资估算、设计概算、预算（形成签约合同价）、竣工结算（进度款核算）、竣工决算、运维测算，动态控制项目全生命周期资金目标。附后详解

02

Closed management of fund flow
资金流向闭合管理

Establish a fund review system with monthly reports and audits, implement indicator control for project funds, and manage in a closed loop. Establish accounts corresponding to construction investment (project costs, other construction expenses, utilization of reserve funds), cost index (management fees, profits, taxes for labor and materials, etc.) with financial expenditures. Conduct real-time dynamic audits of financial statements with the electronic tax bureau to ensure that project costs correspond correctly with fund revenues and expenditures. When the project is approved and delivered for use, determine the sources of working capital, maintenance service fees, property management fees, etc., and prepare the completion settlement report, transferring financial materials alongside engineering documents. Financial accounting should be carried out according to the composition of construction project investment costs to achieve closed management of fund payments and project costs. From a micro perspective, a cost engineer is an economist for construction projects. See attached diagram.

建立资金审查体系，月报、月审，项目资金实行指标控制，闭环管理。以建设投资（工程费用、建设工程其它费用、预备费动用情况）、造价指数（人材机管理费利润税金等）与财务列支对应建账，财务报表与电子税务局实时动态审核，做到工程造价与资金收支对应无误。项目验收合格交付使用时，确定流动资金、维护服务费、物业管理费等资金来源方式，编制竣工结算报表，财务材料与工程资料同步移交。
财务建账按照建设项目投资费用构成列支，实现资金支付与工程造价闭合管理。微观角度而言造价工程师是建设项目的经济师。见附图

03

Establish a dispute review mechanism
建立争议纠纷评审机制

In the project planning stage, a dispute review panel consisting of a lawyer leading, construction lawyers, and senior cost engineers will be established. The Integrated Portfolio Management Team (IPMT) will recommend a team leader, and each of the contracting and subcontracting units will recommend one member. The policy is guided by law, with regulations as a premise, and facts as the basis. Human-centric, collaborative, and empathetic, timely guidance will be provided to avoid disputes, serving as a strong guarantee for cost reduction and efficiency enhancement.

项目策划阶段设立以律师牵头、建工律师和资深造价工程师组成的争议评审三人组，IPMT (Integrated Portfolio Management Team, 集成组合管理团队)推荐组长，发包单位、承包单位各推荐一名组员。政策为导向，法律为棕绳，规范为前提，事实为依据，以人为本，协同共情，及时疏导，避免纠纷产生，是降本增效的有力保障。

04

Bid marking, individual acceptance, and equipment trial operation flow synchronization.
招采标线、单项验收与设备试运行流水同步

Prepare the "Tender Procurement Plan" based on the "General Construction Progress Schedule". For projects that require bidding, such as equipment, major materials, and specialized engineering, tender in advance according to the scheduled nodes, supervise the entry of equipment, report for inspection, and prepare for ready-to-use conditions; supervise the start time of specialized engineering to ensure smooth coordination with the overall project schedule; before the completion and acceptance of the unit installation of the equipment, carry out product protection and operation maintenance following the simultaneous delivery of equipment installation or the acceptance of the completed construction unit project.

根据《施工总进度计划表》编制《招标采购计划表》，设备、主要材料以及专业工程等需招标项目按照节点预前招标、督促设备进场、报备检验，做好随机即用的准备；督查专业工程开工时点，与整体工程进度衔接顺畅；在单体完工验收设备安装之前，随着设备安装同期交付运营或建筑成品单位工程验收之后进行成品保护、运维。

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT IPD项目管理的实施流程

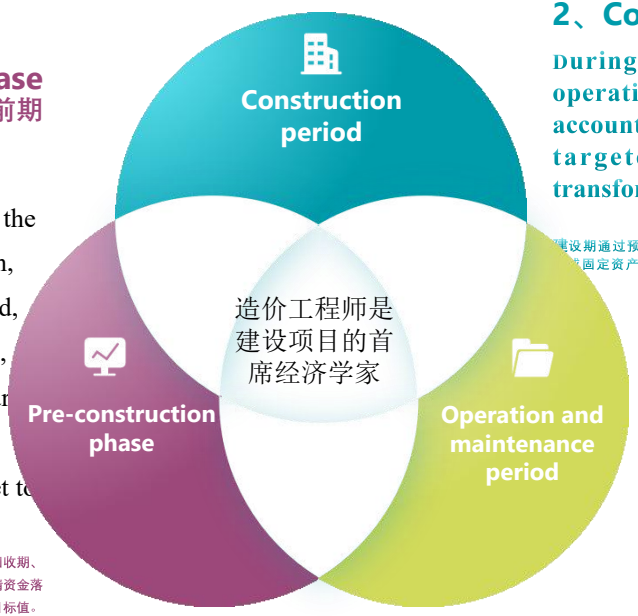
（三）Concurrent Engineering并行工程

The cost engineer is the chief economist of the construction project.造价工程师是建设项目的首席经济学家

1、Pre-construction phase 建设前期

The feasibility study report in the early stage of construction estimates the total investment cost of the construction project through investment estimation, calculates the return on investment, payback period, interest coverage ratio, debt service coverage ratio, net present value, and net annual value, etc.; prepar a financing plan based on the approved sources of funds and applies for funding; estimates the budget t predict the design target value of the project.

建设前期可行性研究报告通过投资估算预估建设项目总投资费用，计算投资收益率、资金回收期、利息备付率、偿债备付率、净现值、净年值等；根据批复的资金来源编制投融资方案，申请资金落实；通过概算预计项目限额设计目标值。



2、Construction period建设期

During the construction period, through a series of operations involving budgeting, settlement, and final accounts, along with fund control and cost analysis, the targeted design objectives will be realized and transformed into fixed assets.

建设期通过预算、结算、决算的系列运算、资金控制和造价分析过程，将限额设计目标值落地变现，形成固定资产。

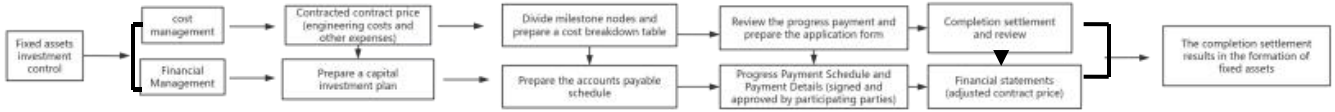
3.Operation and maintenance period运维期

During the operation and maintenance phase, based on the design lifespan of the construction project and the actual fixed assets, analyze economic indicators and operation and maintenance costs, calculate the actual return on investment and payback period of the building products, and assess the social and economic benefits brought by the project investment.

运维期依据建设项目的设计使用寿命，根据实际固定资产，分析经济指标及运维成本，测算建筑产品实际资金收益率和资金回收期等，计算项目投资带来的社会效益和经济效益。

03 IMPLEMENTATION PROCESS OF IPD PROJECT MANAGEMENT IPD项目管理的实施流程

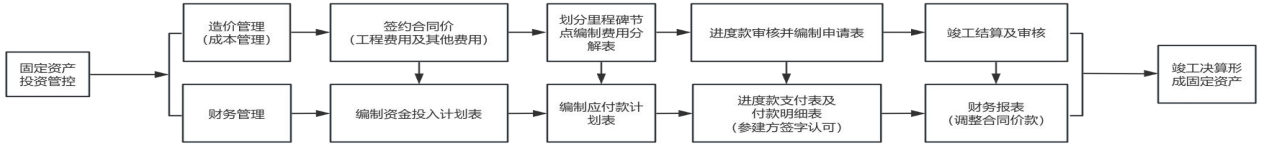
Fixed assets investment control flowchart



The total investment in productive construction projects includes fixed assets investment and initial working capital

（三）并行工程
Parallel engineering

固定资产投资管控流程图



生产性建设项目总投资包括固定资产投资和铺底流动资金

04 CHALLENGES AND RISK PREVENTION IN IPD PROJECT MANAGEMENT IPD项目管理的挑战与风险防范

四、Challenges and risk prevention in IPD project management
IPD项目管理的挑战和风险防范

Although the IPD project management has many advantages, enterprises also face some challenges and risks during the actual implementation process. It emphasizes collaboration, cooperation, and joint decision-making among all parties involved in the project to achieve efficient delivery. These challenges include: establishing cross-disciplinary communication mechanisms, maintaining team trust, balancing short-term and long-term goals, and identifying potential issues related to technology and the market early in the development process.

尽管IPD项目管理具有诸多优势，但在实际实施过程中，企业也会面临一些挑战和风险。它强调项目各方的合作、协作和共同决策，以实现项目的高效交付。这些挑战包括：建立跨专业沟通机制、维护团队信任以及平衡短期与长期目标、在开发初期识别技术、市场等潜在问题。

01 he transformation of multidimensional thinking
多维度思维的变革

Stakeholders need to break the traditional adversarial mindset and establish deep trust, with lawyers familiar with the IPD framework participating in the customization of multi-party agreements. This will help create a consensus mechanism, and initially invest the necessary funds to integrate additional resources. A Multi-Party Agreement (MPA) involves the core participants signing a single contract that clearly defines roles, responsibilities, risk allocation, and incentive mechanisms.

利益相关者要打破传统对立思维，建立深度信任，由熟悉IPD框架的律师共同参与多方协议定制化条款，建立共识机制，初期投入必要的资金整合额外资源。多方协议（Multi-Party Agreement, MPA），核心参与方签署单一合同，明确角色、责任、风险分配及激励机制。

02 organizational cultural change
组织文化变革

Implementing IPD project management requires enterprises to transform their organizational culture, breaking down departmental barriers and establishing a collaborative culture to support the effective operation of cross-functional teams. However, changing organizational culture is a long-term process that requires continuous adjustments and optimizations during the transformation.

实施IPD项目管理需要企业在组织文化上进行变革，打破部门壁垒、建立协作文化等以支持跨职能团队的有效运作。然而，组织文化的变革是一个长期的过程，需要企业变革过程中不断进行调整和优化。

03 cross-functional team management
跨职能团队管理

Managing cross-functional teams is another challenge faced in IPD project management. Since cross-functional teams involve multiple departments and areas of expertise, communication and collaboration among team members are often quite complex. Therefore, companies need to establish effective communication mechanisms and management systems to ensure that cross-functional teams can operate smoothly.

跨职能团队的管理是IPD项目管理中面临的另一个挑战。由于跨职能团队涉及到多个部门和专业领域，团队成员之间的沟通和协作往往比较复杂。因此，企业需要建立有效的沟通机制和管理制度，以确保跨职能团队能够顺利运作。

04 The complexity of process standardization
流程化的复杂性

Process optimization is one of the key steps in implementing IPD project management, but it is also a complex process. Enterprises need to evaluate and optimize the existing development processes, which involves coordination among multiple links and departments. In addition, process optimization also requires the support of advanced tools and technologies.

流程优化是实施IPD项目管理的关键步骤之一，但也是一个复杂的过程。企业需要对现有的开发流程进行评估和优化，涉及到多个环节和部门的协调。此外，流程优化还需要借助先进的工具和技术支持。

05 CHALLENGES AND RISK PREVENTION IN IPD PROJECT MANAGEMENT IPD项目管理保证措施

01

Organizational structure adjustment组织架构调整

IPD project management requires enterprises to make adjustments in their organizational structure to support the effective operation of cross-functional teams. A dedicated Project Management Office (PMO) is established to coordinate and manage the project team. Technical Reviews (RT) and Phase Decision Reviews (DCP) are conducted. It is also necessary to establish a CDP functional management team within the enterprise, with clear responsibilities and authorities, to ensure smooth collaboration among various functional departments.

IPD项目管理要求企业在组织架构上进行调整，以支持跨职能团队的有效运作。建立专门的项目管理办公室（JPO），负责协调和管理项目团队。进行技术评审（RT）和阶段决策评审（DCP）。还需要在企业内部建立CDP职能管理团队，明确的职责和权限，以确保各职能部门能够顺利协作。

02

Process Optimization流程优化

Process optimization is one of the key steps in implementing IPD project management. Enterprises need to evaluate and optimize their existing development processes to support concurrent engineering and full lifecycle management. For example, establishing standardized development processes and templates, implementing agile development methods, etc., are all effective means of process optimization.

流程优化是实施IPD项目管理的关键步骤之一。企业需要对现有的开发流程进行评估和优化，以支持并行工程和全生命周期管理。例如，建立标准化的开发流程和模板，实施敏捷开发方法等，都是有效的流程优化手段。

03

Fund control资金控制

The cost engineer compiles a capital plan based on characteristics, cost indices, and cost analysis. The actual costs are calculated according to monthly or milestone production reports, and the progress and capital control are compared and analyzed. The finance department plans, allocates, and disburses funds accordingly.

造价工程师根据特点、造价指数、成本分析，编制资金计划表根据月或里程碑生产报表核算实际成本，比对分析进度资金控制。财务部门据此计划、拨付、分配资金。

04

Tools and technical support工具和技术支持

Implementing IPD project management requires the support of advanced tools and technologies to facilitate more efficient project management and team collaboration. For instance, AI artificial intelligence, project management software, collaborative design tools, simulation and testing tools, etc., are all crucial tools that support IPD project management.

实施IPD项目管理需要借助先进的工具和技术支持，更高效地进行项目管理和团队协作。例如，AI人工职能、项目管理软件、协同设计工具、仿真和测试工具等，都是支持IPD项目管理的重要工具。

06 PROSPECTS FOR IPD PROJECT MANAGEMENT IPD项目管理前景瞻望

IPD project management is an integrated product development approach that permeates throughout the entire project management process. It aims to save costs in full lifecycle management, fosters collaboration among stakeholders, and shares risks, thereby enhancing management level and economic benefits. The successful implementation of IPD project management's full lifecycle investment control can improve product development efficiency and quality, and enhance market competitiveness and social value.

IPD项目管理是一种集成产品开发的方法，贯彻项目管理始终。在全生命周期管理中节约成本，利益相关者协同合作、风险共担，提高了管理水平和经济效益。成功实施IPD项目管理全生命周期投资管控，提高产品开发效率和质量，增强市场竞争力和社会价值。

Chief Consultant 总咨询师

The chief consultant plays a pivotal role in IPD project management, coordinating operation and maintenance, managing the entire lifecycle system, and facilitating comprehensive communication and coordination. They are a vital force in IPD project management. Certified national-level consultants, architects, cost engineers, and supervision engineers with comprehensive abilities can all serve in this role.

总咨询师在IPD项目管理中统筹运维，全生命周期系统管理，全方位沟通协调，是IPD项目管理生力军。经注册的具有综合能力的国家级咨询师、建造师、造价师、监理工程师均可担任。

Chief Economist 首席经济学家

As the chief economist of construction projects, cost engineers play a pivotal role in investment control within IPD project management. Professor Yin Yilin elaborated in his Spring Festival greetings on February 15, 2021, that the chief economist of construction projects should ensure that projects meet the economic and social needs of their development stages with higher quality, complete project construction more efficiently, treat project stakeholders more fairly, and enable public projects to deliver performance over a longer period of time in a more sustainable manner.

造价工程师作为建设项目的首席经济学家，在IPD项目管理投资管控中具有核心作用。尹贻林教授在2021年2月15日春节贺词中阐述：建设项目的首席经济学家要更高质量地使项目满足发展阶段的经济社会需求，要更有效率地完成项目建设，要更加公平地对待项目利益相关者，要更加可持续地使公共项目绩效长时间释放。

Dispute review expert 争议评审专家

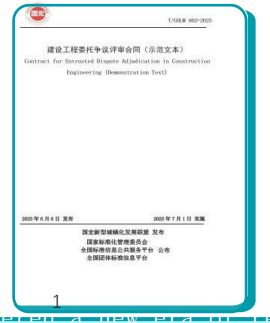
Establish a dispute review mechanism, appoint dispute review experts, and implement the "zero dispute" principle to ensure the smooth progress of project construction. The Guohong New Urbanization Development Alliance has established a commissioned dispute review expert committee, with Zhu Shuying, a barrister, serving as the director.

建立争议评审机制,聘任争议评审专家，贯彻"0"纠纷原则，为项目建设的良序进行保驾护航。国宏新型城镇化发展联盟成立了由朱树英大律师担任主任的委托争议评审专家委员会。

06 PROSPECTS FOR IPD PROJECT MANAGEMENT IPD项目管理前景瞻望

Construction Engineering Commission Dispute Review Contract (Demonstration Text)" (T/GHLM002-2025), edited by Shanghai Jianwei Law Firm and co-edited by leading enterprises such as Zhongliang Engineering Consulting Co., Ltd., Kaiyuan Digital Intelligence Engineering Consulting Co., Ltd., and Haitian Engineering Consulting Co., Ltd., has been reviewed by the Guohong Alliance Standardization Committee and published on the National Standard Information Public Service Platform of the National Standardization Administration of China. It will take effect from July 1, 2025. The implementation of this standard plays a significant role in promoting the standardization and normalization of IPD project management.

由上海市建纬律师事务所主编，中量工程咨询有限公司、开元数智工程咨询有限公司、海天工程咨询有限公司等头部企业参编的《建设工程委托争议评审合同（示范文本）》（T/GHLM002-2025），经国家


建设工程委托争议评审合同（示范文本）
Contract for Entrusted Dispute Adjudication in Construction Engineering (Demonstration Text)
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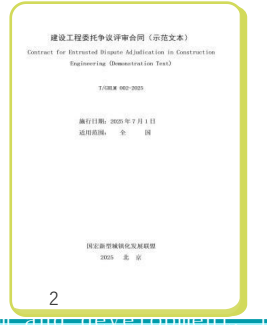
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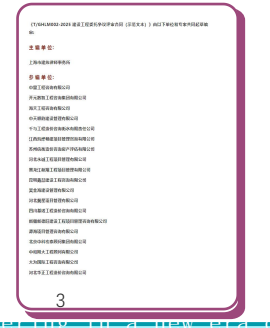
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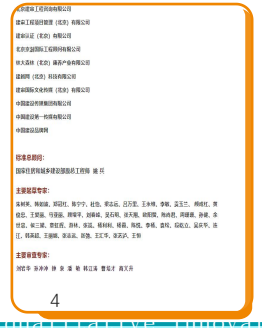
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have entered a new era of reform and development, ushering in a new era of proactive innovation, and are marching into a brighter future with a momentum of seeking progress while maintaining stability and embracing technological innovation. With the confidence that comes from advancing knowledge and the courage to keep pace with the times, we aim to be pioneers of innovation in this era, contributing our humble efforts to the construction of the project.

With General Secretary Xi Jinping's vision of building a community with a shared future for mankind as the overall goal, we should embark on the path of modernization and innovation, work together in synergy, and stride towards a harmonious and beautiful future.

我们进入改革发展的新时代，开启了新质创新的新纪元，以稳中求进、科技创新的态势迈入更加崭新的未来。拥有知识递进的底气，与时俱进的勇气，做时代的创新尖兵，为工程建设添砖加瓦，贡献绵薄之力。以习近平总书记建立人类命运共同体为总体目标，走现代化发展创新之道路，协同共进，一起迈向和谐美好的未来。

thanks

Research Assistant Team of IPPCE Institute, Tianjin University of Technology
Yinshu Think Tank Research Institute
Guohong New Urbanization Development Alliance
Shanghai Jianwei Law Firm
Haitian Engineering Consulting Co., Ltd
Shanxi Hanfang Construction Management Co., Ltd

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Thank you for listening