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TIANS Model

In the contemporary global context, technological innovation and industrial restructuring are converging with dynamic force. Emerging technologies in fields such as fine chemicals, synthetic biology, and biopharmaceuticals are constantly progressing, providing strong impetus for industrial upgrading. Nevertheless, the transition from laboratory achievements to industrialization often encounters challenges owing to technical complexity, cost pressures, safety risks, and market uncertainties. Traditional engineering service models, confined to partial optimization, fall short of multi-dimensional and end-to-end demands of industrialization. The era demands an innovative engineering paradigm that encompasses the entire "From Lab to Fab" chain, driving the industrialization of new technologies more efficiently and flexibly. As a pioneer in engineering design dedicated to creating value by focusing on process technology, TIANS Group is redefining the boundaries and future prospects of engineering technology services with its distinctive "TIANS Model".

The "TIANS Model" is an innovative engineering paradigm for empowering the industrialization of new technologies.

Based on a process-oriented ecosystem as its organizational basis, it operates through the synergistic cooperation of the operation model of "Tri-platform Integration and Triple-engine Driven", which integrates the technology platform, business unit platform, and project command platform. This integrated approach offers one-stop services encompassing all specialties and processes, ultimately fulfilling the value commitment of "one-time successful trial run" to guarantee the efficient implementation of the project.

Market-facing and demand-driven, TIANS Model provides systematic, compliant, and rapidly implementable industrial solutions for clients. Relying on distinctive systems such as investment optimization, inherent safety, and technology confidentiality it creates core value for clients. Through nine capabilities including modular process units and digital delivery, it facilitates the efficient transition of new technologies from lab, pilot to large-scale production. The TIANS Model delivers value engineering services from process validation to one-time successful trial run, driving the sustainable development of industries towards high-end, green, digital, and intelligent.

The industrialization of new technologies confronts multiple challenges, including incomplete process packages, difficulties in scaling up, shortages of interdisciplinary talents, and issues related to cost-effectiveness, reliability, compliance, and maintainability.

TIANS has pioneered and actively implemented the "process-oriented" philosophy, consistently placing process as the core. By establishing a full-chain process through a technological system that

Incentive & Project Commander Qualification Management Program. These measures have facilitated the integration of process capabilities across all disciplines, from design and procurement to automation and construction, achieving comprehensive process-oriented talent development. This effort has cultivated a core team that deeply integrates technology and management, with expertise in process development, innovation, and industrialization. By the end of 2025, the group boasted 12 Ph.D holders and scientists, 60 industry consulting and planning experts, and 416 technical backbone personnel specializing in process technology, engineering design, and production management.

In addition, the TIANS Science & Technology Committee has established strong strategic partnerships with renowned institutions such as Tsinghua University, East China University of Science and Technology, Beijing University of Chemical Technology, Institute of Process Engineering, Chinese Academy of Sciences, and Dalian Institute of Chemical Physics. By the end of 2025, the committee encompassed over 50 industry-academia research experts in domains such as fine chemicals, synthetic biology, pharmaceuticals, and intelligent manufacturing.

2 Full Lifecycle Process Technology Services

Guided by the principle of "multi-core drive", we systematically integrate top-level cross-disciplinary expertise to construct a well

TIANS Model

bio-pharmaceuticals, TIANS leverages two interlocking capabilities. One is a deep bench of engineers with extensive front-line production experience. The other is the integration and implementation capabilities. Guided by the principle of "process-oriented, systematic optimization", we focus relentlessly on core objectives: end-to-end automation, continuous processing, intelligent operations, green chemistry, inherent safety, and investment control.

Production Insight Informing Process Scale-up: Engineers with frontline production experience can precisely translate qualitative findings from laboratory stages into scalable industrial control logic, safety interlocks, and Standard Operating Procedures (SOPs) through process route comparisons and systematic process re-engineering based on operational insights. They have a profound understanding of production pain points to ensure that process solutions are both operable and stable.

Engineering Capability Driving Process Implementation: Leveraging the holistic perspective and professional expertise of an engineering technology company, we ensure the process service throughout the entire lifecycle. Seasoned cross-disciplinary teams (comprising process, equipment, automation, etc.) collaborate seamlessly. Their focus extends beyond the stringent control of Critical Process Parameters (CPPs) to the deep embedding of process logic into every phase of the entire project lifecycle.

Operation Model of "Tri-Platform Integration and Triple-Engine Driven"

To systematically tackle the fragmentation between marketing, design, and execution in construction projects, which results in inefficiency and a poor client experience, TIANS pioneered and practiced an operational model that integrates three platforms: the technology platform, the business division platform, and the project command platform, that is "Tri-Platform Integration and Triple-Engine Driven" model. This model disrupts traditional linear workflows, converting the interaction among the three platforms from sequential collaboration to parallel interaction. It constructs an organic ecosystem centered around client value, capable of self-organizing and dynamic collaboration, achieving rapid response to market demands and high-quality delivery.

1 Organic Ecosystem:Tri-Platform Integration and Triple-Engine Driven

1.1. Technology Platform — The Engine of Innovation and Technology

We specialize in process technology and design, leveraging cutting-edge techniques and exceptional creative design to set high-quality standards

for project delivery. We provide clients with technical solutions that integrate advanced innovation and strong implementability.

TIANS constructs a core competetency foundation to support the project lifecycle by integrating 15 technical centers, including the Process Technology Center, the General Engineer Office, the Chief Designer O f ce, the Chief Safety O f cer O f ce, the Chief Engineer O f ce, the Design Center, the Qingdao Design Center, the Pilot Platform, the Environmental Technology Center, the BIM Center, the Digital Deliver Center, the Validation Center, the Big Data Center, the Commissioning Platform, and the Technology I ! n nt " n z

its focus on high-tech industries such as fine chemicals, fluorine -containing fne chemicals, electronic chemicals, synthetic biology, and bio-pharmaceuticals. Our business covers more than 30 countries and regions globally, with more than 3,500 benchmark projects successfully completed.

1.3. Project Command Platform — The Cornerstone of Project Delivery and Performance

Established as physical entities in response to specific project requirements, these commands precisely anchor both the client demands and design standards, ensuring e f cient, high-quality delivery with the unwavering goal of one-time successful trial run.

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2.1. The Client-centric Project Command System

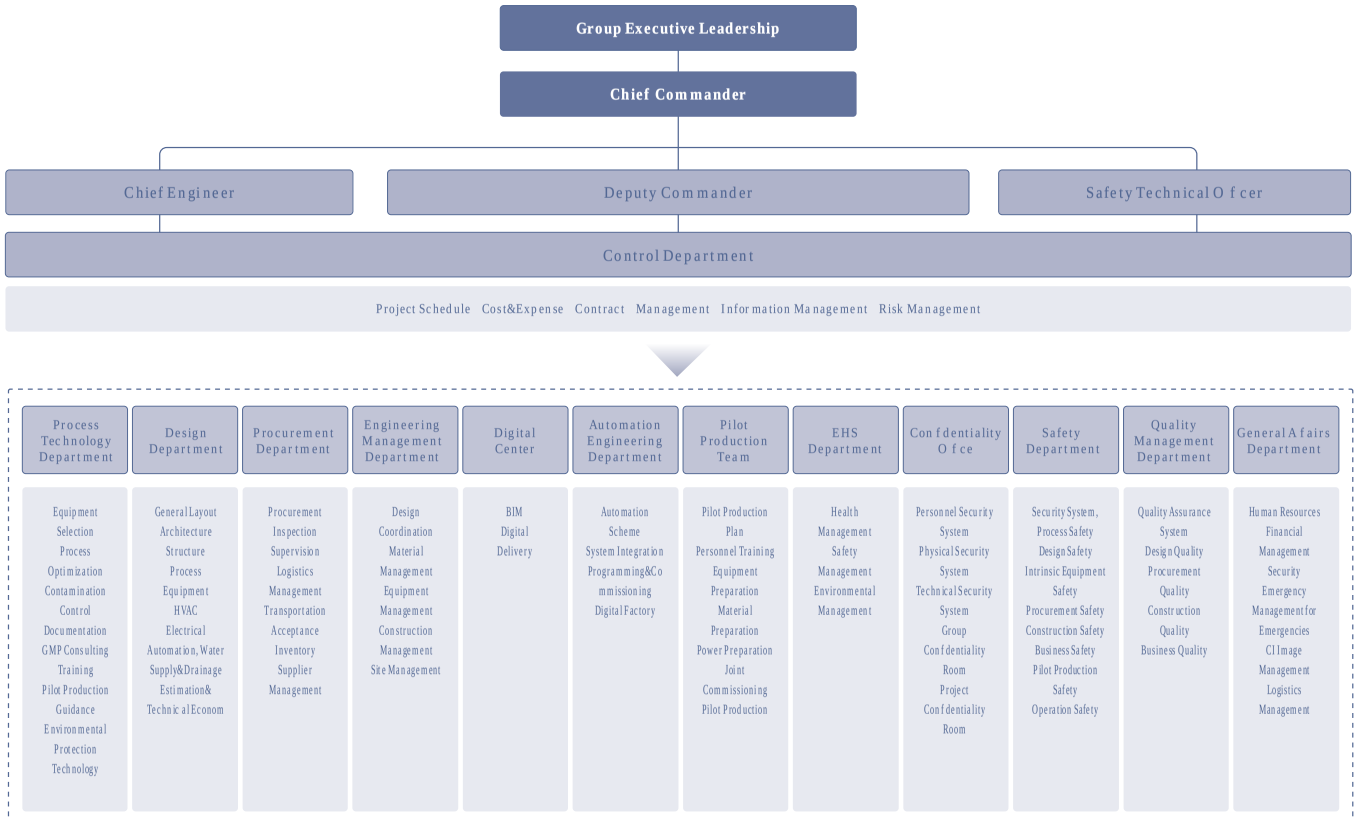
The TIANS project command system allocates resources according to client needs, ensuring that "the command center assigns personnel in line with client requirements". Its key features include:

Professional Command Team: The project commander is typically a process or design expert, supported by a process-proficient chief engineer to ensure one-time successful trial run.

Seamless Functional Integration: Structured with deputy commanders for design, procurement, and construction to guarantee e f cient coordination among key processes.

Forwarding Safety Management: Designating a safety technical o f cer with veto power to implement inherent safety control during the design phase.

Business Information Confidentiality: By means of dedicated security offices and strict confidentiality protocols, we guarantee the security of clients' trade secrets.



Project Command System

2.2. The EPC Management Process Centered on Four Coordination Meetings

Guided by the operation model of "Tri-Platform Integration and Triple-Engine Driven" , TIANS has iteratively developed an EPC management process centered on four coordination meetings. This process systematically connects all key stages of the project, ensuring ful-process control and effective implementation through phased decision-making and reviews, ultimately attaining high-quality delivery.

Four Coordination Meetings

Four Meetings	Key Contents	Participants
Review of Scheme or Preliminary Design Documents (First Coordination Meeting of Process, Design, Procurement and Construction)	1. Evaluate the Feasibility of Process Rechnology Routes, Equipment, and Materials; 2. Identify Potential Process Bottlenecks and Compliance Risks (e.g., environmental/safety /standards); 3. Compare Options (e.g., process Optimization, Modular Design, Automation Level, Key Tech Selection).	· Chief Designer O f ce · Chief Safety O f cer O f ce · Chief Engineer O f ce · Process Technology Center · Design Center · BIM Center · Procurement Control Center · Validation Center · Auto & Info Engineering Division · Members of the Project Command Team
Review of Detailed or Construction Drawing Design Documents (Second Coordination Meeting of Process, Design, Procurement and Construction)	1. Review Producibility, Operability, Maintainability, Construction Feasibility, Safety Audits, P&Id, and Equipment Specs; 2. Coordinate with Equipment, Electrical, and Automation Specialists to Implement Process Requirements; 3. 3d Model Review.	
Procurement Communication Meeting (Third Coordination Meeting of Process, Design, Procurement and Construction)	1. Discuss Key Equipment Selection, Supplier Technical Review, and Acceptance to Meet Process Requirements; 2. Determine Project Execution Plan and Equipment/Material Procurement Plan.	
Project Construction Organization Planning Meeting (Fourth Coordination Meeting of Process, Design, Procurement and Construction)	1. Discuss And Finalize Construction Schedule, Including On-Site Service Time for Process, Design and Procurement Personnel; 2. Finalize the Construction Schedule Assurance Plan; 3. Con f rm Core Team Members (E.g., Commissioning Team) and Clarify Construction Organization.	

Distinctive Systems

Investment Optimization System

In the industrialization of new technologies, a product's capacity to enter the market at a competitive price serves as the key indicator for evaluating its economic viability. Investment advantage derives from a comprehensive understanding of production process and systematic management throughout the entire project lifecycle. Therefore, we have engineered a profound transformation centered on investment competitiveness, aiming to achieve the definitive objective of "controlling investment cost better than competitors and saving project investments more effectively than traditional methods".

1 Source Innovation: Optimizing the Lifecycle Investment with Process Intelligence

Investment cost control must commence before design, originating from process intelligence. TIANS has assembled an expert team with profound expertise in production operations. Adhering to the advanced concept

of "design guided by production", we conduct a reverse review and in-depth design optimization starting from the benefit origin of the Future Factory.

Meanwhile, full lifecycle investment control is implemented. During the feasibility study phase, multi-scheme technical and economic comparisons are carried out to lock in the optimal investment path. In the design phase, we embed cost discipline at the source through intensive plant layout, process optimization, intelligent upgrades, and precision equipment selection.

Layout Optimization:Through systematic plant-wide or workshop-level layout optimization, we reduce material handling distances by an average of 20% to 30%, significantly reducing internal

selecti er a thousand projects, we precisely match instruments and equipment t oject capacity and technical requirements, ensuring optimal econom nd performance ft for maximum investment value.

2 Process Revolution: Achieving Systematic Investment Reduction via Lifecycle Synergy

In traditional engineering models, the fragmentation of the design, procurement, and construction phases, along with non-implementation -ready drawings and frequent design revisions during construction, are the primary factors leading to investment cost overruns. Leveraging lifecycle collaborative advantages, TIANS has transcended conventional cost-centric approaches, through technological empowerment and system integration, we achieve optimal management of operational, energy consumption, and maintenance costs for decades after factory commissioning.

Design-driven Approach with Embedded Investment Considerations: From the very beginning, the design process prioritizes equipment compatibility, construction feasibility, and long -term operational needs, adhering to the "procurable, constructible, operable" philosophy to fundamentally avoid subsequent changes and resource waste.

Procurement Synced, Dynamically Supporting Construction:

By implementing the "demand-integrated procurement" strategy, we systematically plan project sourcing. Delivery schedules for critical equipment and materials are dynamically linked to construction progress, minimizing on-site material shortages and warehousing.

Construction Feedback Enabling Lean Closed-loop Management: Through the extensive application of Building Information Modeling (BIM) and modular prefabrication, rework is reduced at the source. The "real-time design-construction feedback mechanism" eliminates the barriers between design and construction, establishing a collaborative closed loop where "design guides engineering, and engineering optimizes design", thereby achieving continuous cost reduction and efficiency improvement.

Through real-time information sharing, cross-functional management, and dynamic decision-making coordination across these three links, TIANS systematically resolves e f ciency losses and resource waste caused by fragmentation in traditional engineering, achieving lifecycle, multi-dimensional investments optimization and value enhancement.

- Standardized and modular design reduces procurement costs by an average of 10% to 15%.
- The early involvement of the trial production and construction teams in the design phase reduces post-project changes by over 30%.
- The proactive empowerment of the procurement team in early-

stag[illegible]uces equipment investments by more than 20%.

- The [illegible]plication of BIM and modular technologies shortens project sche[illegible]les by 20%–25% and reduces labor costs by 30%–40%.

3 Digital Engine: Data-driven Precision Investment Control

Beyond relying on experience, scientific approaches are of utmost importance. TIANS has developed a continuously iterative digital investment control system. Based on systematic research into extensive engineering practices, we have created standardized tools including the *Project Investment Cost Reference Manual*, transforming technical expertise into project forecasting capabilities and investment certainty. This provides end-to-end data support for new projects spanning from investment esti[illegible]ion to construction implementation, assisting clients in achievin[illegible]th[illegible]otimal balance between technological advancement and econ[illegible]mic ra[illegible]nality.

4 Proven Practice: From Investment Savings to Value Creation

4.1. Modular Process Units Facilitates Direct Investment Reduction

Possessing independent R&D and integration capabilities, our modular process units deliver quanti f able investment advantages:

- Automated Batching Systems: Automation levels increased by

over 50%, weighing accuracy remains consistently high, and batching labor is reduced by 80%.

- Integrated of Separation and Washing Modules in Line with Process: By integrating solid-liquid separation, washing and filtration, extraction and phase separation, and low-temperature vacuum drying modules into a single, continuously operated, unified control module, reduces material transfers and equipment footprint,cutting labor input by 80%.
- Next-generation TCU Control System: Achieves cost savings of over 30% compared to traditional solutions, with temperature control precision meeting international certification standards.
- Advanced Melt Crystallization Units: Reduce footprint and investment, improve product purity, and achieve dual optimization of investment cost and quality.

4.2. Cost Transformation Through Integrated EHS Solutions

Environmental protection is not simply a cost factor, rather, it can be a value-generating link. TIANS employs technologies such as material recycling, advanced oxidation, and membrane technology integration to achieve high-value material recovery and near-zero wastewater discharge with resource recovery, turning environmental pressure into circular economy gains.

By recovering high-value elements like manganese and bromine, as well as materials such as acetonitrile, phenol, and isopropanol, the

annual economic benefits can fully cover all treatment , with some projects even yielding a profit.

For high-salt and high-concentration chemical and pharmaceutical wastewater, the application of advanced oxidation, membrane integration, concentration and crystallization technology can discharge the mother liquor amount to less than 2%, achieve a water reuse rate of over 95%, and lower the overall system operating costs by more than 30%.

4.3. Integrated Optimization and Lifecycle Process Control to Eliminate Hidden Costs

In a high-end Active Pharmaceutical Ingredient (API) project, production capacity is increased by 20% through in-depth process optimization, while the overall investment is reduced by 18% compared to the budget.

In a key fine chemicals project, the full-process re-engineering reduced client's operating costs by 32% and shortened the investment payback period by 40%.

Inherent Safety System

Safety is not merely about cost, but it serves as the cornerstone of investment and competitiveness in new-technology industrialization. TIANS has redefined traditional passive safety by regarding it as a core engineering attribute that can be designed and implemented. We have established a comprehensive inherent safety management system centered on "risk pre-control, source governance, and full lifecycle management". Guided by a dual-helix decision-making mechanism that integrates "data + expertise", we achieve bidirectional verification and enhancement. Prevention measures are deeply embedded at the sources of process and design, and rigorously implemented across the full lifecycle: R&D, design, procurement, construction, trial production, and operations. Through standardized, compliance-driven delivery, we ensure every link in the chain is traceable and controllable.

It is firmly believed that the highest level of safety lies in eliminating the possibility of risk occurrence. Therefore, this system not only ensures compliance but also establishes reliable and sustainably competitive engineering value for clients, systematically converting safety into long-term project advantages.

1 Safety is a Design-able and Deliverable Product

TIANS views safety as an engineering attribute that must be integrated from the source, adhering to the following three principles:

- Proactive Principle: Risk management begins at the process design stage.
- Integration Principle: Safety serves as the common guiding principle for all disciplines, encompassing process, design, procurement, construction, and operation.
- Assetization Principle: Safety investments are transformed into quantifiable long-term assets, including fewer unplanned shutdowns, higher asset utilization, and improved corporate reputation.

2 "Data + Expert" Dual-Helix Decision-Making Mechanism

Safety decision-making does not rely on vague experience or isolated intuition. Therefore, we establish a decision-making framework that deeply integrates "data-driven quantitative insight" with "expert systemic knowledge". Data uncovers risks, while experts analyze causes and formulate countermeasures. This synergy enables precise risk prediction and elimination.

2.1. Data-driven: Engineering Safety Optimization Practice Based on Risk Scenario Simulation

By utilizing tools such as reaction safety risk assessment, DNV Phast

for quantitative risk analysis and explosion simulation, and AspenPlus for dynamic process simulation, thousands of risk scenarios are simulated in virtual environments. For example, in a new energy project, precise prediction of uncontrolled reaction pressure peaks was realized through reaction safety risk assessment data and simulation calculations. This allowed us to optimize the safety scheme scientifically, reducing the control temperature by 10% and increasing the relief area by 20%.

2.2. Expert-driven: Fortifying Defenses with Collective Intelligence

Each project is supported by a "think tank" of process, instrumentation,

Inherent Safety Design Guidelines codify more than one thousand clauses derived from accident investigations and industry best practices, providing designers with a definitive safety checklist. For example, the guidelines mandate closed-loop samplers in toxic gas leak zones.

End-to-end HAZOP Assurance: Mandatory in-depth HAZOP analysis is conducted at critical design milestones (30%, 60%, 90% model reviews), subjecting the design to multi-disciplinary "stress tests". In a large-scale fine chemical project, HAZOP identifies and eliminates 47 potential points of equipment misoperation and interlock logic conflicts at an early stage.

4 Lifecycle Layered Control

TIANS has established a layered safety management system, strategically led by the office of the Chief Safety Officer and implemented by safety engineers embedded across all platforms and project phases. Safety teams are flexibly configured based on project needs, deeply integrated into the entire process, and maintain dynamic control:

R&D Phase: Rigorous control of core risks, with inherent safety philosophy applied throughout.

Design Phase: Lifecycle real-time participation, providing inherent safety design recommendations.

Procurement Phase: Strict review of equipment safety performance

and compliance certi f cations.

Construction Phase: On-site dynamic supervision, with specialized contr veloped for high-risk activities.

Trial Production: Verify safety measures, compile specialized p f er lifecycle supervision.

Audit-able Assets: Deliver a Clear Safety "Balance Sheet"

We not only deliver a secure facility but also a comprehensive and traceable safety asset profile. Through a comprehensive safety accountability system and a digital document management framework, we ensure that all actions, ranging from the justifications of safety conditions and risk classi f cation control lists to each hazard investigation record, are traceable, and all responsibilities are clearly de f ned.

This "safety log" serves as a reliable digital asset throughout the project's lifecycle. It provides regulators with clear evidence of compliance and offers clients irreplaceable core asset data for future operations, expansions, and mergers and acquisitions.

TIANS inherent safety system transforms safety from an "implicit cost" into a "visible asset" throughout the plant's lifecycle, ultimately creating a predictable future where customers can focus on production and market operations with con f dence.

Technology Confidentiality System

As the lifeblood of innovation, trade secrets must be protected through a closed-loop process. TIANS consistently regards technology confidentiality serves as the cornerstone of client trust and collaboration. During the industrialization process, we strictly adheres to technology confidentiality standards, establishing a dual-safeguard system that integrates "static control" and "dynamic control" across the entire project lifecycle.

This system addresses both the static infrastructure — policies, physical facilities, and digital security — and the dynamic workflows of document handling, archiving, and destruction during design, procurement, and construction. The result is a closed-loop safeguard for client core technologies and intellectual property, ensuring technology confidentiality and complete document control throughout the industrialization.

1 Three-dimensional Defense: Institutional, Physical, and Digital

1.1. Institutional: Full-scenario Coverage

TIANS has formulated over 10 confidentiality policies and standardized workflows, including the *Confidentiality Management System, Design Confidentiality Room Usage System, Ten Confidentiality Management*

2.1.Initiation Phase: Co-creating the Rules

Collaborate with client to establish a confidentiality team, jointly identify critical confidentiality points and risks, and produce a customized *Project Confidentiality White Paper*.

2.2.Execution Phase: Dynamic Control

Personnel Isolation: Implement cell-level access control based on the "minimum necessary" principle. Core information such as processes, equipment, and control systems is decomposed and stored, enabling engineers to access only the essential information of their assigned modules.

Process Isolation: Core design reviews are conducted in confidentiality rooms. All drafts are shredded immediately on site. Data transmission takes place over physically isolated networks, and any unauthorized form of data export is prohibited.

Behavioral Auditing: Confidential areas operate under a strict access "whitelist". Entry and exit records as well as surveillance footage are archived automatically, forming an immutable evidence chain.

In a new battery material industrialization project, the process was divided into multiple modules. Engineering teams from different disciplines could only access data directly relevant to their work and design collaboration is conducted through physically isolated, network-encrypted sandbox environments. This measure effectively prevented unauthorized information aggregation.

2.3. Closing Phase: Zero Audit

Upon project completion, a rigorous "data sanitization protocol" is implemented. All classified electronic data undergoes multi-layer verification before irreversible physical erasure. Paper documents are [illegible] destroyed under dual supervision. A jointly signed *Confidential[illegible] Audit Report* is submitted to the client as the final deliverable, achieving a streamlined closed-loop security control.

3 Innovation Practices Beyond the Standard

The TIANS technology confidentiality system is more robust due to several forward-looking practices:

3.1. For exceptionally sensitive projects, at client request, parallel project environments with simulated technical parameters have been established to monitor and alert against any suspicious probing activities. This approach has successfully assisted client in identifying and mitigating potential business risks.

3.2. Blockchain-based evidence anchoring. All access and operation logs of core documents are synchronized in real-time to the blockchain evidence storage platform, generating judicially recognized electronic evidence to offer irrefutable proof for potential disputes.

3.3. Confidentiality is not solely about signing agreements, but a cultural imperative. Through regular scenario-based training,

case studies, employee confidentiality credit records, and incentive mechanisms, confidentiality awareness is deeply ingrained in TIANS culture.

By the end of 2025, over 30 projects involving core processes and cutting-edge technologies had been successfully delivered in confidentiality rooms, maintaining an impeccable "zero-leakage" record and achieving 100% client satisfaction for consecutive years.

Innovative Practices

Comprehensive Disciplines and Lifecycle Service

The construction projects in fields of fine chemicals, biopharmaceuticals, and electronic chemicals are facing multiple challenges, including high technical integration, tight schedules, and complex cross-regional coordination. Traditional design institutes or construction firms can no longer fully meet clients' comprehensive requirements for technological foresight, holistic engineering solutions, and guaranteed delivery. TIANS addresses these requirements through its approach of "comprehensive disciplines and lifecycle service", facilitating the internalization and integration of all necessary technical and operational capabilities. This establishes a seamless, reliable, and efficient delivery channel from technology to industrial application for clients.

1 Comprehensive Disciplines: Horizontal Integration To Eliminate Technical Silos

TIANS has developed a comprehensive professional framework that encompasses the entire industrialization chain of emerging technologies.

This system not only resolves the issue of "who will execute it", but also, through in-depth horizontal integration, completely breaks down professional barriers, guaranteeing that technical solutions can be fully, precisely, and promptly implemented across all disciplines.

We offer full coverage of all disciplines encompassing process R&D, engineering consultancy and design, process safety, technical-economic estimation, cleanroom systems, automation, environmental protection, commissioning, validation, equipment manufacturing, and even BIM and digital delivery. Each discipline is staffed with top-level experts and equipped with robust capabilities. Through our integrated internal collaboration mechanism, we achieve e f cient cross-disciplinary synergy, converting fragmented strengths into a highly integrated project support system.

All professional teams are organically integrated within the company, operating under a unified mÀt gă hat ʁ/ ȳt ! ttu] Ď/ie "

offering "end-to-end" services from the conceptual stage to the operational phase, rather than merely participating in partial phases. This guarantees that clients ultimately obtain a fully integrated facility capable of sustained value creation, rather than just a set of blueprints and fragmented projects.

The project commences with front-end process package development, process optimization, pilot-scale test, and feasibility studies. It encompasses the entire engineering design process from conceptual design to construction drawings, integrating specialized procurement strategies. The team supervises construction, installation, and commissioning while strictly adhering to quality and safety standards. The final deliverables include system startup, performance evaluation, and stable handover, supplemented with digital operation and maintenance support to ensure the continuous and efficient operation of the facility.

3

Core Value: The Synergistic Advantage of 1+1>2

The combination of "comprehensive disciplines" and "lifecycle service" provides a decisive advantage:

Traditional Subcontracting Model	TIANS Model
Multiple Interfaces, Di f cult Coordination: Client manages many supplier interfaces, leading to high communication costs and unclear responsibilities.	A Single Responsible Entity: TIANS acts as the sole interface, assumes full responsibility, enabling simple and e f cient client management.
Technology Easily Disconnected: R&D, design, construction, and operation have inconsistent objectives, diluting technical intent.	Technology Fully Integrated: Technical team participates throughout, ensuring precise translation from lab to fab.
Local Optimization, Overall Loss of Control: Parties pursue minimum cost in their own segments easily leading to overall budget and schedule overruns.	Global Optimization: Decision-making based on total lifecycle cost, maximizing investment value.
Risk Transfer: Problems lead to mutual blame, with the client as the ultimate risk bearer.	Risk Internalization: TIANS resolves all inter-disciplinary issues internally, delivering certainty to the client.

Pilot Platform

From laboratory fasks to facility production lines, up to 80% of laboratory achievements fail to be scaled up due to challenges such as process scaling and cost overruns. The TIANS Pilot Platform not only offers end-to-end validation services from micro-scale, but also transforms fragile lab[illegible]y samples into industrial-grade products with scalable production capab[illegible]es. This platform systematically bridges the "last mile" gap between techn[illegible]gical feasibility and commercial success.

1 Platform Capabilities and Data Foundation

Hardware Infrastructure: It is equipped with more than 10 types of specialized pilot-scale production lines, including continuous fow, high-temperature/high-pressure systems, distillation purification, biological

Delivery Outcomes: In addition to providing validation reports, a "pil[illegible]ge" directly applicable to foundational design and a "mo[illegible]dular proces[illegible]ckage" with high replicability are delivered, enabling a seamless trans[illegible]n from validation to design.

2 End-to-end Engineering Validation: Six Dimensions for Closed-loop Empowerment

TIANS has developed an engineering validation closed-loop system covering six dimensions: process, equipment, cost, reliability, safety, and talent, which addresses the core pain points of industrialization.

Process Scale-up and Parameter Solidification: By leveraging more than 10 modular pilot-scale units and online analytical instruments (such as PAT process analysis technology), the system accurately simulates industrial conditions. It expands the laboratory's "single-point optimal parameters" into a "process operation window" that can be stably replicated. This method has successfully completed over 50 process scale-up cases, spanning from milligrams per liter to hundreds of kilograms per batch.

Verification of Critical Equipment and Materials: A supply chain validation database is established to conduct performance testing and compatibility evaluation for more than 300 key equipment suppliers and special materials. Optimal suppliers are pre-identified to avoid equipment incompatibility during mass production.

Cost Precision Accounting and Optimization: Leveraging pilot-scale data, an accurate "material balance and energy consumption model" is established, facilitating production cost calculation with the error rate in final mass production controlled within ±5%. This offers robust data support for investment decisions and product pricing.

Reliability and Life Testing: Through simulating extreme conditions and conducting long-term operations, continuous stability tests and accelerated aging tests with a duration of ≥1000 hours are carried out to ensure that the product performance and the service life of catalysts and critical components meet commercial requirements. Meanwhile, post-production failure rates are reduced by more than 70%.

Safety and Environmental Compliance Pre-review: Concurrent reaction safety risk assessments, initial process validations, and three-waste treatment process validation are conducted to ensure that the process route is inherently safe and environmentally compliant, thereby removing major obstacles to project approval and production licensing.

Talent Training and Documentation Output: During the validation process, more than 500 core process engineers and operators are trained for clients, and standardized process packages (PDP) with complete operational parameters and Standard Operating Procedures(SOP) are delivered, realizing the dual implementation of "technical transfer" and "talent transfer".

3 Industry-Academia-Research Application Collaborative Ecosystem

The TIANS Pilot Platform has pioneered a distributed, networked alliance of pilot bases. Through equipment sharing and expert collaboration, a synergistic innovation mechanism that deeply integrates industry, academia, research, and application is established. University research teams provide cutting-edge technology and talent support; the pilot platform undertakes engineering development and validation. Leading enterprises participate in demand analysis and standard formulation, while downstream companies conduct product testing and offer application feedback, thus establishing a closed-loop innovation ecosystem.

4 Core Value: Providing Certainty and Accelerating Industrialization

Through systematic pilot testing, we help clients achieve industry-leading industrialization success rates. Meanwhile, we reduce the average time-to-market by 6-12 months, enabling them to gain market leadership during the critical technology window.

Modular Process Units

In traditional engineering models, facility construction is similar to "manual sculpting from scratch", a process marked by long timelines, inconsistent quality, and cost overruns. TIANS revolutionizes construction by adopting product-oriented thinking, conducting in-depth analysis of core processes, and seamlessly integrating intelligent technologies. We successfully break down complex facility systems into standardized, intelligent process m . Guided by the development logic of "process modularization → modu roductization → product intelligentization", we are committed to build exible, e f cient, and future-proof production systems for clients.

1

Core Product Matrix: From Single Module to Integrated Process System

TIANS' modular units are not merely assembled devices but proprietary intellectual property that encapsulates core processes, safety logic, and control logic in an intelligent manner. By leveraging its proprietary modular system and in line with specific requirements, TIANS enables clients to develop standardized and modular engineering solutions. This approach ensures the efficient implementation of initial projects. Meanwhile, it provides standardized modules that can be rapidly replicated and iterated for secondary development or similar projects.

By the end of 2025, we had successfully delivered over 50 high-standard portable units across eight core process sectors, specifically MVR evaporation crystallization, electronic specialty gases, continuous flow hydrogenation, and hazardous powder handling. All projects achieved a 100% one-time acceptance pass rate. These deliverables have created tangible value for clients in various fields such as fine chemicals and synthetic biology.

- Construction Timeline: Modular design and installation reduce on-site duration by 40% to 60%.
- Total Cost: Through continuous design optimization and mass prefabrication, the total cost is decreased by 15% to 25%.
- Quality and Safety: Manufactured in a controlled factory environment, the one-pass qualification rate for critical processes such as welding has been raised to 99.8%, ensuring intrinsic safety.

TIANS is transitioning from single-unit systems to integrated process modules with multi-unit coupling (e.g., Continuous production modules for integrated reaction, separation, and purification). These modules are fully integrated with predictive maintenance algorithms and digital twins to enable self-perception and self-optimization capabilities.

2 TIANS Intelligent Instantaneous Continuous Sterilizing System: Defining an Industry through a Distinct Category

The TIANS Intelligent Instantaneous Continuous Sterilizing System demonstrates the company's proficiency in "process equipment and equipment intelligence". It is not just about equipment manufacturing; it is about establishing industry standards.

Relying on 21 core patents and combined with its self-built advanced laboratory, based on *Continuous Sterilization Process Without Superheated Water Tank* and the *Automated Control Management System for Continuous Sterilization Equipment*, this system achieves "one-touch sterilization" with a stable 100% sterility rate. Compared with traditional systems, it reduces steam energy consumption by over 70% and recoups equipment investment costs within an average of 10 months. Moreover, it has redefined the reliability benchmark with a continuous "zero-failure" operation record (the longest single-unit equipment failure -free operation time exceeds 50,000 hours).

TIANS Intelligent Instantaneous Continuous Sterilizing System holds a market share of over 90%, ranking first in China, and has been awarded the authoritative "domestic leading" Level certification.

3 Core Value of Modular Process Equipment

capitalize on market opportunities.

- Seamless Technological Upgrades: When process innovations occur, specific modules can be independently replaced or upgraded without scrapping entire production lines, thus safeguarding investments.
- Green and Sustainable: The modular design enables easy disassembly and relocation, thereby maximizing the asset value over the entire lifecycle.

BIM Implementation

Through extensive application in over 100 complex projects, TIANS has progressed beyond basic modeling to establish a comprehensive digital collaboration ecosystem. It has achieved a triple leap in BIM value realization: from utilizing models to support design, driving construction with models, and ultimately evolving into "living models" to support cli[illegible]ong-term operations. Guided by industry-leading standards, BIM is pos[illegible]ned as the core data foundation spanning the entire project life cycle[illegible]ving a solid foundation for high-quality project execution.

1 Triple Leap: BIM Value Across the Entire Project Life-cycle

Through industry leading practices and innovations, the value of BIM is systematically unlocked via a three-level application framework, empowering projects throughout the entire lifecycle.

Level I: Design Optimization, Forward-Decision-Making in the BIM Process

The TIANS BIM team is proficient in resolving design-phase challenges via high-precision collaborative models. By executing automated collision detection, process simu tn` iC ol

advanced BIM application standards. By the end of 2025, through more than ten research topics such as *Rapid Drawing of Factory Modular Data*, BIM technology has been comprehensively applied in over 50 application scenarios, covering the entire chain from intelligent drawing review to smart operation and maintenance. The cloud-based cross-disciplinary collaboration platform ensures that all participants operate within a unified data environment, which guarantees "one model throughout" from a systematic perspective.

2.2. A Professional Team of Versatile Talents

We have established a multi-disciplinary, composite BIM team that spans across process, design, procurement, and automation. This team not only has a good command of BIM technology but also offers customized solutions based on clients' process requirements. Through integrated design and real-time conflict resolution, a 30% increase in collaborative efficiency and a 40% reduction in pipeline conflict are realized, providing strong support for the efficient execution of projects.

2.3. Deep Data Fusion and Applications

The TIANS BIM team goes beyond geometric models through multi-stage data integration. During the design phase, structured information such as equipment parameters and process logic is incorporated; during the construction phase, schedule, cost, and quality data are linked. Ultimately, a "digital twin" that comprehensively reflects the physical

facility and is rich in critical engineering data is delivered.

- Operational E f ciency: Twin-based simulation and diagnostics improve inspection and fault resolution rates by 20% to 40%.
- Cost Savings: Preventive maintenance and energy efficiency optimization can reduce life-cycle operating costs by 5% to 15%.

Digital Delivery

To deliver traceable, simulatable, and operable digital twin assets to clients together with physical facility, TIANS has established an integrated data chain covering design, procurement, construction, and operation. Utilizing high-precision 3D models as visual carriers and structured data as the core, it establishes a static mapping of physical facilities to support their future safe, efficient, and intelligent operations.

Through the *TIANS Digital Delivery Project*, the TIANS system has developed five core capabilities:

1 Data Structuring: Enabling Data to be "Active"

Centering on facility equipment and pipelines, selection, correlation,

2 High-Precision Modeling and Data Link

TIANS Digital engineers are proficient in utilizing mainstream international platforms such as SP3D for comprehensive 3D collaborative design across all disciplines. Teams from different specialties conduct real-time synchronous work within a unifed model space, with data synchronized in real time. The real-time collision detection feature establishes a rapid "design-check-modify" iteration mechanism. Proven in practice, this approach reduces on-site design changes and rework by an average of approximately 30%, signifcantly reducing project costs and time.

3 High-Performance Team + High-Efficiency Organization

For each digital delivery project, a dedicated collaborative team is established, which is led by a Digital Delivery Manager and integrates professional knowledge from the design, procurement, data, and IT sectors. The entire process, from project initiation and strategy formulation to acceptance and delivery, is streamlined through a digital platform. As a result, the on-time project delivery rate exceeds 94%, and the cost waste caused by information errors and rework is successfully reduced by 10% to 20%.

4

Full-Cycle Quality Control: Delivering Trustworthy Digital Assets

TIANS Digital Delivery Team consistently adheres to data accuracy, consistency, completeness, and compliance as core principles. Through strict model testing and data verification processes, it is ensured that digital models are precisely aligned with design drawings, physical facilities, equipment lists, etc. This approach leads to the delivery of high-quality digital twins that accurately mirror real - world facility operations.

Practice demonstrates that strict quality control reduces information conflicts in design collaboration by over 90%, notably enhancing decision -making efficiency. Meanwhile, it saves more than 60% of the data preparation time and costs for advanced applications such as predictive maintenance and intelligent inspection after facility commissioning.

5

Empower Future Smart Operations: Delivery is Just the Beginning

The ultimate value of digital transformation lies in empowering operations. TIANS is actively promoting and will continue to advance this initiative:

5.1. Enhance Data Asset Management and Utilization: Based on the existing material database, establish enterprise-level "Standard Equipment Databases" and "Typical Design Module Libraries". Explore the integration of digitally delivered static data with real-time operational

data (e.g., DCS data) during facility maintenance phases, laying the foundation for advanced applications such as predictive maintenance and intelligent inspections.

5.2. Establish a Unified Delivery Platform: The objective is to integrate intelligent software with multi-source data from document management and progress tracking, creating a customer-oriented, unified digital delivery platform. It not only enables interactive 3D model browsing but also supports rapid data retrieval by tag number or region, linked document access, construction simulation, and training functions, ultimately delivering a "scalable and operational" digital facility core.

By the end of 2025, digital transformation solutions were successfully delivered for leading domestic fine chemical companies including Juhua Group and Tianjin Bohai chemical industry group.

Automation and Informatization

In industries with complex control logic and high regulatory risks, such as fine chemicals, synthetic biology, and biopharmaceuticals, traditional digital transformation often faces challenges such as substantial capital investment, low implementability of solutions, and high costs of trial and errors. By leveraging over a thousand process automation and informatization projects in the industrial sector, TIANS has developed multi-level process-integrated solutions that are closely aligned with production scenarios, systematically resolving the core conflict among efficiency, compliance, and cost.

1 Process Technology Leading Full-Process Automation

TIANS has established a cross-disciplinary expert team encompassing process engineering, instrumentation, automation systems, equipment, and validation. The core members of this team possess extensive industry experience. By capitalizing on in-depth understandings of industrial production scenarios, we introduced a menu-style four-level automation service to guarantee that the solutions are both advanced and implementable:

Level I: Modular Rapid Deployment

scenarios, such as chemical synthesis, biotechnology fermentation, and biomedical applications, a core control model library has been developed. This allows customers to independently and flexibly design and manage production recipes in accordance with their specific process requirements. The system promotes efficient integration and optimization, attaining over 80% efficiency improvement in solution design and adjustment, and enhancing the stability of control schemes by more than 20%.

Level II: Integrated Process-Automation Synergy

Through forward integration design, process and automation experts collaborate at the origin to directly incorporate requirements such as control points and safety interlocks into 3D design and automation solutions. This guarantees that the process intent is accurately transmitted to the control system, assisting customers in achieving an average 10-25% increase in product qualification/yield rates and reducing fluctuations in key process parameters by approximately 40%.

Level III: Compliance Validation Acceleration

A template-based validation document system (URS/DQ/IQ/OQ) and electronic batch record solutions are provided. These solutions, validated by extensive project experience, reduce validation cycles by over 30% on average, facilitating systems to achieve compliance in a timely manner.

Level IV: Continuous Operations Empowerment

offer[illegible] compass performance optimization and preventive maintenance, enabling clients to attain sustained enhancements in production efficiency.

2 Light Production Management System

To circumvent the challenges of digital transformation, namely high costs and protracted cycles, a flexible, efficient, and cost-effective production management system was developed based on the principles of light design, modularity, and ease of deployment.

The core product, Light Manufacturing Execution System (T-MES), is characterized by drag-and-drop processes and plug-and-play compliance, significantly reducing the application threshold.

Drag-and-Drop Ultra-Fast Modeling: The system incorporates nearly 100 pre-built universal business components. Process engineers can configure production workflows by simply dragging these components, and the system automatically generates electronic SOPs. This innovation shortens the modeling and deployment cycle from weeks to hours.

Out-of-the-Box Compliance: Standardized components such as electronic signatures and audit trails reduce validation documentation by 80%, ensuring efficient and compliant implementation.

AI-powered Production Intelligence Hub: By integrating open-

source AI models with enterprise knowledge bases, it combines data, rules, and expertise to provide intelligent decision support for anomaly alerts and process optimization.

By the end of 2025, TIANS T-MES had been successfully implemented in over 10 engineering projects across chemical synthesis, biotechnology fermentation and the food & beverage industries, including Huashengyuan and Yihai, it assists clients in achieving the following:

- A 20%-30% increase in production e f ciency
- The ability to trace quality issues within 10-40 minutes, which was previously taking days.
- An over 50% improvement in management decision-making e f ciency.

3D Visualization Platform

The high-fidelity digital twin platform, developed utilizing Unreal Engine 5, integrates and optimizes BIM models (with comprehensive reconstruction of architectural structures, pipeline layouts, equipment placements, etc.). Through a dedicated data relay station, it collects and analyzes multi-system data in real-time, presenting the overall operational status via immersive 3D interactive interfaces. This enables a new intelligent operation model of "one-screen centralized management", which has been

4

successfully applied in leading domestic biopharmaceutical enterprises such as BeiGene, Hanu Ante Pharmaceutical, and Huashengyuan.

Value Loop from Stable Production to Intelligent Operation

The TIANS Automation and Informatization Team is based on process expertise and customer value. By implementing "full-process automation", it establishes a stable, efficient, and compliant physical production foundation, while the "light production management system" creates a flexible and intelligent digital management environment. This synergy constructs a future-oriented, sustainable, optimized and innovative digital platform for manufacturing enterprises, laying a reliable and agile foundation for smart factories.

AI Applications

In the era of the explosive growth of artificial intelligence (AI) technology, TIANS has astutely capture the pulse of technological transformation. Beyond simple digital connectivity, TIANS is committed to intelligent generation and decision-making. By deeply integrating AI into all aspects of engineering design, process decision-making, and business operations, TIANS has achieved a profound synergy between "AI+engineering". This integration has not only notably enhanced d[illegible]e f ciency but also achieved a paradigm shift from "experience -driv[illegible] to "data-driven" decision-making, redefining the productivity stand[illegible]s in engineering services.

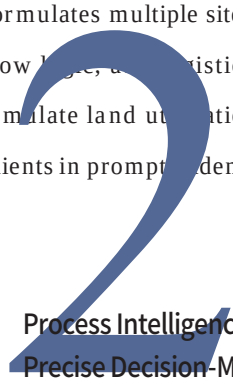
1 AIGC-driven Intelligent Design: From "Conception" to "Visualization"

TIANS takes the lead in adopting generative artificial intelligence (AIGC) technology, overcoming the temporal and spatial limitations of traditional engineering design. This innovation provides visually appealing and decision-supporting design solutions for clients.

1.1. Instantaneous Facade Rendering: Powered by our proprietary industrial architecture style model, designers only need to input basic parameters and style keywords, and the AI can generate dozens of high-quality facade renderings in diverse styles within minutes. This

innovation not only shortens the design cycle by over 90%, but also allows clients to compare visual solutions from multiple perspectives during the early stage of the project, realizing the vision of "what you think is what you see".

1.2. Site Layout Planning Based on Intelligent Deduction: Drawing upon TIANS experience from over 3,500 projects, our AI assistant formulates multiple site layout plans according to site parameters, process flow l[illegible], a[illegible]istics requirements. By means of AI algorithms that simulate land ut[illegible]ation, logistics costs, and energy efficiency, it assists clients in prompt[illegible]dentifying optimal layouts to optimize land usage.



Process Intelligence Brain: Massive Data Accumulation Enables Precise Decision-Making

"Process-centricity" constitutes the core characteristic of TIANS, and AI functions as a potent engine to activate this core and propel future development. Through in-depth analysis and structured processing of process data from over a thousand previous projects, TIANS has established an industry-leading "Process Intelligence Brain".

2.1.Process Data Accumulation and Knowledge Graph: TIANS has digitized the expertise of over 400 process technology specialists and extensive engineering data (including material balance, energy consumption data, equipment selection parameters, etc.) into digital

assets, and trained specialized vertical models for high-tech fields such as fine chemical engineering, synthetic biology, and biopharmaceuticals.

2.2.Assist in Decision-Making Acceleration: During the project feasibility study and conceptual design stages, AI utilizes historical data to rapidly predict crucial process parameters and investment estimates, offering quantifiable data support for the comparison and selection of technical routes. This enables clients to make well-informed decisions and improve the project's implementability.

Customized Solutions Based on Industry Insights

TIANS innovatively integrates and constructs a technical marketing

By seamlessly integrating state-of-the-art AI technology with TIANS' profound process accumulation, lifecycle EPC services, and industry-specific insights, we are leading a new engineering paradigm where "virtual guides reality, data drives decision-making".

Compliance Validation

The requirements for GMP compliance and validation in both domestic and international GMP standards and guidelines, as well as those from related organizations, are becoming increasingly strict. Through systematic thinking and long-term practice, TIANS has established an experienced professional validation team that can offer clients qualification and validation services for critical systems, including facilities, HVAC (Heating, Ventilation, and Air Conditioning), clean

of "post-event supplementary validation" and deeply integrated validation work into every phase of project construction. Adhering to international advanced concepts such as ICH Q10 and ISPE C&Q2, the validation services are thoroughly incorporated into the following three stages:

1.1. Design Phase: Proactive Intervention, Defining Quality

The validation team participates from the project's initiation, participating in and reviewing the definition and evaluation of Critical Quality Attributes (CQAs) and Critical Process Parameters (CPPs) from both compliance and customer needs perspectives, as well as the identification of Critical Control Elements (CCEs/CDEs). This ensures that the design output is verifiable from the beginning, laying a solid foundation for subsequent compliance and thereby reducing the cost of late-stage changes caused by design defects by approximately 40%.

1.2. GEP Phase: Quality-Oriented, Standardized Implementation

During the Good Engineering Practice (GEP) phase, the validation team adopts a GMP outcome-driven approach by establishing clear quality requirements for critical control points. Through validation-oriented methodologies, we standardize construction and equipment installation to ensure that all work complies with regulatory standards. This methodology achieves a reduction of over 50% in on-site rework and corrective actions, shortens system commissioning and validation timelines by approximately 30%, and significantly reduces the risks of compliance deviation caused by project non-compliance.

1.3.Delivery and Usage Phase: Professional Testing to Ensure Handover

Prior to system delivery, the validation team conducts standardized commissioning and qualification tests (e.g., SAT/IQ/OQ) with professional proficiency. This ensures that all systems and equipment are transferred to customers in a stable and compliant state, while supporting subsequent performance qualification (PQ) to ensure production continuity and process reliability.

Synchronous Qualification for Efficiency and Compliance

The strict implementation of "synchronous qualification" serves as the foundation for the full lifecycle compliance management of the TIANS validation team. By integrating verification activities into every phase of project construction and generating compliance documents in real-time, we shorten the average project cycle by 15%-20%, substantially saving clients' time and audit costs.

"synchronous qualification" 4D model:

Project Phase	Core Activities	Deliverables
User Requirements (URS)	Communicate and review the applicability and compliance of URS clauses.	Ensure requirement documents meet validation standards to avoid subsequent deviations.
Design & Procurement	Review design documents and drawings; participate in key equipment selection and FAT.	Control design and equipment quality from the source, eliminating issues at the manufacturing plant.
Construction & Installation	Conduct real-time inspections of key quality elements; collect and file equipment data and critical records.	Ensure construction process control and real-time document archiving, providing an evidence chain for confirmation reports.
Commissioning & Qualification	Lead risk assessments, DQ, SAT, IQ/OQ, etc., to ensure scientific and logically rigorous processes.	Deliver a complete and compliant validation package, ensuring smooth system handover and regulatory release.

Trial Run Platform

As the "final stage" of EPC projects, trial run directly determines both the project's deliverables and the client's return on investment. Drawing on over 3,500 project implementations and more than 1,000 technical reviews, TIANS has made dual breakthroughs in methodology and execution. It has accomplished this by establishing a systematic trial run pl[illegible] and standardizing process re-engineering, which has notably incre[illegible]d the rate of one-time successful trial run and improved project produ[illegible]on e f ciency.

1 A Fully Integrated Professional Trial Run Technology System

To tackle common pain points and crucial phases during the trial run phase, a cross-disciplines collaborative trial run verification platform has been established. This platform assembles experts from the entire chain, including process engineering, equipment, instrumentation and electrical systems, safety, and quality, forming a trial run team led by the chief engineer. By the end of 2025, the platform had assembled over 50 experts with extensive practical experience in process engineering and production.

TIANS has developed a universal validation system that is independent of specific manufacturing processes. This system is

driven by standardized procedures and data, facilitating a fundamental transformation of trial runs from being "reliant on empirical judgment" to "guaranteeing system performance". Even when faced with unknown "process black boxes", it allows for the objective qualification and assessment of whether the technology meets the required standards.

In a large-scale antibiotic project, pre-intervention via the trial-run verification platform identified and resolved 23 design risks in advance. This resulted in a 30% reduction in the trial-run cycle and enabled the client to achieve compliance and production targets 42 days ahead of schedule.

2 Lifecycle Service and Multidimensional Empowerment

TIANS integrates its test validation team and standardized processes throughout the project lifecycle, ensuring both "one-time successful trial run" and "long-term stable operation".

Process Optimization and Front-end Design: Participate in the evaluation during the process package review and HAZOP analysis phases, presenting recommendations for process safety and control logic optimization based on actual operational data. Through the *Compulsory Milestone Review System*, trial run feedback is incorporated as a mandatory closure criterion for the 30% and 60% design model reviews, eliminating design defects at the source.

Detailed Design Phase:A standardized checklist system is used to review P&IDs, equipment layout drawings, etc., ensuring that the design aligns with the actual operational and maintenance requirements. The *Document Sign-off Authority System* stipulates that critical drawings must be co-signed by the trial run verification team, integrating O&M requirements into construction drawings to minimize future modifcations.

Procurement and Construction Phase: The technical agreement shall clearly defne requirements for operational training and specialized tools, incorporating commissioning and operation & maintenance (O&M) clauses into the bidding framework according to the *Standardized Technical Specification*. During construction, the Standardized *Pre-Commissioning Procedure* is used to supervise installation and commissioning, ensuring that the physical construction conforms to the design intent.

Trial Run Execution and Delivery: Prior to the trial run, the *Trial Run Operation Execution Plan* and emergency response plan are formulated. During the trial run, the *Trial Run Operation Manual* and the expert team collaborate throughout to ensure a rapid response and smooth progress.

In a vitamin B12 project, it achieved one-time successful trial run, achieving stable production within only 62 days after mechanical completion, which is 40% shorter than the industry average cycle.

3

Three-stage Systematic Validation Ensures Reliable Delivery

TIANS implements the progressive principle of "transitioning from standalone to system integration and from no-load to operation". Through a three-phase validation process, namely single -machine trial run, coordinated trial run, and material-load trial run, it gradually verifies equipment performance, system synergy, and process compliance. Supported by standardized procedures and expert supervision throughout, the project attains its core objective of "one-time successful trial run and long-term stable operation", delivering engineering deliverables that is production-ready.

One-time Successful Trial Run

In engineering industry, "one-time successful trial run" goes beyond mere pledges; it represents a comprehensive assessment of technical systems, organizational capabilities, and delivery execution. TIANS was the first to systematically implement this standard across the industry and continuously validates it through major projects. Through a model characterized by end-to-end process control, cross-disciplinary integration, and lifecycle empowerment, we fundamentally eliminate clients' uncertainties regarding production timelines and operational outcomes. In doing so, we have redefined the benchmark for engineering delivery — propelling the industry from traditional "completion-based handover" to results-driven "efficient production launch".

By the end of 2025, TIANS had successfully completed one-time successful trial run in over 100 projects, spanning multiple industries such as biopharmaceutical, fine chemicals, and new materials. This has evolved into a repeatable, verifiable delivery paradigm — one that is actively reshaping the engineering industry toward accountability for result-oriented and a value-driven model of success.

Reference Projects

Excellence is never an overnight achievement but is forged through continuous iteration and refined over time. By the end of 2025, TIANS had confronted challenges and delivered values in over 3,500 projects, evolving from an industry participant to a key challenger and ultimately a trailblazer. This journey vividly embodies the philosophy of "inheriting legacy, inspiring innovation, pursuing practice, and aspiring to greatness" — rooted in heritage, focused on innovation, dedicated to practice, and driven by aspirations.

Within this developmental framework, each project embodies and testifies to this philosophy.

Industry	No.	Reference Projects (Partial)
Fine Chemicals	1	Zhejiang Jusheng Fluorine Chemical Co., Ltd. Fluoropolymer Project
	2	Zhejiang Jusheng Fluorine Chemical Co., Ltd. Perfuoroether Rubber Project
	3	Zhejiang Jusheng Fluorine Chemical Co., Ltd Molten Fluorine Resin Project
	4	Gansu Juhua New Material Co., Ltd. High Performance Silicon Fluorine New Material Integrated Project

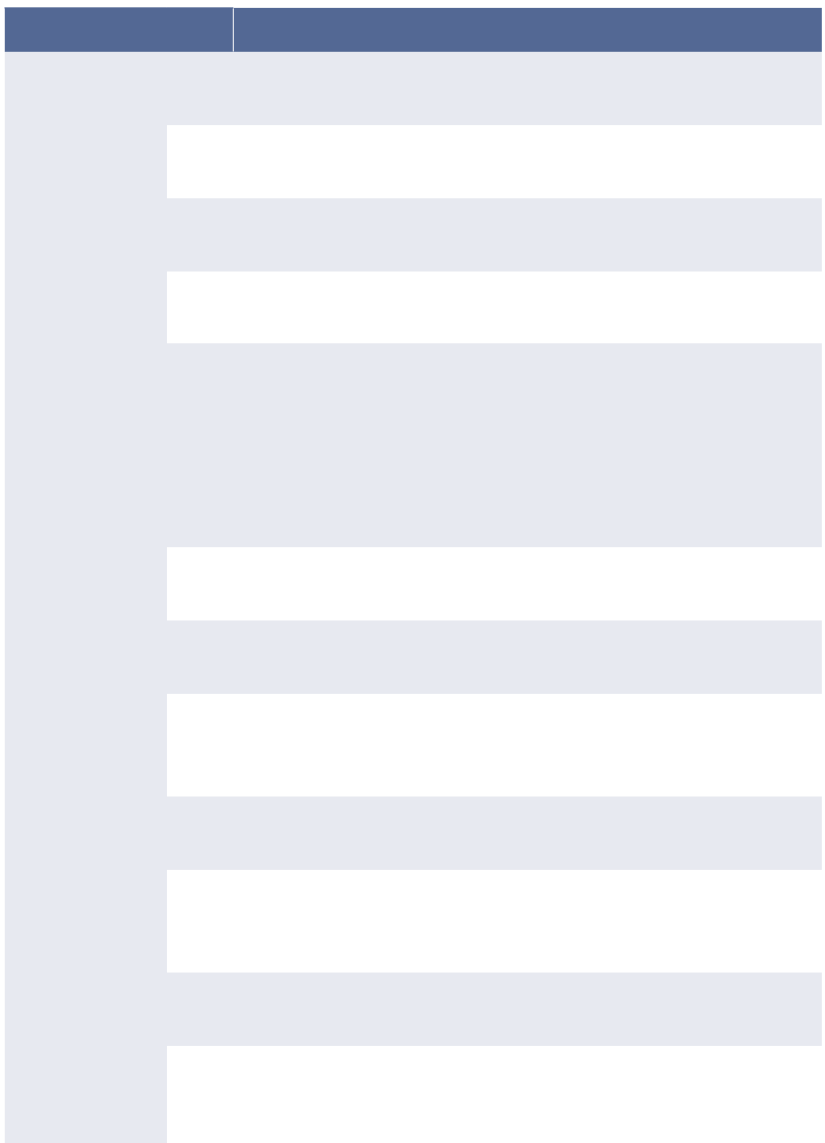
Industry	No.	Reference Projects (Partial)
Fine Chemicals	5	Gansu Juxiang Fluoroplast Technology Co., Ltd. 5000 tons/year polytetrafluoroethylene series products deep processing project
	6	Tianjin Changlu Chemical New Material Co.,Ltd Fluorine Organic New Material Industrialization Project
	7	CECEP Valiant Corporation Limited Industrial Park Project
	8	CECEP Valiant (Penglai) New Materials Co., Ltd. Electronic Information Materials Project
	9	Hubei Yihua New Energy Co., Ltd. New Energy Battery Additive Project
	10	Zhejiang Yanyi New Energy Technology Co., Ltd. Lithium Battery Water-based Binder Project
	11	Sichuan Yanyi New Material Co., Ltd. Special Water-based Binder Project
	12	Shenzhen Yanyi New Materials Co., Ltd. Lithium Battery Functional Additives and Materials Production Project
	13	Henkel Loctite (China) Co., Ltd. Green High-end Adhesive Industrialization Base Project
	14	Shandong Hengxing New Material Technology Co., Ltd. Calcium Propionate Project
	15	SPIC High-Purity Electronic Special Gas Project
	16	Shangsai (Huanggang) New Material Co., Ltd. New Photoelectric Organic Semiconductor Materials Industrialization Project
	17	Lithium Chen (Jiangshan) New Materials Co., Ltd. Silicon Carbon Project
	18	Star New Energy (Hami) Technology Co., Ltd. Project for the Manufacturing Base of High-Accitivity Electrolyte for Vanadium Redox Flow Battery

Industry	No.	Reference Projects (Partial)
Fine Chemicals	19	Jingdezhen Fushine Life Technology Co., Ltd. Vinylene Carbonate (VC) & Electrolyte Additives Project
	20	Henan Pingmei Shenma Electronic New Material Co., Ltd. Vanadium Liquid Flow Energy Storage Equipment New Medium Project
	21	Shandong Kehan Silicon Source New Materials Co., Ltd. Electronic-grade Silicon Chemicals Project
	22	Kingboard (Hengyang) Industrial Co., Ltd. Annual Production of 10,000 Tons of Chlorine-Containing Electronic-Grade Specialty Gases Project
	23	Tianjin DisTheAll Technology Co., Ltd. 100-ton Electronic-Grade Equipment project
	24	Shandong Ginno New Material Technology Co., Ltd. Electronic-grade Organic Borate Ester Project
	25	Jingchu Membrane Material (Yangquan) Co., Ltd. Yangquan Quasi-solid State Membrane Project
	26	Jiangxi Desi Chemical Co., Ltd. Electronic Chemicals Project
Synthetic Biology	27	Ili Chuanning Biotechnology Co., Ltd. Fermentation Active Pharmaceutical Ingredients and High-end Active Pharmaceutical Ingredients Project
	28	Yili Jiangning Biotechnology Co., Ltd. Green Circular Economy Industrial Park Project
	29	Qinhuangdao AHB Bioengineering Co., Ltd. Small Amino Acid Project
	30	Baiyannur AHB Biotechnology Co., Ltd. Small Amino Acid Project
	31	Anhui AHB Biotechnology Co., Ltd. AI-driven Biomanufacturing R&D and Pilot Demonstration Base Project

Industry	No.	Reference Projects (Partial)
Synthetic Biology	32	Inner Mongolia EPPEN Biotechnology Co., Ltd. Monosodium Glutamate Project
	33	Kekedala Jinhai Biotechnology Co., Ltd. 600,000-ton Corn Deep Processing Project
	34	Vedan International (Vietnam) Co., Ltd. Amino Acid Project
	35	Inner Mongolia Guangda Lianfeng Biotechnology Co., Ltd. New Construction of Bio-based New Materials and Pharmaceutical Intermediates Project
	36	Inner Mongolia VTR Biotechnology Co., Ltd. Bio-enzyme Preparation Project
	37	Chifeng Pharmaceutical Co., Ltd. Hongshan Base Project
	38	Shanxi Jinbo Biomedical Co., Ltd. Industrialization Project of Type III Human Collagen
	39	Polyway (Lianyungang) Biotechnology Co., Ltd. New 50,000 tons/year Straw-based Biosynthesis Industrialization Project
	40	Shengtai Biotechnology Co., Ltd. of Fufeng Group Kazakhstan Biotechnology Industrial Park Project
	41	Cathay Biotech's Fermentation Continuous Sterilization Projects at its Jinxiang, Wusu, and Taiyuan bases
	42	Zhaoqing Star Lake Biotechnology Co., Ltd. Multi-functional Fermentation Pilot Platform Project
	43	Wuhan Grand Hoyo Co., Ltd. Amino Acid Industry Construction Project
	44	Angel Yeast Co., Ltd. Enzyme Preparation Project
	45	Bloomage Biotechnology Co., Ltd. Life Health Industrial Park Project

Industry	No.	Reference Projects (Partial)
Synthetic Biology	46	Wanhua Chemical (Sichuan) Co., Ltd. Fermentation Project
	47	Heilongjiang Yiheng Biotechnology Co., Ltd.Annual Production of 10,000-ton Key Technology New Enzyme Preparation Project
	48	Fortune Pharmaceutical (Taixing) Co., Ltd. New Production Base Project
	49	Hengtong (Inner Mongolia) Biotechnology Co., Ltd. Small Variety Amino Acid Industrial Base Project
	50	Nanjing Biotogether Biotechnology Co., Ltd. Research and Industrialization Project on High-E f ciency Nucleotide Biosynthesis Technology
	51	Changde Economic and Technological Development Zone Development and Construction Bureau Synthetic Biology Manufacturing Pilot Transformation Base Project
	52	Henan Muyuan Anliang Synthetic Biotechnology Co., Ltd. 30,000 tons/year Synthetic Biological Products Project
	53	Inner Mongolia Zhongmu Biological Pharmaceutical Co., Ltd. Demonstration Project of Innovation-driven Industrial Chain Upgrade of Macrolide
	54	Xinjiang Yilihong Bio New Material Technology Co., Ltd. 500,000 tons/year Agricultural By-products Deep Processing and Comprehensive Utilization Project
	55	Yi Yi Xing Hua Biotechnology Co., Ltd. Integrated Project of Active Pharmaceutical Ingredients and Formulations
	56	Shenyang Botai Biopharmaceutical Co., Ltd. Steroid Hormone Project
	57	Shandong Jinnuo Pharmaceutical Co., Ltd. Synthetic Biology Innovation Base Project

Industry	No.	Reference Projects (Partial)
Biopharmaceutical	58	Guangzhou Beone Biopharmaceutical Co., Ltd. ADC&DS4 Workshop Project, Nanyuan Park
	59	Beone (Shanghai) Pharmaceutical R&D Co., Ltd. Shanghai Innovation Center Project
	60	Biomedical Technology Transfer and Transformation Center (Guangzhou) Co., Ltd. Project
	61	Chiatai Tianqing Pharmaceutical Group Co., Ltd. High-end Comprehensive Preparation Workshop Project
	62	Lvye Jia'ao Pharmaceutical Shijiazhuang Co., Ltd. CNS Recombinant and Drug R&D Production Base Project
	63	Fosun Antigen (Chengdu) Biopharmaceutical Co., Ltd. Innovative Vaccine Headquarters and Industrialization Base Project
	64	Shenzhen Hepalink Pharmaceutical Group Co., Ltd. New Preparation Line Project at Pingshan Factory
	65	Shanghai Topalliance Bioscience Engineering Co., Ltd. New Pilot Plant Construction Project at Lingang Base
	66	Hubei Grandpharma Yongsheng Pharmaceutical Co., Ltd. Preparation Factory Construction Project
	67	Guangzhou Innocare Pharmaceutical Technology Co., Ltd. Construction Project of Anti-Cancer Drug Production Base
	68	Shihuida Pharmaceutical Group (Jilin) Co., Ltd. Pilot Production Facility for Biologics Project
	69	Suzhou Juwei Biotechnology Co., Ltd. 45 Million Doses/year Human Vaccine Project
	70	Hangzhou DAC Biotechnology Co., Ltd. Antibody-Drug Conjugate (ADC) Project
	71	Jiangsu Vanguard Pharmaceutical Co., Ltd. Changle Phase II Comprehensive Preparation Workshop Project



Industry	No.	Reference Projects (Partial)
Chemical Pharmaceuticals	85	Shandong Lukang Pharmaceutical Co., Ltd. Circular Human Synthetic Active Pharmaceutical Ingredient Technology Upgrade Project
	86	Zhuhai United Laboratories Co., Ltd. Gaolan Port Production Base Project
	87	Chengdu Microchip Pharmaceutical Co., Ltd. Original Innovative Drug Manufacturing Base Project
	88	Huanggang Humanwell Pharmaceutical Co., Ltd. Industrialization Production Base Project of High-end New and Special Active Pharmaceutical Ingredients
	89	Jiangsu Sinopep Aosainuo Biopharmaceutical Co., Ltd. Construction Project of Peptide Active Pharmaceutical Ingredient Workshop
	90	Fujian Genohope Biotech Co., Ltd. API Pilot Production and Pharmaceutical Industrialization Base Project & Peptide Industrial Park Project
	91	Sichuan Duorui Pharmaceutical Co., Ltd. High-end Peptide Biopharmaceutical Industry Base Project
	92	Hisun Pharmaceutical (Hangzhou) Co., Ltd. Fuyang Base Project
	93	Tianke (Jingzhou) Pharmaceutical Co., Ltd. Green Pharmaceutical Industry Base Project
	94	Pharmaron (Shaoxing) Pharmaceutical Co., Ltd. CDMO Active Pharmaceutical Ingredient Project
	95	Betta Pharmaceutical (Shengzhou) Co., Ltd. Innovative Drug Industrialization Base Project
	96	Huadong Medicine (Xi'an) Bodyguard Pharmaceutical Co., Ltd. Construction Project of New Base for Active Pharmaceutical Ingredients at the Pharmaceutical Division

Industry	No.	Reference Projects (Partial)
Food Health	111	Tianjin Modern Innovation Traditional Chinese Medicine Science and Technology Co., Ltd. Innovation Center Project for Modern Traditional Chinese Medicine Manufacturing
	112	Etsong (Qingdao) Industrial Co., Ltd. Flavoring and Fragrance Production Line Project
	113	Foshan Mai Dian Food Co., Ltd. Turnkey Project for Flavoring and Seasoning Process
	114	Hubei Honch Pharmaceutical Co., Ltd. Anti-tumor Preparation and Plant Extraction Processing Turnkey Project
	115	Guangxi WeHand Pharmaceutical Co., Ltd. Construction Project for Intelligent Traditional Chinese Medicine Production Line
	116	Baoding Waychein Food Technology Co., Ltd. Process Improvement Project for Seasoning Materials
	117	Yichang Huamanwell Pharmaceutical Co., Ltd. Yuan'an Oral No.Third Workshop Syrup Ingredient System Project
	118	Weilong Delicious Global Holdings Co., Ltd. New Red Oil Turnkey Project
	119	Sichuan Conwee Food Co.Ltd. Base Oil and Water Recovery and Treatment System Project
	120	Xiamen Tobacco Industrial Co., Ltd. Purchase of Extraction Equipment and Supporting Implementation Project

TIANS Model

By posing critical questions to uncover innovative solutions and establishing structured pathways to enable transformative growth, the TIANS Model will continue to embody this advanced paradigm of industrial evolution. It drives technological innovation with purpose and delivers measurable outcomes that set new industry benchmarks. In empowering industries to advance toward higher value-added, environmentally sustainable, and intelligent manufacturing practices, the model consistently contributes predictable and impactful momentum to the global industrialization of emerging technologies.

技驭未来

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