Research Project Report

Motivation of High-Risk Industry Employees Aiming for a Circular Economy: A Case of Chinese Chemical Manufacturers

HUANG Zheng

Supervisor: Kunio Shirahada

Graduate School of Advanced Science and Technology

Japan Advanced Institute of Science and Technology

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Abstract

High Reliability Organizations (HROs), particularly in the chemical sector, face a profound institutional paradox under the global "Dual Carbon" strategy. While the Circular Economy (CE) transition requires continuous technical change and process reorganization, the traditional Safety-I management paradigm demands absolute system stability and zero tolerance for errors. This macro-level paradox of "seeking change" versus "seeking stability" often translates into structural rigidity and job burnout for frontline employees, severely inhibiting the organization's adaptive capacity (Safety-II). Existing studies focus on macro-strategic compatibility but rarely discuss how micro-individuals resolve this tension through agentic behaviors under the dual constraints of resources and institutions.

To explore the micro-mechanisms of this resolution, this study employs an inductive Comparative Multiple Case Study based on Resource Bricolage Theory and Self-Determination Theory. It examines three distinct chemical business units in a typical old industrial base in Eastern China: a private fine chemical enterprise (survival-oriented), a large SOE core unit (orchestration-oriented), and an SOE peripheral unit (bricolage-oriented). Data were collected through semi-structured interviews, on-site walking observations, and secondary archive analysis, and systematically analyzed using the Gioia method.

The findings reveal distinct motivational pathways determined by contextual constraints. In the private enterprise, high liability pressure leads to a defensive survival anxiety. In the resource-abundant SOE core unit, top-down "Resource Orchestration" grants employees Public Service Motivation based on macro narratives, yet standardized Safety-I control deprives them of process autonomy, leading to a dilemma of "cognitive agreement but emotional detachment." Conversely, in the SOE peripheral unit facing policy-induced resource scarcity, "Resource Bricolage" emerges as a strategic survival means. Frontline employees creatively reframed the "burden" of heating into a "low-carbon compliance shield" by converting refinery waste heat. This process of "turning waste into treasure" not only legitimized the department but also strongly activated employees' Safety-II adaptive capabilities through "visible efficacy" derived from creativity and prosocial motivation for community stability.

This research advances the theoretical understanding of HRO transformation by constructing a "Bricolage-Empowerment Model." It reveals that resource bricolage functions not merely as a material strategy for scarcity but as a psychological restoration mechanism in rigid organizations. The study suggests that while the macro Safety-I system remains unshakable, allowing micro-bricolage behaviors in peripheral areas is an effective path to activate organizational resilience and employee vitality, providing a practical framework for balancing safety rigidity with adaptive flexibility.

Keywords: *Circular Economy; High Reliability Organizations; Resource Bricolage; Safety-II; Employee Motivation; Self-Determination Theory*

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Abbreviation

CE Circular Economy

HRO High Reliability Organization

SDT Self-Determination Theory

SOE State-Owned Enterprise

KPI Key Performance Indicator

RQ Research Question

HSE Health, Safety, and Environment

3Rs Reduce, Reuse, Recycle

Chapter 1. Introduction

This chapter provides an overview of the dissertation, focusing on the micro-motivational mechanisms of frontline employees in High Reliability Organizations (HROs) during the transition to a Circular Economy. It introduces the research background, highlighting the deep institutional paradox between the need for "continuous change" under the Dual Carbon strategy and the strict requirement for "absolute stability" in safety management. The chapter identifies the critical gap regarding how individuals resolve this tension under resource and institutional constraints, defines the research objectives and questions, and concludes with a summary of the thesis structure.

1.1 Research Background

With the advancement of the global carbon neutrality strategy, high-polluting industries, represented by the chemical industry, are undergoing a deep transition period. As a typical process industry, chemical production involves complex molecular-level material transformation and energy metabolism. This characteristic of "interactive complexity" and "tight coupling" (Perrow, 1984) makes the industry naturally compatible with Circular Economy (CE) concepts in terms of underlying physical logic, making it a primary scenario for waste resource utilization and energy cascading in the industrial system.

However, these externally imposed environmental performance targets trigger conflicts in management logic within the organization. To control high systemic risks in production processes, chemical enterprises usually adopt the High Reliability Organization (HRO) operation mode. The core mission of this mode is to prevent catastrophic consequences. Its management logic follows strict safety principles, aiming to ensure survival by maintaining absolute system stability and low volatility (LaPorte & Consolini, 1991).

This constitutes a profound attribute paradox: in the technical dimension, chemical production requires process changes and resource reorganization through CE to pursue

efficiency; but in the management dimension, the HRO mode requires strict restriction of non-standard operations and system disturbances to pursue control. This deep conflict between the technical necessity for change and the managerial necessity for stability subjects' frontline production organizations to extremely complex dual task constraints.

At the micro-operational level of HROs, this macro-conflict translates into significant cognitive load for frontline employees. Based on the safety framework, the core Key Performance Indicator (KPI) for frontline employees is zero accidents. In actual operations, most of their working time is allocated to standardized routine inspections and dashboard monitoring. Such work is characterized by low arousal and high repetition, which easily leads to psychological "vigilance decrement" (Mackworth, 1948). Employees are strictly bound by the typical Safety-I negative feedback psychological contract: "no reward for safety, but punishment for accidents" (Hollnagel, 2014).

In this context, circular economy tasks are superimposed on existing workflows as incremental work. For employees already burdened with high-intensity inspections, these extra waste disposal targets are often perceived as operational disturbances or pure compliance burdens, further exacerbating the prevalent job burnout in the industry. Meanwhile, in terms of organizational resource allocation, there is a significant "resource-task mismatch" between core departments and peripheral auxiliary departments. Peripheral units bear rigid waste disposal targets but face budget constraints, forcing them to seek non-standard coping strategies.

However, despite the increasing technical application of CE, existing theoretical research and management practice still have significant cognitive blind spots. First, existing literature mostly views CE as an economic or environmental strategy from an instrumental rationality perspective (e.g., Kirchherr et al., 2017; Ghisellini et al., 2016), ignoring its psychological impact on the executing micro-subjects—the frontline employees. Second, in the safety management field, facing the prevalent job burnout in HROs, Safety-II theory (Hollnagel,

2014; Woods, 2015) lacks concrete implementation tools; traditional external incentives struggle to penetrate the psychological barrier of defensive compliance. There is an urgent need to explore: within boring chemical workshops, does there exist a mechanism endogenous to the task itself that can break this deadlock of safety burnout? This constitutes the problem consciousness of this study.

1.2 Research Objectives

Based on the above background, this study aims to break through the traditional perspective focusing solely on "economic benefits," turning instead to explore the "Positive Spillover Effect" (Thøgersen, 1999; Truelove et al., 2014) of the circular economy on frontline employees in high-risk industries.

Specifically, this study attempts to demonstrate that although the primary purpose of enterprise CE implementation is compliance, it objectively generates an unexpected psychological value. In resource-constrained and extremely boring HRO contexts, CE tasks, by creating "visible results," allow employees to regain a sense of control over their work, thereby becoming a psychological power source to counter job burnout and activate Safety-II adaptive capabilities.

To achieve these objectives, this study constructs the following two core Research Questions (RQs):

RQ1 (Contextual Differences): In the HRO industry, how do different resource endowments (scarcity vs. abundance) and institutional constraints (panoptic monitoring vs. institutional voids) shape employees' motivation patterns in CE? Why is it that only in resource-scarce peripheral units can CE be transformed into an opportunity to activate psychological motivation?

RQ2 (Micro-Mechanisms): In resource-constrained contexts, through what micro-psychological mechanisms (such as creator self-efficacy) does the "Resource Bricolage"

behavior that employees are forced to undertake transform boring compliance tasks into psychological energy that counters burnout and activates proactive adaptability?

1.3 Research Methodology

This study adopts a Comparative Case Study method (Eisenhardt, 1989; Yin, 2014), selecting representative business units within chemical enterprises (private enterprise, SOE core unit, SOE peripheral unit) as research objects. Through in-depth interviews, field observations, and secondary data analysis, it compares employee behavioral patterns and psychological mechanisms under different contexts, and applies Resource Bricolage Theory (Baker & Nelson, 2005) and Self-Determination Theory (Deci & Ryan, 2000) for coding analysis (Gioia et al., 2013).

1.4 Structure of the Thesis

The structure of this dissertation is organized as follows:

Chapter 1 introduces the research background and objectives;

Chapter 2 reviews literature related to Safety-I & Safety-II, resource bricolage, and work motivation;

Chapter 3 elaborates on the research methodology and case selection basis;

Chapter 4 presents the empirical analysis results of the three cases;

Chapter 5 provides a comprehensive discussion and theoretical dialogue on the case results;

Chapter 6 summarizes research conclusions, limitations, and future prospects.

To provide a clear overview of the logical flow and chapter organization, the research

framework of this thesis is illustrated in Figure 1.

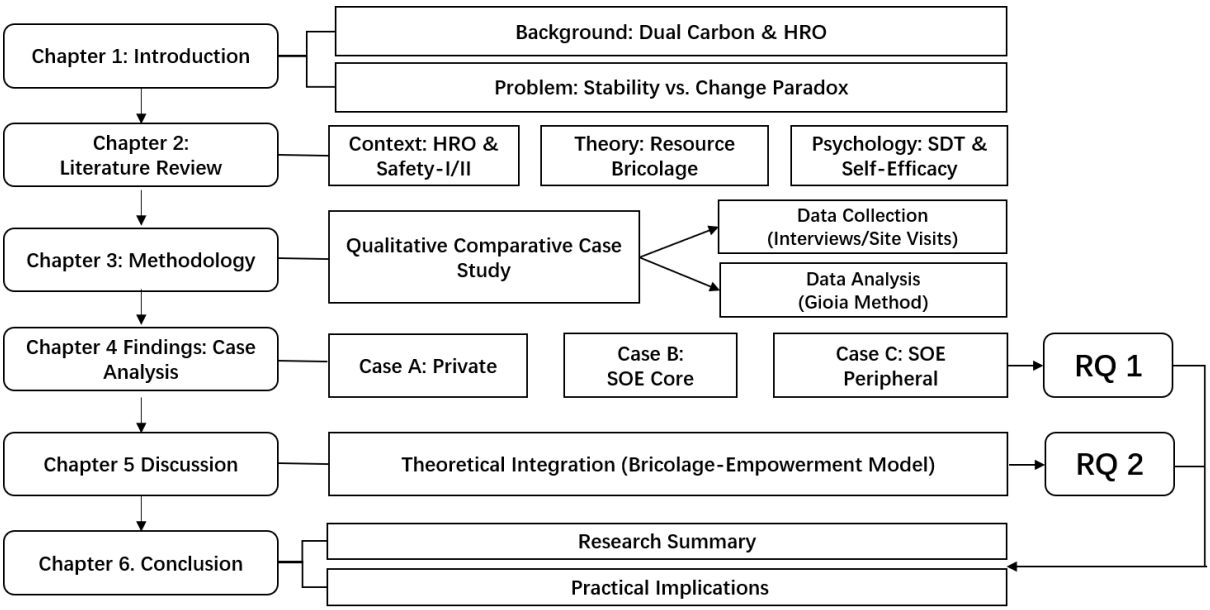

Figure 1: Research Framework of the Thesis

Chapter 2. Literature review

This chapter establishes the theoretical foundations for the dissertation by reviewing pertinent literature across three key dimensions: context, behavior, and psychology. It begins by examining the operational characteristics of High Reliability Organizations (HROs) and the paradigm shift from Safety-I to Safety-II, providing the contextual basis for understanding safety management tensions. Subsequently, it introduces Resource Bricolage Theory as the core behavioral lens to analyze employee agency under constraints, contrasting it with Resource Orchestration. Finally, the chapter incorporates Self-Determination Theory and Social Cognitive Theory to explore the micro-psychological mechanisms—specifically self-efficacy and prosocial motivation—that drive adaptive behaviors. The chapter concludes by identifying gaps in current research and summarizing the theoretical framework that guides this study.

2.1The Imperative of Circular Economy in the Chemical Context

2.1.1 Concept and Definition

Under the constraints of the global "Dual Carbon" strategy, the transition to a Circular Economy (CE) has evolved from an environmental option to a strategic imperative for the chemical industry. Conceptually, CE represents a systemic paradigm shift from the traditional linear "take-make-dispose" model. Kirchherr et al. (2017) provide the most comprehensive definition, describing CE as an economic system that replaces the "end-of-life" concept with reducing, alternatively reusing, recycling, and recovering materials in production/distribution and consumption processes. Unlike the 3R principles (Reduce, Reuse, Recycle) applied in general manufacturing, CE in the process industry involves more complex "metabolic" logic, emphasizing the closing of energy loops and the cascading utilization of resources at the molecular level (Ghisellini et al., 2016).

2.1.2 The Implementation Gap

For chemical enterprises, adopting CE is not merely about waste management but entails a fundamental restructuring of production processes. However, a review of existing literature reveals a significant 'techno-centric' bias. Current research predominantly focuses on 'hard' dimensions, such as the development of green catalytic technologies, supply chain network optimization, and macro-level industrial symbiosis (Korhonen et al., 2018; Geissdoerfer et al., 2017). In contrast, the 'soft' dimension regarding the micro-psychological impact of this radical organizational change on the frontline workforce remains significantly underexplored. This theoretical omission is critical because, in practice, the execution of CE tasks relies heavily on the agency of individuals who are often embedded in rigid organizational structures.

2.2 Safety Management Paradigms in High Reliability Organizations

2.2.1 High Reliability Organizations

The subjects of this study—chemical enterprises—belong to typical High-Reliability Organizations (HROs). Understanding the operational logic and micro-work characteristics of such organizations is the prerequisite for analyzing employee behavioral motivation.

HROs refer to organizational forms that operate in complex and high-risk technical environments but, instead of experiencing frequent disasters, are able to maintain extremely high safety performance. Typical representatives include nuclear power plants, aircraft carriers, and large chemical plants (Weick & Sutcliffe, 2001). According to the classic definition by Weick & Sutcliffe (2001), the core characteristic of an HRO lies in its "Preoccupation with Failure." Since their technical systems usually possess characteristics of "Tight Coupling" and "Interactive Complexity" (Perrow, 1984), any minor operational deviation may rapidly cascade into catastrophic consequences. Therefore, the management philosophy of HROs is not to pursue efficiency maximization, but to pursue absolute reliability of operation and zero tolerance for errors.

To maintain this macro-system stability, HROs form a specific work morphology at the micro-operational level. As Weick (1987) pointed out, the cost of high reliability lies in a cognitive paradox: although employees face completely normal dashboard readings for the vast majority of time, in order to identify and correct anomalies in time to avoid disasters when extremely low-probability events occur, they are forced to maintain high arousal during boredom for long periods.

This work essentially consists of "Prolonged Monitoring." Employees are chronically situated in a mismatched environment of "low stimulus input" and "high responsibility pressure," which easily leads to psychological "Vigilance Decrement" (Mackworth, 1948). In other words, HRO daily work often manifests as high boredom and repetitiveness, which lays the institutional groundwork for employees to generate "Safety Fatigue." This suppressive and monotonous work tone constitutes the baseline context for the subsequent discussion of employee psychological motivation changes in this study.

2.2.2 Safety-I and Safety-II

Addressing the growing management dilemmas HROs face when coping with complexity, Hollnagel (2014) proposed the theory of paradigm shift from Safety-I to Safety-II. This is not only a replacement of management tools but also an ontological reconstruction of the cognition of the essence of "safety."

(1) Safety-I: Defensive Logic Based on "Fault Elimination" The traditional safety management paradigm is termed Safety-I, the core of which defines safety as "a state where the number of adverse events (accidents/incidents) is as low as possible" (Hollnagel, 2014).

Bimodal Assumption: Safety-I assumes the system operation has two distinct modes: normal mode and malfunction mode. It believes malfunctions are caused by specific "deviations" or "human errors."

Humans as Liability: In this perspective, humans are viewed as the most unreliable

component (Liability) in the system (Reason, 1990; Dekker, 2014). The goal of management is to limit human behavioral variation through Standard Operating Procedures (SOP) and strict constraints.

Practical Consequences in HROs: In the micro-practice of chemical enterprises, Safety-I logic dominates the formation of "Defensive Compliance" culture. To avoid accountability, employees tend to strictly follow "Work-as-Imagined (WAI)" (Hollnagel, 2012)—procedures formulated by managers under ideal conditions—while deliberately avoiding flexible adjustments actually needed on site. Although this logic maintains static stability, it leads to significant rigidity and learned helplessness when employees face non-standard tasks.

(2) Safety-II: Resilience Logic Based on "Adaptive Capacity" With the increasing complexity of industrial systems, Hollnagel (2014) pointed out that simply eliminating faults is no longer sufficient to ensure survival, thus proposing the Safety-II paradigm. Safety-II redefines safety as "the ability of the system to adjust its performance under expected and unexpected conditions to succeed" (Hollnagel et al., 2006; Hollnagel, 2014).

Unimodal and Performance Variability: Safety-II believes success and failure stem from the same process—namely, Performance Variability in daily work. Variability is inevitable and necessary.

Humans as Assets: In this perspective, humans are no longer risk sources to be eliminated, but sources of system resilience (Resource) (Woods, 2015). Safety relies on humans' flexible adaptation to "Work-as-Done (WAD)" (Hollnagel, 2012), which is the ability to bridge the gap between procedures and reality.

Core Focus: Shifting from "Why things go wrong" to "Why things go right," emphasizing coping with uncertainty by enhancing "Adaptive Capacity" (Woods, 2015).

(3) Implementation Dilemma: "Theoretical Suspension" Lacking Micro-Carriers Although Safety-II theoretically provides an antidote for HRO rigidity, there exists a significant

Implementation Gap within chemical workshops dominated by boring monitoring. For employees long situated in the Safety-I negative feedback environment, "exerting adaptability" is an abstract and high-risk requirement. Existing Safety-II research mostly remains at the level of macro-organizational culture initiatives (e.g., Provan et al., 2020), lacking specific tangible micro-levers that are endogenous to frontline operations and low-risk. In the absence of explicit task carriers, it is difficult for employees to spontaneously switch from "defensive mode" to "adaptive mode." This implies that outside of standardized operations, finding a specific practice (such as resource bricolage) capable of activating employee adaptive behavior is particularly urgent.

2.2.3 Institutional Pressure and Coercive Isomorphism

The micro-rigid behavior in HROs stems not only from internal Safety-I management logic but is also deeply shaped by the external institutional environment. According to the New Institutionalism theory by DiMaggio & Powell (1983), to obtain social Legitimacy, organizations are often forced to adopt structures or behaviors consistent with environmental requirements, known as "Institutional Isomorphism."

Among them, this study specifically focuses on "Coercive Isomorphism," which refers to the passive convergence occurring when organizations depend on external key resources or face legal and cultural pressures. In this process, the core motivation of organizational behavior often shifts from "solving practical problems" to "demonstrating obedience to rules."

In the context of the chemical industry, this coercive pressure manifests extremely. With increasingly strict environmental regulations, such as China's Criminal Law Amendments and the normalization of environmental inspections (Standing Committee of the NPC, 2020), environmental compliance has escalated from administrative responsibility to hard constraints with the nature of "criminal liability." As Scott (2013) pointed out, when regulation possesses coercive characteristics, organizations tend to adopt "Ceremonial Conformity." This high-

pressure environment transmits to the micro-operational level, forcing enterprises to formulate extremely complex and insurmountable operating procedures to avoid potential legal risks and accountability. Consequently, when executing circular economy tasks, frontline employees have to prioritize "exemption from liability" over "efficiency," thereby exhibiting prevalent "compliance rigidity" and "action distortion." This provides an external institutional perspective for understanding why resource-abundant core departments lack adaptability

2.3 Resource Bricolage and its Behavioral Dimensions

2.3.1 Resource Bricolage

To elucidate the mechanism by which employees in resource-scarce peripheral units break through the institutional constraints of HROs to fulfill Circular Economy tasks, this study introduces "Resource Bricolage" as the core theoretical lens.

(1) Definition of Bricolage: Creative Recombination of Resources at Hand (Duymedjian & Rüling, 2010) The term "bricolage" originates from the anthropologist Lévi-Strauss (1966), who juxtaposed the "Bricoleur" (tinkerer) with the "Engineer." The engineer is accustomed to acquiring sufficient resources in advance to execute a plan; in contrast, the bricoleur is adept at solving emergent problems using fragmented materials that are "at hand." In the field of organizational management, Baker & Nelson (2005) systematically defined it as "making do by applying combinations of the resources at hand to new problems and opportunities."

Its core logic lies in the "Refusal to enact limitations." Bricoleurs possess a distinct cognitive reframing capability. They can identify potential value in objects regarded as "waste" or "redundancy" by conventional perspectives, and break the functional fixedness of resources through "Creation ex nihilo" style recombination (Garud & Karnøe, 2003). This proactive agency explains why employees in peripheral units, despite lacking budgets, can still perceive waste as a source of resources.

(2) Core Bricolage Dimensions in the HRO Context Although Baker & Nelson (2005) proposed that bricolage covers material, labor, and institutional domains, given that HROs are

characterized by strict material control and safety compliance, this study focuses primarily on the following two most significant dimensions:

Physical Bricolage: This refers to the non-standard recombination of material entities. In resource-constrained environments, actors substitute for expensive standard parts by giving new functional definitions to waste materials, idle equipment, or scraps. For example, redefining production waste as energy carriers or using scrapped parts to repair core equipment. This behavior reflects the actor's deep understanding of material properties and the re-creation of physical functions.

Institutional Bricolage: This refers to the "edge testing" of rules by actors when regulations become obstacles to problem-solving. This does not imply violating the core safety bottom line, but rather establishing informal communication channels within the gray areas or "institutional voids" to bypass cumbersome bureaucratic processes (Mair & Marti, 2009), or providing a new legitimacy explanation for borderline behaviors through "Issue Reframing" (Sonenshein, 2014).

In summary, resource bricolage is not merely a survival strategy for scarcity, but a proactive adaptive mechanism involving cognitive reframing (seeing value in waste) and behavioral reorganization (breaking rule boundaries). This provides the theoretical cornerstone for the subsequent analysis of how employees reconstruct work meaning through these practices.

2.3.2 Resource Orchestration as a Comparative Perspective

To more clearly define the uniqueness of resource bricolage, this study introduces "Resource Orchestration" theory as a comparative reference. Unlike bricolage, which emphasizes "improvisation amidst scarcity," resource orchestration represents the standardized management logic in resource-abundant contexts.

According to the definition by Sirmon et al. (2007, 2011), resource orchestration refers

to the process by which managers create value by structuring, bundling, and leveraging the resources owned by the firm. This paradigm implies two key assumptions:

Resource Abundance: The organization possesses sufficient budget and technical reserves to acquire standardized resources through formal procurement.

Managerial Centrality: Change is planned top-down by managers, and frontline employees are merely executors rather than designers.

In the core business units of chemical enterprises, Circular Economy tasks typically follow this logic: the enterprise invests huge funds to introduce mature environmental equipment (such as automated desulfurization towers) and enforces implementation through Standard Operating Procedures (SOPs). Although this "planning of the wealthy" may be technically more efficient, it deprives frontline employees of the opportunity to participate in resource reorganization. As mentioned earlier, under the overly standardized orchestration mode, employees become appendages of machines, making it difficult to generate the psychological efficacy derived from bricolage behaviors. Therefore, in this study, resource orchestration is primarily used as a theoretical contrast to analyze "why having more resources leads to greater employee burnout."

2.4 Key Psychological Mechanisms Driving Employee Behavior

To analyze how resource bricolage transforms boring compliance tasks into positive psychological motivation, this study incorporates core constructs from Social Cognitive Theory and Self-Determination Theory as analytical tools for micro-psychological mechanisms.

2.4.1 Self-Efficacy and Enactive Mastery Experience

Self-Efficacy (Bandura, 1977), a core concept of Social Cognitive Theory, refers to an individual's belief in their capability to organize and execute specific courses of action to achieve expected goals. In work contexts full of uncertainty, efficacy determines whether an

individual chooses to persist or give up when facing obstacles.

Bandura (1997) explicitly pointed out that the formation of self-efficacy relies primarily on four sources of information: Enactive Mastery Experience, vicarious experience, verbal persuasion, and physiological/emotional states. Among them, enactive mastery experience is proven to be the most influential and powerful source.

(1) Core Mechanism of Enactive Mastery Experience Enactive mastery experience refers to the direct experience of an individual successfully overcoming difficulties and completing challenging tasks through their own efforts. Unlike mere verbal encouragement, enactive experience provides "Authentic Evidence" of personal capability. When an individual solves a concrete problem through actual action and intuitively sees the successful results brought by that action, this direct feedback builds an indestructible belief in competence (Gist & Mitchell, 1992).

(2) Special Value in Feedback-Scarce Contexts For employees in high-repetition, low-feedback environments (such as HRO inspections), enactive mastery experience plays an irreplaceable role in psychological activation. In routine work, employees often struggle to perceive the direct impact of their behavior on results (causality ambiguity). However, once employees have the opportunity to create "perceptible physical changes" through certain behaviors (such as technical retrofitting or turning waste into treasure), this direct positive feedback from the physical world becomes a key anchor for breaking learned helplessness and rebuilding a sense of psychological control. This theoretical perspective provides the psychological basis for analyzing why employees gain "creator confidence" through concrete bricolage behaviors in the subsequent analysis.

2.4.2 Self-Determination Theory: From External Regulation to Autonomy

Self-Determination Theory (SDT) is a macro-theory of motivation proposed by Deci & Ryan (2000). Its core view is that motivations driving human behavior differ not only in

"intensity" but fundamentally in "nature." In the HRO context, understanding whether employees act out of "have to" or "want to" is key to explaining the coexistence of burnout and vitality.

(1) External Regulation and Controlled Motivation In the SDT motivation continuum, External Regulation is the form with the lowest autonomy and belongs to typical "Controlled Motivation." An individual's behavior is driven entirely by external contingencies (such as material rewards, threats of punishment, or regulatory pressure). In this state, the "Locus of Causality" perceived by the employee lies outside themselves, and behavior is viewed as a means to achieve an external end rather than an end in itself.

This concept provides a theoretical lens for explaining employee behavior in HRO core departments. Under the high-pressure management of Safety-I, employees' execution of circular economy tasks is often based on the avoidance of "negative consequences (e.g., point deduction, accountability)" or the pursuit of "external incentives (e.g., compliance bonuses)." SDT research indicates that although external regulation can maintain high-intensity compliance behavior in the short term, it continuously depletes the individual's willpower resources, leading to emotional exhaustion and dehumanization in the long run (Gagné & Deci, 2005). This explains why in resource-abundant but strictly controlled departments, employees are in a state of "defensive burnout" psychologically, despite meeting behavioral standards.

(2) Autonomy and Internal Integration In contrast to external regulation, Autonomy refers to a psychological state where the individual experiences behavior as emanating from their own Volition and Self-endorsement. It must be emphasized that autonomy in SDT does not equate to total independence or lack of constraint, but rather that the individual perceives themselves as the "Origin" of the behavior during action.

For HRO employees in strict bureaucracies, total task freedom is unrealistic. However, when employees can deeply participate in the task process through non-standard practices (such

as resource bricolage) and transform from mere "instruction executors" to "rule makers" or "solution conceivers," the nature of their motivation undergoes Internalization from controlled to autonomous (Ryan & Deci, 2000). This restoration of autonomy effectively buffers environmental stress and activates the individual's deep psychological energy. This theoretical mechanism provides the core explanatory framework for why employees in peripheral units can demonstrate high initiative amidst resource scarcity.

2.4.3 Task Significance and Prosocial Motivation

Beyond efficacy and autonomy, the social meaning inherent in work tasks is another major psychological pillar driving employee behavior. Especially in the context of State-Owned Enterprises (SOEs), analyzing whether employees act based on "abstract responsibility" or "concrete emotion" is key to distinguishing the motivational patterns of different departments.

(1) Task Significance and Public Service Motivation According to the model by Hackman & Oldham (1976), Task Significance refers to the degree to which work has a substantial impact on the lives of others. In state-owned chemical enterprises, this significance is often closely linked to Public Service Motivation (PSM) (Perry & Wise, 1990). Employees in core units generally possess high political awareness; they clearly recognize that their compliant operations directly relate to regional environmental safety and the success of the "Blue Sky Defense War." Therefore, their perception of task significance exists and is even noble. However, this significance based on "Grand Narratives" often remains at the Cognitive Level (Wright & Grant, 2010)—employees "know" the work is important, but because the beneficiaries (such as "society" or "the natural environment") are invisible and widely distributed, this abstract sense of responsibility is difficult to transform into high-arousal emotional energy during day-to-day boring inspections.

(2) Beneficiary Contact and Its Motivational Effect To explain why peripheral units can generate stronger emotional engagement, the concept of "Beneficiary Contact" proposed by

Grant (2007) is crucial. Grant points out that for task significance to transform into behavioral motivation, the key lies in whether employees can "see" the concrete person being helped.

When the beneficiary of work shifts from abstract "society" to concrete "individuals" (e.g., seeing with their own eyes that retired workers are no longer freezing after the circular economy retrofit), this "Perceived Social Impact" undergoes a qualitative leap (Grant, 2008; 2012). Concrete beneficiary contact establishes an Emotional Connection, transforming the employee's prosocial motivation from "performing public duties" to "caring for partners." This "warmth" based on human connection and community ties effectively offsets the psychological burden caused by service degradation (such as heating temperature fluctuations), becoming powerful

2.5 Chapter Summary

This chapter has systematically reviewed the research surrounding High Reliability Organizations (HROs), Resource Bricolage Theory, and relevant micro-psychological mechanisms. Existing literature has elucidated the differences between Safety-I and Safety-II paradigms from the perspective of organizational safety management, and discussed the adaptive significance of bricolage behavior in resource-constrained environments from the Resource-Based View (RBV). Simultaneously, psychological factors at the employee level, such as Self-Efficacy, Autonomy, and Prosocial Motivation, have been proven to influence individual behavioral responses in complex contexts.

However, several issues remain to be further explored in current research. First, in the highly institutionalized and risk-sensitive context of HROs, the micro-processes of how employees generate adaptive behaviors within strict compliance frameworks have not been fully explained. Second, Circular Economy practices are mostly analyzed from technical, institutional, or economic performance perspectives; empirical support is still lacking regarding whether they can generate psychological meaning and behavioral incentives at the individual

level.

Based on the research status above, this study attempts to introduce "Resource Bricolage" as a possible behavioral mechanism within the HRO context. By combining psychological factors such as self-efficacy, autonomy, and prosocial motivation, it explores how employees comprehend and respond to their work contexts in an environment where institutional constraints and resource limitations coexist. Through qualitative comparison of multiple cases, this study aims to provide supplementary evidence for understanding the formation mechanisms of employee adaptive behaviors in high-risk organizations. l emotional fuel for employees to persist in bricolage behaviors amidst scarcity.

Chapter 3. Research Methodology

This chapter details the methodological design of this study, including the selection of research strategies, case sampling logic, data collection processes, and specific steps for data analysis.

3.1 Research Strategy

3.1.1 Justification for Qualitative Research Method

This study aims to explore how employees in High Reliability Organizations (HROs) reconstruct work meaning through Resource Bricolage practices and influence their safety behavioral patterns. This inquiry concerns the psychological change processes and their formation mechanisms within specific contexts, belonging to typical "How" and "Why" type questions. Following the suggestion of Yin (2014), this study adopts qualitative research as the primary strategy.

First, the research focuses on the subjective experiences and behavioral logic of employees in actual work, rather than quantitative relationships between variables. Such complex psychological and behavioral processes are difficult to fully capture through standardized questionnaires and require understanding based on in-depth contextual data.

Second, the theoretical intersection involved in this study (HRO, safety management, and resource bricolage) lacks an integrative perspective in existing literature, and relevant mechanisms remain at an exploratory stage. Edmondson & McManus (2007) point out that in the stage of Nascent Theory, qualitative research offers richer insights than quantitative data. Therefore, this study adopts an inductive approach to derive concepts from practice, gradually forming an explanatory framework based on empirical materials.

Finally, the motivation and sensemaking involved in the study depend highly on specific organizational contexts, such as institutional pressure, resource conditions, and informal collaboration methods. Qualitative research helps reveal how these background factors

influence employee cognition and behavior, thereby forming a relatively complete explanation.

Based on these considerations, the qualitative research method can more effectively respond to the core questions of this study.

3.1.2 Multiple Case Study Design

This study employs a comparative multiple-case design to more clearly identify differences in employee behavioral mechanisms under different contexts. Compared to single cases, although more time-consuming, multiple-case design provides more robust theoretical evidence through "Replication Logic" (Yin, 2014; Eisenhardt & Graebner, 2007), rather than remaining at the level of idiosyncratic phenomena in individual organizations.

This study selected three types of contrasting case contexts: (1) Contexts where bricolage behavior rarely occurs (such as private enterprises and SOE core production units); (2) Contexts where bricolage behavior is relatively active (SOE peripheral units).

This comparison aims not for statistical representativeness but follows the principle of "Theoretical Sampling" (Eisenhardt, 1989). It aims to understand the organizational conditions under which employees are more likely to shift from passive compliance to proactive adaptation through a "presence/absence" comparison. By observing employee behavioral manifestations and psychological states in different contexts, this study can more specifically identify the relationship between resource conditions, organizational support, and employee agency.

Therefore, the multiple-case design primarily serves the function of "contextual contrast" in this study, helping to reveal the formation boundaries of bricolage practices and their motivational mechanisms.

3.2 Case Selection and Research Context

3.2.1 Theoretical Sampling Strategy

This study adopts purposeful sampling (Patton, 2002), selecting research subjects from differentiating organizational contexts to more clearly observe changes in employee behavior

under different resource conditions and organizational environments. As this study focuses on the actual work experience of employees in the HRO context, the selection emphasizes contextual differences, following the Theoretical Sampling principle (Glaser & Strauss, 1967) rather than statistical representativeness.

Centering on differences in resource conditions and organizational management styles, this study finally selected three contrasting business units as research objects. These cases show distinct differences in resource allocation, management modes, and employee work experiences, helping to understand how employees participate in Circular Economy practices under different contexts.

- Case A (Private Chemical Enterprise) This enterprise faces strong market competition pressure, and resource input is relatively limited. Its environmental and safety management aims primarily at meeting regulatory requirements. Employees' daily work emphasizes compliance execution rather than autonomous improvement. Therefore, this case helps understand employee behavioral characteristics under conditions of high pressure and low redundancy.
- Case B (SOE Core Production Unit) This unit possesses abundant financial and technical resources. Its management is dominated by standardized processes and top-down institutional execution. Employees carry out work within the institutional framework and rarely participate in resource reuse or autonomous improvement practices. This case helps observe the manifestation of employee behavior in contexts with abundant resources but relatively standardized management.
- Case C (SOE Peripheral Unit) This unit is situated in a relatively marginal position within the enterprise. It has limited resource support but faces many practical problems in daily work that require flexible coping. Employees more frequently use existing resources for adjustment and modification in practice. Therefore, it

provides an important context for observing Resource Bricolage behavior and its impact on employee psychological states.

Through the comparative analysis of the above three types of cases, this study can identify differences in employee participation in Circular Economy-related practices under different organizational conditions, thereby providing a basis for the subsequent analysis of employee motivation and behavioral mechanisms.

3.2.2 Research Context: A Typical Old Industrial Base in Eastern China

The case enterprises in this study are all located in a chemical industry cluster zone with a long history of industrial development in Eastern China. Formed in the mid-20th century, this region was one of the earliest areas in China to deploy heavy chemical industries. Currently, it still concentrates a large number of chemical and related supporting enterprises, thus possessing typical high-risk industrial characteristics.

First, regarding the organizational management environment, enterprises in this region have long been subject to a relatively strict safety and environmental regulatory framework. Enterprises have generally established relatively complete operational specifications and safety management systems, and frontline employees possess strong compliance awareness. In such an institutional environment, employees' daily work focuses on following established procedures, manifesting obvious "Institutional Inertia" (DiMaggio & Powell, 1983). This provides a realistic background for understanding employee behavioral patterns in high-reliability organizational environments.

Second, regarding the development stage, this industrial base has recently faced the dual pressure of industrial transformation and environmental upgrading. On one hand, some production facilities have been running for a long time, creating actual needs for equipment maintenance and efficiency improvement. On the other hand, continuously rising environmental standards require enterprises to promote resource recycling while controlling

costs. These realistic conditions require some positions to solve problems by adjusting and reusing existing resources in actual work, providing a suitable research setting for observing employee concrete practices in resource-constrained contexts.

In summary, this region is highly relevant to the context focused on in this study in terms of industrial type, regulatory environment, and transformation background, thus possessing good research suitability.

3.2.3 Case Descriptions

Based on the theoretical sampling logic mentioned above, this study finally locked onto three representative chemical business units. To comply with academic ethics and confidentiality agreements, this study refers to them as Company A, Company B, and Company C, respectively. A comparison of the basic situations of the three case enterprises is shown in Table 3-1.

Table 3-1: Comparison of Basic Profiles of Case Enterprises

Indicator	Company A	Company B	Company C
Ownership Nature	Private Enterprise	Large SOE Core Production Unit	Large SOE Peripheral Unit
Main Business	Fine chemical raw materials	Basic chemicals & environmental governance	Community heating & logistics services
Resource Condition	Tight budget; Cautious investment	Sufficient special budget	Limited budget; Reliance on existing facilities
Safety Management	Emphasizes compliance & risk control	Strict standardized management	High flexibility in on-site adjustments
Management Style	Centralized decision-making; Clear hierarchy	Top-down project management	Relatively higher frontline participation

Company A: Medium-sized Private Fine Chemical Enterprise Company A is a private fine chemical enterprise engaged in the production of specialty lubricant base oils and

pharmaceutical excipients. The enterprise is of medium scale with relatively high product added value, and has strict requirements for production stability and quality control. Located within a chemical industrial park, the company has long faced strict environmental and safety regulations. Influenced by market competition and cost pressure, the company is relatively cautious in its investment in safety and environmental protection. Management emphasizes compliant operation and risk control. On-site operations primarily focus on following established operating procedures, with clear division of labor and a relatively clear organizational hierarchy.

Company B: Large SOE Core Production Unit Company B is affiliated with the core business sector of a central state-owned petrochemical enterprise, primarily engaged in basic chemical raw material production and supporting environmental governance. This department undertakes important production tasks and possesses relatively complete technical equipment and special fund support. Many environmental projects are uniformly planned and implemented by higher-level units. Due to the large scale of facilities and high-risk levels, the on-site safety management system is comprehensive, and the degree of standardization in operational processes is high. Job responsibilities are divided meticulously, and organizational operation is dominated by institutionalized management.

Company C: Large SOE Peripheral Unit Company C is a peripheral unit under the same central SOE system as Company B, primarily responsible for community heating and related logistics services. In recent years, affected by business structure adjustments, this unit has been relatively limited in capital investment (CAPEX) and relies more on the operation and maintenance of existing facilities. In actual work, frontline employees need to adjust and reuse equipment and resources to a certain extent based on on-site conditions to guarantee the continuity of heating services. This type of work possesses strong on-site problem-solving attributes, which differs from the standardized operation mode of the core production department.

3.3 Data Collection and Sources

3.3.1 Semi-structured Interviews and Site Visits

Interviews constitute the primary data source for this study. The researcher engaged with personnel across various positions regarding their daily work content, understanding of safety and environmental tasks, and modes of resource utilization. Given the distinct operational environments of each case, the interview formats varied slightly.

(1) Formal Semi-structured Interviews (Company A & Company B) In the private enterprise and the SOE core production unit, interviews were primarily conducted in conference rooms. Using a semi-structured protocol, the researcher guided participants to review workflows, safety management requirements, and actual practices regarding resource usage. With the participants' consent, selected interviews were audio-recorded and transcribed into

text.

(2) Walking Interviews (Company C) In the peripheral unit, due to the strong on-site operational characteristics of the heating system, the researcher conducted site visits to key links of the heating system accompanied by management personnel. These "Walking Interviews"—exchanges conducted directly beside the equipment—facilitated the researcher's understanding of specific operational methods and resource utilization conditions. Relevant content was documented via field notes.

(3) Beneficiary Interviews (Company C) To gauge the actual impact of heating services at the community level, the researcher conducted brief interviews with selected residents. The content covered daily heating experiences and perceptions of the enterprise's service. These data were used to supplement the understanding of the service context.

Table 3-2: Profile of Interviewees and Key Themes

ID	Case	Role	Format	Key Focus
I-A-01	Company A (Private)	EHS Manager	Face-to-face / Recorded (90min)	Fear of criminal liability; High risk perception of resource utilization; Employees' defensive execution.
I-B-01	Company B (Core)	Steam Plant Manager	Face-to-face / Notes (60min)	Regional energy interconnection strategy; Pressure from digital monitoring; SOE responsibility vs. personal burnout.
I-C-01	Company C (Peripheral)	General Manager	Walking Interview / Recorded	Dilemma of departmental marginalization; Pressure for business survival under capital shortage; Strategies for reusing waste pipe networks.
I-C-02	Company C (Peripheral)	Workshop Director	Walking Interview / Recorded	Technical bricolage details of waste heat recovery; Operational flexibility; Sense of control over aging equipment.
B-C-01	Company C (Beneficiary)	Resident (Retired Employee)	Informal Interview	Historical emotional connection; Gratitude for the enterprise "taking care of its own"; Community cohesion.
B-C-02	Company C (Beneficiary)	Resident (Employee Family)	Home Visit & Observation	Direct experience of heating effects; Family support and understanding for frontline work; Perception of effects after heating reform.
B-C-03	Company C (Beneficiary)	Resident (Migrant Worker)	Informal Interview	Market value of heating services; Heating factors in home-buying decisions; Evaluation of community livability.

3.3.2 Triangulation of Multiple Data Sources

To enhance data reliability, this study utilized Data Triangulation by combining interviews with field observations and relevant archival materials.

First, Investigator Triangulation was applied during parts of the interviews at Company

B, where a second researcher participated in the exchanges. Notes were collated and compared after the interviews to minimize bias arising from personal interpretation.

Second, during site visits, the researcher conducted observations of the production environment within the permitted scope, recording safety publicity boards and equipment status. This on-site information helped contextualize the management environment and actual operational background.

Furthermore, this study reviewed public enterprise data and relevant textual materials, including safety management documents, environmental information disclosures, and local media reports. These archival materials were used to verify time nodes and project backgrounds mentioned in interviews.

Through the cross-referencing of information from these different sources, key facts were substantially confirmed, thereby strengthening the credibility of the research description.

3.4 Data Analysis Approach

This study conducted a systematic organization and inductive analysis of interview data, field notes, and relevant textual materials. During the analysis process, the researcher engaged in iterative reading of the raw data, conducting cross-case comparisons to identify commonalities and differences with explanatory significance.

3.4.1 Coding Process

The data analysis followed the inductive analysis paradigm of Gioia et al. (2013), roughly divided into three steps, ascending from data-proximal descriptions to generalized thematic induction.

Step 1: Data Organization and Initial Induction (First-Order Analysis) :

The researcher first combed through interview transcripts and field notes line by line, marking content related to research questions, such as employees' perception of safety pressure, modes of resource usage, and coping practices in work. At this stage, the respondents' original

expressions were preserved as much as possible to avoid premature theoretical interpretation.

For example:

In **Company A**, multiple respondents mentioned phrases like "resource utilization is just an attempt, hard to do" and "to save money," reflecting a strong perception of risk pressure.

In **Company B**, respondents frequently discussed situations such as "highly fixed operational procedures" and "strict digital monitoring."

In **Company C**, respondents focused on describing "how to retrofit existing equipment conditions to maintain heating operations."

Step 2: Thematic Induction (Second-Order Analysis) Based on the initial organization：

The researcher merged similar descriptions to form several themes. For instance, expressions related to institutional constraints were categorized together; practices related to resource reuse were grouped; and content regarding employees' understanding of work meaning formed another category. Through this process, differences between cases became distinct: in some contexts, employees primarily emphasized compliance pressure, while in others, they focused more on finding alternative solutions under existing conditions.

Step 3: Comprehensive Comparison (Aggregate Dimensions)：

Finally, the researcher conducted a comparative analysis of themes across the three cases, teasing out the correlations between resource conditions, management styles, and employee psychological experiences. This comparison provided the basis for the subsequent discussion on the differences in employee motivation under different contexts. During the analysis, parts of the interview content were also cross-checked with public enterprise data and on-site observation notes to ensure an accurate understanding of key contexts.

3.4.2 Thematic Structure

Based on the aforementioned coding, the researcher further organized relevant

expressions in different cases, merging similar concepts into themes, and forming a higher-level inductive structure through cross-case comparison. The overall inductive path ascends from concrete experiences to generalized understanding, as shown in **Figure 3-3**.

This study finally formed three interrelated analytical dimensions:

(1) Contextual Constraints This dimension mainly involves the institutional environment and resource conditions employees face at work. In some cases, respondents frequently mentioned issues like compliance pressure, liability risk, and limited operational space; while in other contexts, constraints manifested as tight budgets and aging equipment. These factors constitute the background conditions for employees to adopt different coping methods.

(2) Resource Coping Modes Under the above constraints, different organizational units exhibited different modes of resource usage. Some prioritized strict adherence to established procedures, while others conducted equipment retrofitting or resource reuse under existing conditions. The researcher summarized these specific practices into several types to present the different practical paths of organizations under resource variation.

(3) Employee Work Experience and Sensemaking Further comparison revealed a correlation between different resource coping modes and employees' subjective experiences. In certain contexts, employees emphasized responsibility pressure and procedural execution; whereas in others, employees more easily perceived the value of work from specific results, forming a stronger sense of participation and responsibility.

Table 3-3: Data Structure (Visualizing the inductive process from specific practices to comprehensive understanding)

Specific Expressions (First-Order Concepts)	Induced Themes (Second-Order Themes)	Aggregate Dimensions
Compliance pressure; Liability risk	Institutional & Resource Constraints	Contextual Constraints
Equipment reuse; On-site retrofitting	Resource Coping Modes	Practical Paths
Sense of achievement; Impact on others	Experience of Work Meaning	Psychological Impact

During the coding and thematic induction process, significant cross-case variations emerged regarding the "Experience of Work Meaning". For instance, respondents in Case B (SOE Core Unit) predominantly conceptualized work value through macro-level constructs such as "organizational responsibility" and "environmental governance". In contrast, employees in Case C (SOE Peripheral Unit) derived meaning from more localized and tangible outcomes, specifically the perceived social impact on their immediate community. These nuanced differences in sensemaking provide a critical basis for the comparative analysis in the subsequent findings' chapters.

Chapter 4: Empirical Findings: Case Analysis

4.1 Case A (Private Enterprise): Motivational Mechanisms Based on "Cost-Benefit Analysis" and "Legal Deterrence"

This section focuses on a private fine chemical enterprise in Nanjing. Unlike SOEs dominated by dual "political and economic" logic, this case follows a singular "Market Logic." Interview data indicates that under the dual effects of resource constraints and strict regulation, the enterprise's environmental behavior adheres to the principle of "minimizing compliance costs," and employee motivation manifests primarily as passive execution based on "External Regulation."

4.1.1 Contextual Constraints: Economic Rationality and Criminal Liability Pressure

The contextual characteristics faced by the case enterprise are manifested as a "production-first" resource allocation mode and high-intensity "Legal Deterrence."

(1) **Marginalization of Non-productive Departments** Under the dominance of market logic, the allocation of organizational resources strictly follows the "Return on Investment (ROI)" principle. The respondent (EHS Manager) pointed out that since the Safety and Environmental Department does not generate direct economic benefits, it occupies a marginal position in the organizational power structure.

"The production and sales departments say... no matter how good your environmental safety is, can it turn into money? ... The General Manager's mind is more or less tilted towards the sales department." (I-A-01)

This power structure results in extremely high "Cost Sensitivity" for environmental protection inputs. The respondent mentioned that the investment budget for environmental facilities is usually strictly compressed, often barely meeting the minimum standard for compliance (referred to as "scraping the edge" in the interview).

(2) **Criminal Liability as a Hard Constraint** External regulation constitutes a severe "Coercive Isomorphism" pressure on the enterprise. Unlike general administrative penalties, the "criminalization of environmental crimes" clause has produced direct legal deterrence on management.

"Now the Criminal Law of the PRC has added a clause... illegal disposal of waste leads to criminal sentences... [we are] afraid of losing freedom." "If the enterprise's main safety responsibility is not implemented... people get arrested... the legal representative has to bear the responsibility." (I-A-01)

This legal consequence, based on the restriction of personal freedom, forces the enterprise to view compliance as an insurmountable "Survival Baseline," rather than a proactive

choice based on social responsibility.

4.1.2 Behavioral Pattern: Minimalist Compliance and Avoidance Strategy

In the above context, the enterprise's environmental behavior manifests as "Defensive Compliance," and institutional risk significantly inhibits the willingness for resource innovation (Bricolage).

(1) Innovation Inhibition Induced by Institutional Risk Although the private enterprise has an economic motive to reduce costs through resource utilization (e.g., recycling non-conforming products), it is constrained by the "Uncertainty of Compliance Risk." The respondent pointed out that internal attempts at resource reuse are easily characterized by regulators as "illegal disposal of hazardous waste."

"Non-conforming products... if treated as hazardous waste, you have to spend money to dispose of them... [If] you reprocess them into products for reuse... it might involve violations of laws and regulations." (I-A-01)

(2) Avoidance Decision-making To avoid potential criminal risks, the enterprise tends to adopt "Conservative Decision-making," choosing outsourcing disposal—which has higher costs but zero legal risk—and abandoning potential resource bricolage opportunities.

"So no one wants to take the risk to do this... as long as you make this move, it is deemed as illegal transfer and leads to criminal sentencing." (I-A-01)

This finding indicates that in a high-pressure regulatory environment lacking tolerance mechanisms, legal deterrence actually produces a "Chilling Effect," blocking the enterprise from implementing Safety-II style proactive adaptive behaviors.

4.1.3 Motivational Mechanism: Transactional Contract and Low Self-Efficacy

Based on Self-Determination Theory (SDT), the motivation of employees in this

enterprise remains at the "External Regulation" level and lacks high-level self-efficacy experiences.

(1) Transactional Motivation Based on Survival Needs Employees' compliance with safety norms stems primarily from the maintenance of "Job Security," rather than identification with safety values.

"If I can't put food on the table, nothing else matters... Only when the problem of livelihood is solved, will he think of [safety]." (I-A-01)

However, this motivational mechanism based on a "Weak Contract" is extremely fragile. The respondent pointed out that because private enterprise compensation lacks competitiveness (lacking the "benefit lock-in effect" of SOEs), management finds it difficult to implement high-intensity negative incentives (punishment).

"If you punish him for a small problem at every turn, he says 'if you punish me, I won't do it, I'll quit'." (I-A-01)

This leads the organization into a "Low-level Compliance Equilibrium": employees maintain only minimum obedience, and the enterprise dares not implement strict safety accountability.

(2) Learned Helplessness from Low Expectations Unlike the "rule-maker" role experienced by employees in the SOE peripheral unit (Case C), grassroots employees in the private enterprise are strictly defined as "Executors" of standard procedures.

"You say, what technical content can a basic operator propose? It's impossible." (I-A-01)

Management's Stereotype regarding the cognitive ability of frontline employees deprives them of opportunities to participate in technical improvements. This "Disempowerment" management style leads employees into "Learned Helplessness," satisfying themselves with discovering superficial low-level hazards, unable to generate internal self-

efficacy based on creativity.

4.1.4 Section Summary

In summary, the private enterprise case demonstrates a "Baseline Survival Mode" under Safety-I logic.

Institutional Level: Although legal deterrence guarantees baseline compliance, it induces "Risk Avoidance Behavior," inhibiting the possibility of internal resource bricolage.

Individual Level: The motivational mechanism relying on external economic exchange is unstable, and bureaucratic role rigidification precludes the generation of employee self-efficacy.

As the Control Group of this study, this case confirms that in the absence of institutional tolerance space and organizational support, mere external high pressure cannot stimulate employees' proactive safety behaviors (Safety-II)

4.2 The SOE Core Business Case: Motivational Mechanisms Based on "Institutional Isomorphism" and "Public Service Motivation"

This section focuses on the core business unit of Yangzi Petrochemical (YPC). In stark contrast to the "bricolage" logic of peripheral departments, the core business unit operates in an environment characterized by strong institutional constraints and relative resource abundance. This case demonstrates that the unit's Circular Economy (CE) practice follows the logic of "Resource Orchestration," and its motivational mechanism is primarily driven by external compliance pressure and macro public value.

4.2.1 Contextual Constraints: The Iron Cage and Panoptic Monitoring

The context faced by the core business is typical of "Coercive Isomorphism" (DiMaggio & Powell, 1983).

(1) Digital Compliance Rigidity Unlike the marginal status of peripheral units, the core

business stands under the regulatory spotlight. Emission data are directly connected to national platforms, and hazardous waste vehicles are tracked via GPS.

"We have meters... connected to the government platform... tracking the full chain of evidence, you cannot escape." (I-B-01)

This high transparency eliminates space for "workarounds," establishing extremely high Compliance Salience.

4.2.2 Behavioral Pattern: System Integration and Industrial Symbiosis

In this context, employee behavior is based on bureaucratic "System Integration."

(1) Interconnection of Steam Pipelines

The most significant practice in this case is the integration of regional steam pipelines. Through engineering retrofits during major overhauls, independent pipelines of various plants were connected, forming a regional "Industrial Symbiosis" network.

"Previously, we fought alone... later everyone connected the pipes... if you use more and I use less, it is already enough for everyone." (I-B-01)

This is a top-down Resource Orchestration (Sirmon et al., 2011). It relies on high-level coordination and large-scale infrastructure investment, solving problems by optimizing the allocation efficiency of existing stock resources, characterized by a high degree of planning and standardization.

(2) Marketized Contracts for Waste

For by-products like desulfurization gypsum, the core business department has established standardized supply chain contracts. This treatment method is highly Procedural; employees only need to follow rules without investing personal creative wisdom.

4.2.3 Motivational Mechanism: External Regulation and Public Service Motivation

Analysis shows that the motivation of core business employees presents a significant

"Polarized" characteristic: lacking the "creative fun" in the middle layer, it is driven primarily by compliance fear at the bottom and a sense of mission at the top.

(1) External Regulation Based on Fear and Performance

Under Safety-I logic, motivation first stems from the Fear of Punishment and the pursuit of performance rewards.

"If the employee's suggestion is adopted, there is a bonus... for the employee, it is definitely a return." (I-B-01)

According to SDT theory, this belongs to "External Regulation." Employees execute CE tasks to meet external requirements (KPIs) or obtain economic rewards. This motivation is controlled, and employees experience pressure rather than spontaneous pleasure.

(2) Public Service Motivation Based on Macro Results

However, as SOE employees, respondents demonstrated strong Public Service Motivation (PSM) (Perry & Wise, 1990).

"When you walk out of the factory and find the sky blue and water green, you sincerely sigh that my work is worthwhile... countless small fireflies converging into a huge light source." (I-B-01)

This motivation stems from identification with the social value of the Task Outcome. The feedback for core business employees is abstract and macro (such as "Blue Sky"). This Social Identity supports them in maintaining professional dignity amidst boring compliance work.

4.2.4 Section Summary

In summary, the SOE core business demonstrates a path of "Institutional Compliance."

Behaviorally: It relies on Resource Orchestration (Industrial Symbiosis) via funding and high-level coordination, rather than individual bricolage.

Psychologically: It relies on External Regulation (Baseline) and Public Service

Motivation (Highline).

This finding is crucial as it constitutes a perfect Control Group: it proves that in a standard bureaucratic environment lacking "bricolage space" and "creative autonomy," it is difficult for employees to generate the kind of "creative intrinsic pleasure" described in Section 4.3. This conversely highlights the unique value of resource bricolage in activating individual micro-motivation.

4.3 The SOE Peripheral Unit Case: Efficacy-Oriented Motivation through Resource Bricolage

This section focuses on a highly representative peripheral business unit within YPC—the Community Heating Department. Distinct from the core business (Case B) which enjoys abundant internal support, this department operates under the dual constraints of "Resource Scarcity" and "High Compliance Pressure." This case demonstrates how, in the absence of External Incentives, employees reconstruct work meaning through the process of Resource Bricolage, thereby obtaining a unique motivational mechanism based on "Visible Efficacy."

4.3.1 Contextual Constraints: The "Double Bind" and Organizational Inertia

In the early stage of the Circular Economy transition, the heating project faced an institutional dilemma termed by Bateson as a "Double Bind," which constituted a trough in employees' initial motivation.

(1) Survival Crisis caused by Resource Decoupling

According to the policy of "Divestment of Social Functions of SOEs" implemented by the Chinese government, non-core assets such as heating and property management were defined as "fiscal burdens" of the enterprise. Except for enterprises with specific technological advantages capable of professional operation, all non-core assets were required to be divested and handed over to local governments before 2019. Consequently, since 2016, the group headquarters cut off new Capital Expenditure (CAPEX) for such businesses. This meant the

department not only could not obtain funds for technical upgrades but also faced the survival risk of being laid off or forcibly transferred at any time.

(2) Escalating Legitimacy Standards Simultaneously

the tightening of environmental regulations broke the original status quo. The local environmental protection department issued an ultimatum: the existing small coal-fired boiler system must be phased out within a time limit; otherwise, the enterprise would face huge "daily penalties" or even production suspension for rectification.

(3) The Peak of Safety Fatigue

In this paradoxical context of "must comply (retrofit required) but no input (zero budget)," pessimism permeated the organization. Interview data shows that employees generally exhibited "Learned Helplessness" in the early stages of the retrofit.

"It was really difficult at that time. The higher-ups gave no money, while the Environmental Bureau checked strictly from below... This business has been around for a long time, and we didn't know what to do... [we just hoped] for a safe landing without accidents." (I-C-01)

This mentality is an extreme manifestation of Safety-I logic: employees were not only trapped by daily safety compliance pressure but also fell into deep anxiety about career prospects, resulting in a scarcity of Intrinsic Motivation.

4.3.2 Physical Bricolage: Generating "Visible Efficacy" through Resource Re-purposing

To break the deadlock of "zero budget" and "mandatory rectification," the technical team turned internally to find neglected Slack Resources and implemented "Physical Bricolage." This process not only solved technical problems but also provided employees with "Positive Feedback," which is extremely scarce in Safety-I environments, at the psychological level.

(1) Redefining and Substituting Resources

According to the bricolage principles of Baker and Nelson (2005), the team first redefined the attributes of existing resources. They discovered that the low-grade waste heat (60°C-80°C cooling water) discharged by the core refinery business was not "industrial waste" as commonly perceived, but a potential "thermal resource." By installing plate heat exchangers, the team creatively implemented resource substitution: transforming this "burden" (which the enterprise originally had to pay electricity costs to cool) directly into a "civil heat source," replacing the originally expensive and highly polluting coal steam.

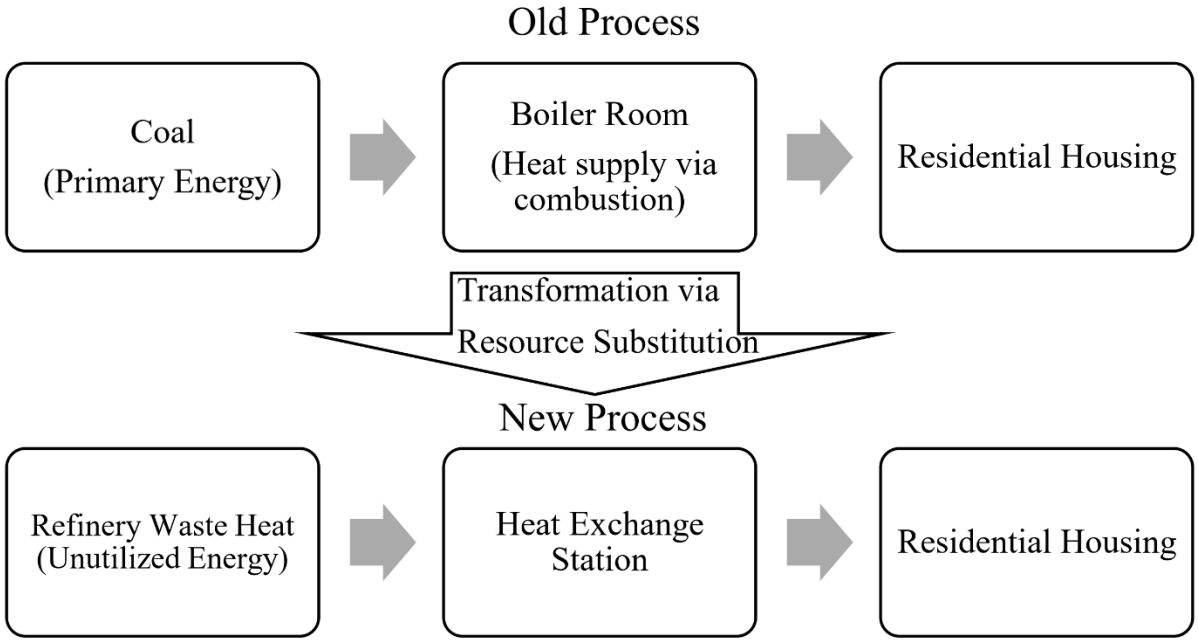

Figure 2: Schematic Comparison of Coal Steam vs. Waste Heat Recovery System

(2) Economic Self-sufficiency Strategy

Addressing the zero-budget constraint, the project team constructed an "Internal Cost Offsetting" model rather than traditional financial bricolage.

Revenue Generation (Open Source): Canceling the free welfare attribute of the project and charging residents a low heating fee covering operating costs.

Cost Reduction (Throttling): Using the fuel costs saved by replacing coal with waste heat and the avoided environmental fines to hedge against the one-time hardware investment for pipeline retrofits.

This strategy allowed the project to achieve financial balance without capital injection from headquarters, proving that bricolage behavior contains high economic rationality.

(3) Motivational Mechanism: Value Reversal and Enactive Mastery Experience

This study finds that the core motivation of the project stemmed from a unique "Transformative Experience." The bricolage process endowed employees with "Enactive Mastery Experience" as defined by Bandura (1977). Unlike routine tasks, this experience contained a profound "Symbolic Reversal"—personally reversing "negative value (waste heat)" into "positive value (heating)." As the workshop director vividly described the psychological impact brought by this tactile feedback in the interview:

"When touching the new heating pipes... to be honest, it's not as warm as before... but it feels amazing to successfully utilize waste heat. That sense of achievement is something we never had before... we actually got the thing done." (I-C-02)

This data indicates that the process was not merely the reuse of physical resources but a psychological "Symbolic Value Reversal." Through bricolage behavior, employees successfully transformed the object from "Negative-valence Waste" to "Positive-valence Resource." This visible efficacy, based on "Transformative Mastery Experience," effectively counteracted the structural repression under the Safety-I environment and became a key cognitive catalyst for breaking employees' Learned Helplessness.

4.3.3 Institutional Bricolage: Restoring "Agency" through Issue Reframing

Beyond physical resource scarcity, the project also faced severe institutional resistance—in the bureaucracy, the peripheral service department lacked voice. To break the deadlock, employees implemented "Institutional Bricolage," successfully regaining agency within the organization.

(1) Breaking Departmental Silos

To mobilize cooperation from the core business department (e.g., providing heat source

interfaces), the peripheral department broke conventional vertical reporting lines. Authorized by company leadership, they established a temporary cross-departmental matrix group (covering HSE, Refinery, and Industrial departments). Utilizing informal communication mechanisms (such as WeChat work groups), they bypassed the cumbersome document circulation system. This "Network Bricolage" behavior allowed employees to step out of the narrow role of "executors" for the first time and begin actively building horizontal collaboration networks.

(2) Issue Reframing Strategy

The most critical bricolage lay in the symbolic definition of the project's nature.

The Original Frame: The project was viewed as a "Welfare Burden"—neither profitable nor efficient, thus rejected by the core production department which owned the waste heat.

The Reframed Frame: The project was redefined as a "Survival Shield" that guarantees plant-wide environmental compliance.

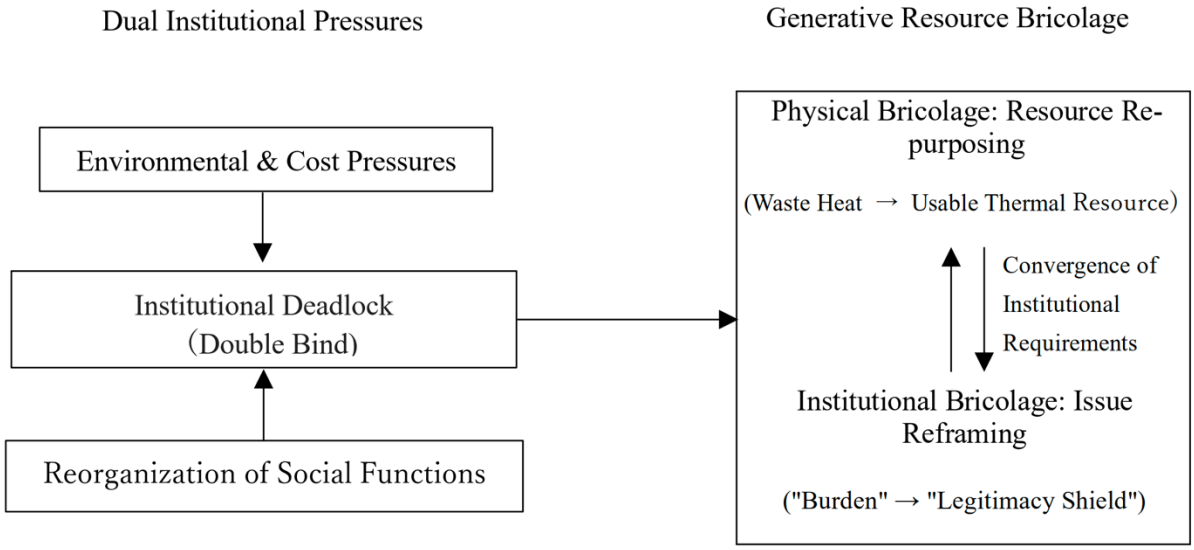

Figure 4-2: The Process of Issue Reframing via Resource Bricolage (Case C)

The logic of reframing lies in establishing a new causal chain: "If waste heat is not utilized for heating, the plant-wide carbon emissions will exceed standards, directly threatening the operation rate of the core refinery business." This strategy successfully achieved Strategic

Alignment, transforming external "divestment pressure" into internal "retention motivation."

(3) **Motivational Mechanism: Restoration of Autonomy**

From a motivational perspective, this institutional gaming process greatly satisfied employees' psychological need for Autonomy. Under the traditional SOE system, grassroots employees are usually viewed as passive "Doers." However, through issue reframing, employees experienced a role transition to "Rule-makers." This "Sense of Control" effectively dissolved the learned helplessness under the Safety-I environment, making employees realize that they have the capability to change the rigid organizational status quo through strategic behavior.

4.3.4 The Outcome: Sustaining Motivation via Task Significance and Prosocial Motivation

The project ultimately achieved the survival of the heating service, but it was a typical "Bricolage Solution"—the heating medium changed from high-temperature steam to low-temperature hot water, leading to an objective decline in indoor temperature and service downgrading. However, interview data shows that this result did not trigger professional frustration among employees; instead, it became a source of sustaining their long-term motivation. Based on existing theories, this study summarizes this motivational mechanism as the joint effect of cognitive restructuring and prosocial motivation.

(1) Cognitive Rationalization of Service Downgrading

Facing the technical reality that "temperature is not as high as before," employees did not view it as a failure but engaged in Cognitive Restructuring, redefining "service downgrading" as a "Rational Compromise for Resource Optimization." In interviews, employees pointed out:

"Previously, steam heating was actually too hot; wearing short sleeves at home in winter was unreasonable and a waste of energy... It was rough management before, but now it is refined management." (I-C-02)

This psychological process indicates that by introducing high-order values of "environmental protection/energy saving," employees dissolved the Cognitive Dissonance caused by the decline in service quality. This "Rational Compromise" provided psychological legitimacy for the continuous operation of the project.

(2) Core Motivation: Task Significance and Prosocial Motivation

A deeper source of motivation stemmed from employees' perception of the social value of their work. Although technical indicators declined, the project maintained an extremely low price compared to the market, which is of critical significance to specific beneficiary groups.

Task Significance: According to Hackman and Oldham (1976), task significance refers to "the degree to which the job has a substantial impact on the lives of others." In this case, retired employees living in the old industrial zone belong to a low-income group, and cheap heating is a critical resource for maintaining their basic quality of life. Employees deeply recognized the Critical Impact of their work, thereby confirming its value.

Prosocial Motivation: As the HSE Manager stated in the interview:

"Many neighbors are retired old workers, all 'Old Company A' people... if we shut down the heating, our conscience would be uneasy." (I-A-01) This expression aligns with Grant's (2007) definition of "Prosocial Motivation"—"the desire to expend effort to benefit others." In this context, through "Perspective Taking," employees stood in the shoes of beneficiaries (vulnerable retired workers) and perceived the irreplaceability of the service. This responsibility driven by "Altruism" replaced traditional economic KPI indicators, becoming the core intrinsic motivation for employees to persist in action amidst resource scarcity.

4.3.5 Section Summary

In summary, the SOE peripheral unit case demonstrates a third motivational mechanism distinct from the private enterprise (Fear-driven) and the SOE core business (Mission-driven)—Efficacy-Oriented Motivation.

Physical Bricolage: Not only achieved resource reuse but also realized a "Symbolic Value Reversal" from "negative-valence waste" to "positive-valence resource," providing employees with embodied verification of "Visible Efficacy."

Institutional Bricolage: By breaking bureaucratic barriers, it reshaped the employee role from passive "Executor" to active "Rule-maker," effectively restoring employee "Autonomy."

Outcome Feedback: By guarding the survival baseline of vulnerable groups, it endowed service downgrading with moral legitimacy, activating employees' deep "Prosocial Motivation."

This finding suggests that CE practice acts as a "Psychological Resource Restoration Mechanism" at the micro level. Even in "desperate straits" lacking external resources, creating visible physical results and restructuring the social meaning of work can still activate strong intrinsic motivation in high-risk industry employees, thereby breaking the negative feedback loop of Safety-I.

Chapter 5 Discussion

5.1 Summary of Key Findings: Comparison of Three Motivational Pathways

Through a comparative multi-case analysis of the fine chemical industry, this study identifies three distinct pathways by which CE practice stimulates employee motivation under different resource endowments and institutional constraints:

Survival Anxiety Pathway (Private Enterprise Case): In a context of resource scarcity and extremely low "institutional tolerance" due to the deterrence of criminal liability, CE is viewed as high-risk behavior. Employee motivation is driven primarily by external regulation (job security), manifesting as a defensive Safety-I mode ("Dare not do").

Institutionalized Execution Pathway (SOE Core Business Case): In a context of resource abundance but facing "panoptic monitoring," CE is transformed into standardized Resource Orchestration (Sirmon et al., 2011). Employee motivation stems from a mixture of compliance pressure and Public Service Motivation (PSM) (Perry & Wise, 1990), manifesting as a high-intensity Safety-I execution mode ("Do as prescribed").

Efficacy-Oriented Pathway (SOE Peripheral Unit Case): In a context of resource scarcity but possessing "institutional voids," CE evolves into bottom-up Bricolage (Baker & Nelson, 2005). This behavior activates employees' creator self-efficacy by creating experiences of "Visible Efficacy" and "Value Reversal," thereby emerging into a proactively adaptive Safety-II mode ("Do creatively").

The comparison of these three motivational pathways not only reveals the impact of contextual differences on employee behavior but also lays the foundation for the theoretical discussion from the perspectives of Bricolage Theory and Safety-II below.

The inclusion of contrasting motivational pathways, including compliance-driven and avoidance-based patterns, reduces the risk of retrospective theoretical fitting and strengthens

the analytical validity of the cross-case comparison

5.2 Theoretical Implications

5.2.1 Enriching the Psychological Dimension of Resource Bricolage

Previous studies have mostly viewed bricolage as an economic strategy to resolve material scarcity (Baker & Nelson, 2005). This study expands the application boundaries of this theory, revealing the "Psychological Spillover Effect" of bricolage behavior in highly institutionalized organizations.

The research finds that "Physical Bricolage" achieves not only the physical transformation of resources but, more importantly, triggers a "Symbolic Value Reversal" at the psychological level—that is, reversing "waste" into "resource" through "Resourcing/Reframing" (Sonenshein, 2014). This "Transformative Mastery Experience" effectively counteracts the learned helplessness long present in high-risk industries, proving that bricolage is an effective micro-mechanism for activating employees' intrinsic motivation. Therefore, this study advances resource bricolage from an operational strategy for coping with scarcity to a micro-motivational mechanism capable of reshaping employee psychological energy, thereby expanding the explanatory boundaries of bricolage theory, which has long centered on material dimensions.

5.2.2 Refining the Micro-Motivational Foundation of Safety-II

Hollnagel's (2014) Safety-II theory emphasizes the importance of "humans as an adaptive resource," but rarely discusses how such adaptability can be sustained in high-risk, strongly regulated contexts.

The cases in this study demonstrate that when employees participate in Circular Economy practices with clear positive feedback (such as resource bricolage), they can gain a confirmation of their own problem-solving abilities through concrete outcomes of "turning waste into treasure." This is similar to "Creative Self-Efficacy" (Tierney & Farmer, 2002). This

sense of efficacy helps restore employees' sense of control and agency over work, enabling them not to remain solely in defensive execution (Safety-I) but to be more willing to maintain proactive observation and situational adjustment.

It should be noted that this study does not test the direct impact of Safety-II on safety performance. Instead, it reveals from the micro-psychological level that creative practices may provide the necessary psychological basis for the sustained adaptive behaviors relied upon by Safety-II. Therefore, this study does not start from system structure or process design but cuts in from the daily creative practices of frontline employees, revealing the psychological sources that sustain adaptive capacity, thus supplementing the long-missing micro-motivational foundation for Safety-II theory. This study does not claim that CE practices directly improve safety outcomes. Instead, it identifies a psychological micro-foundation that may support the adaptive capacity emphasized in Safety-II.

5.2.3 Revealing the Motivational Shift from Resource Consumption to Resource Generation

Existing organizational research typically views resources as exogenous inputs, assuming that resource sufficiency contributes to employee performance improvement. However, the comparative analysis of this study shows that in the High Reliability Organization (HRO) context, the "mode of acquisition and use" of resources influences employee motivational states more than the quantity itself.

In the resource-relatively-abundant core business department, circular economy practice manifests mainly as standardized equipment introduction and technology procurement. Employees play the role of "Resource Consumers" more often; although compliance efficiency is improved, their cognitive engagement and sense of involvement in problems are limited. Conversely, in the budget-constrained peripheral unit, employees transform idle elements into usable resources through bricolage, thereby shifting from "consumers" to "Participants in Resource Generation."

This shift not only enhances employees' attitudes toward work but also forms a subjective experience similar to what existing research calls "Psychological Ownership" (Pierce et al., 2001)—that is, employees view safety and improvement behaviors as "things I am responsible for." Thus, the key role of bricolage stems not from resource scarcity itself, but from its prompting of employees to enter a psychological state of proactive resource creation. Therefore, this study advances the resource issue from a static perspective of "how much is owned" to a dynamic perspective of "how it is generated," revealing that the mode of resource acquisition itself constitutes an important source of employee psychological motivation, providing a new explanatory path for understanding the formation mechanism of innovation motivation in high-reliability organizations.

Chapter 6: Conclusion

6.1 Summary of Findings

This study aimed to explore how different resource endowments and institutional constraints shape the motivational mechanisms of frontline employees participating in the Circular Economy (CE) within the context of High Reliability Organizations (HROs). Through a comparative analysis of three typical chemical business units, the following core conclusions were drawn:

First, context determines the motivational trajectory. In the private enterprise (Case A), characterized by resource scarcity and high criminal liability pressure, motivation manifested as a fragile "Transactional Contract." In the SOE core business (Case B), characterized by resource abundance but strict monitoring, motivation appeared as a mixture of "Public Service Motivation" and "Compliance Rigidity." In contrast, in the peripheral unit (Case C), characterized by resource scarcity but possessing institutional voids, motivation evolved into a unique "Efficacy-Oriented" mode.

Second, the psychological spillover effect of bricolage behavior. In Case C, resource bricolage was not merely a survival strategy to cope with the crisis of the "divestment of social functions." Through "Physical Bricolage" (creating visible efficacy) and "Institutional Bricolage" (issue reframing), it alleviated the passive execution state under the Safety-I environment to a certain extent and supported more adaptive work behaviors.

6.2 Practical Implications

6.2.1 From Zero-deviation Control to Controlled Exploration Spaces

Traditional HRO safety management emphasizes high standardization and "zero deviation" to prevent systemic risks. However, the cases in this study indicate that in resource-constrained non-core links, spontaneous "Bricolage" behavior by grassroots employees can,

under certain conditions, help maintain system operational resilience.

Based on this, managers could explore establishing limited, contextualized "Controlled Exploration Spaces" without compromising core production safety. For example, in low-coupling links such as auxiliary businesses or logistics, frontline employees could be allowed to attempt to use idle resources to solve local problems within clear risk boundaries. Such arrangements do not encourage disorderly innovation but, through institutionalized means, transform originally implicit non-standard operations into identifiable and learnable organizational experiences, thereby reducing the risk of concealed violations caused by excessive suppression.

6.2.2 Using Value-reversal Tasks to Mitigate Safety Fatigue

Addressing the long-standing work characteristics of "boring monitoring" and negative feedback dominance in HROs, relying solely on compliance education and responsibility emphasis is often difficult to sustainably activate employee psychological engagement.

This study found that Circular Economy tasks with clear physical transformation results (such as waste reuse and energy recovery) provide employees with positive experiences distinct from daily inspections through the visible feedback of "turning waste into treasure." Managers can view such tasks as supplementary arrangements to routine safety management. Without increasing high material incentives, these tasks help employees restore a sense of control and efficacy over work, thereby mitigating safety fatigue and job burnout to a certain extent.

6.2.3 Context-sensitive Incentives Aligned with Safety-I and Safety-II

The results suggest that differences in resource conditions and risk attributes across business units lead to inconsistent responses to safety motivational mechanisms. Therefore, in practice, it is necessary to distinguish the applicable contexts for Safety-I and Safety-II.

In core high-risk areas, priority should continue to be given to compliance and stability, maintaining the system safety baseline through clear responsibilities and institutional

constraints. Conversely, in resource-constrained peripheral units, authorization and a sense of participation can be moderately strengthened, recognizing employees' creative contributions in solving specific problems. This context-sensitive incentive orientation helps retain organizational adaptability and learning capability in marginal areas without weakening core safety control.

6.3 Limitations and Future Research

Although this study reveals the motivational mechanism by which bricolage activates Safety-II, given the specificity of the case contexts, the Generalizability of the results is subject to specific Boundary Conditions.

6.3.1 Task Specificity of HROs

The psychological activation mechanism identified in this study relies heavily on the specific task context of HROs. For industries that are inherently highly creative, possess task diversity, or have clear positive incentives, CE practice might be viewed as an extra "Task Burden." The psychological resource restoration mechanism discussed in this study may not be significant in those contexts. Therefore, the motivational model proposed here may be more applicable to high-risk industries characterized by "Rigid Task Structure and Negative Feedback Dominance."

6.3.2 Dependency on Physical Perception

The "Sense of Efficacy" in this study largely stems from employees' Embodied Perception of high-pollution and high-risk environments. Chemical workers have intuitive professional sensory experiences (e.g., smell, temperature) regarding "waste gas" and "waste heat." Therefore, when these negative objects are transformed into resources, the psychological impact is strong. For non-manufacturing industries or sectors where environmental externalities are not obvious, it may be difficult for employees to generate deep "Value Reversal" experiences, thereby weakening the generation intensity of prosocial motivation.

6.3.3 Sample and Cultural Limitations

Sample Limitation: This study focuses only on one large SOE and a private enterprise within its ecosystem. Although the cases are representative, the generalizability of the conclusions still needs verification through quantitative data.

Cultural Limitation: The "Public Service Motivation" of SOE employees may be related to China's specific collectivist culture or the socialist SOE system. Its applicability in other cultural institutional backgrounds deserves further exploration.

Subjectivity: As qualitative research, the conclusions are inevitably influenced by the researcher's subjective interpretation.

6.4 Conclusion: Micro-Sparks and Macro-Resilience

The final implication of this study is that in the modern industrial system pursuing standardization and high compliance, the creative adaptive capacity of frontline employees remains the Last Line of Defense for maintaining the systemic resilience of High Reliability Organizations (HROs).

Traditional safety management often pins safety on strict restrictions and redundant resource inputs (Safety-I). However, this study confirms that even in peripheral contexts with extreme resource limitations, as long as the organization grants frontline employees moderate "Bricolage Space," they can reconstruct the meaning and sense of control of work through the creative transformation of resources.

This "Meaning Reconstruction" originating from micro-individuals is not only a psychological antidote for curing job burnout but also the micro-foundation for activating Safety-II adaptive capabilities when high-risk organizations face uncertainty. This reminds us: no matter how perfect the technical system or how rigorous the institutional design, the "Last Mile" of safety management must ultimately be borne by concrete "people." Seeing and respecting the agency of micro-individuals remains fundamental to building long-term

organizational resilience.

Reference

Adler, P. S., & Borys, B. (1996). Two types of bureaucracy: Enabling and coercive. Administrative Science Quarterly, 41(1), 61-89.

Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. Administrative Science Quarterly, 50(3), 329-366.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191-215.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: W.H. Freeman.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. Psychological Inquiry, 11(4), 227-268.

Dekker, S. W. A. (2014). The field guide to understanding 'human error' (3rd ed.). Ashgate.

Denzin, N. K. (1978). The research act: A theoretical introduction to sociological methods (2nd ed.). McGraw-Hill.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American Sociological Review, 48(2), 147-160.

Duymedjian, R., & Rüling, C. C. (2010). Towards a foundation of bricolage in organization and management theory. Organization Studies, 31(2), 133-151.

Edmondson, A. C., & McManus, S. E. (2007). Methodological fit in management field research. Academy of Management Review, 32(4), 1155-1179.

Eisenhardt, K. M. (1989). Building theories from case study research. Academy of Management Review, 14(4), 532-550.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases:

Opportunities and challenges. Academy of Management Journal, 50(1), 25-32.

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. Journal of Organizational Behavior, 26(4), 331-362.

Garud, R., & Karnøe, P. (2003). Bricolage versus breakthrough: Distributed and embedded agency in technology entrepreneurship. Research Policy, 32(2), 277-300.

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production, 114, 11-32.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. Organizational Research Methods, 16(1), 15-31.

Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinant and malleability. Academy of Management Review, 17(2), 183-211.

Glaser, B. G., & Strauss, A. L. (1967). The discovery of grounded theory: Strategies for qualitative research. Aldine.

Grant, A. M. (2007). Relational job design and the motivation to make a prosocial difference. Academy of Management Review, 32(2), 393-417.

Grant, A. M. (2008). The significance of task significance: Job performance effects, relational mechanisms, and boundary conditions. Journal of Applied Psychology, 93(1), 108-124.

Gunningham, N., Kagan, R. A., & Thornton, D. (2003). Shades of green: Business, regulation, and environment. Stanford University Press.

Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. Organizational Behavior and Human Performance, 16(2), 250-279.

Hollnagel, E. (2012). FRAM: The functional resonance analysis method - Modelling

complex socio-technical systems. Ashgate.

Hollnagel, E. (2014). Safety-I and Safety-II: The past and future of safety management. CRC Press.

Hollnagel, E., Woods, D. D., & Leveson, N. (2006). Resilience engineering: Concepts and precepts. Ashgate Publishing.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. Resources, Conservation and Recycling, 127, 221-232.

Kostka, G., & Zhang, C. (2018). Tightening the grip: Environmental governance under Xi Jinping. Environmental Politics, 27(5), 769-781.

LaPorte, T. R., & Consolini, P. M. (1991). Working in practice but not in theory: Theoretical challenges of "high-reliability organizations". Journal of Public Administration Research and Theory, 1(1), 19-48.

Lévi-Strauss, C. (1966). The savage mind. University of Chicago Press.

Mackworth, N. H. (1948). The breakdown of vigilance during prolonged visual search. Quarterly Journal of Experimental Psychology, 1(1), 6-21.

Mair, J., & Marti, I. (2009). Entrepreneurship in and around institutional voids: A case study from Bangladesh. Journal of Business Venturing, 24(5), 419-435.

Patton, M. Q. (2002). Qualitative research and evaluation methods (3rd ed.). Sage Publications.

Perrow, C. (1984). Normal accidents: Living with high-risk technologies. Basic Books.

Perry, J. L., & Wise, L. R. (1990). The motivational bases of public service. Public Administration Review, 50(3), 367-373.

Pierce, J. L., Kostova, T., & Dirks, K. T. (2001). Toward a theory of psychological ownership in organizations. Academy of Management Review, 26(2), 298-310.

Provan, D. J., Woods, D. D., Dekker, S. W. A., & Rae, A. J. (2020). Safety II

professionals: How resilience engineering can reshape safety practice. Reliability Engineering & System Safety, 196, 106740.

Reason, J. (1990). Human error. Cambridge University Press.

Roberts, K. H. (1990). Some characteristics of one type of high reliability organization. Organization Science, 1(2), 160-176.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. Contemporary Educational Psychology, 25(1), 54-67.

[Scott, W. R. (2013). Institutions and organizations: Ideas, interests, and identities (4th ed.). Sage Publications.

Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. Academy of Management Review, 32(1), 273-292.

Sirmon, D. G., Hitt, M. A., Ireland, R. D., & Gilbert, B. A. (2011). Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects. Journal of Management, 37(5), 1390-1412.

Sonenshein, S. (2014). How organizations foster the creative use of resources. Academy of Management Journal, 57(3), 814-848.

Standing Committee of the National People's Congress. (2020). Amendment (XI) to the Criminal Law of the People's Republic of China. Beijing: National People's Congress.

Thøgersen, J. (1999). Spillover processes in the development of a sustainable consumption pattern. Journal of Economic Psychology, 20(1), 53-81.

Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. Academy of Management Journal, 45(6), 1137-1148.

Truelove, H. B., Carrico, A. R., Weber, E. U., Raimi, K. T., & Vandenbergh, M. P. (2014). Positive and negative spillover of pro-environmental behavior: An integrative review

and theoretical framework. Global Environmental Change, 29, 127-138.

Weick, K. E. (1987). Organizational culture as a source of high reliability. California Management Review, 29(2), 112-127.

Weick, K. E., & Sutcliffe, K. M. (2001). Managing the unexpected: Assuring high performance in an age of complexity. Jossey-Bass.

Woods, D. D. (2015). Four concepts for resilience and the implications for the future of resilience engineering. Reliability Engineering & System Safety, 141, 130-137.

Wright, B. E., & Grant, A. M. (2010). Unanswered questions about public service motivation: Designing research to address key issues of emergence and effects. Public Administration Review, 70(5), 691-700.

Yin, R. K. (2014). Case study research: Design and methods (5th ed.). Sage Publications.

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? Journal of Cleaner Production, 143, 757-768.

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production, 114, 11-32.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. Resources, Conservation and Recycling, 127, 221-232.

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular economy: The concept and its limitations. Ecological Economics, 143, 37-46.