

Holacracy Governance: An Exploration of Business R&D Process Re-engineering for Chinese company

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Abstract: Innovation is pivotal for development, and efficient research and development (R&D) processes are essential for fostering innovation. However, Chinese enterprises often grapple with challenges in their R&D processes, such as a lack of autonomy, missed improvement opportunities, and reluctance to take risks. This paper advocates for re-engineering the R&D process, highlighting the holacracy system as a promising solution. Holacracy, with its network structure and self-management teams, is gaining popularity for R&D process re-engineering. The paper explores successful enterprises using holacracy, combining enterprise process re-engineering theory with holacracy's organizational model to propose a path for R&D process re-engineering. Recommendations and countermeasures for localized implementation in China are provided, aiming to enhance R&D efficiency and address common dilemmas in Chinese enterprises.

Keywords: Holacracy; Enterprise Research & Development; Enterprise Process Re-engineering

1 Introduction

Innovation is the driving force for progress, crucial for both nations and companies. Research and development (R&D) is an important means of innovation. The R&D process of a company involves multiple departments within the organization. Effective systems and efficient workflows are important guarantees for implementing product development. The production process improvement has been a factor that can help the survival of enterprises and it has occupied the thoughts of leading business managers^{[1][2]} (H. Azimi, 2020; Ghazanfari, 2020). Holacracy, distributing power across the organization, empowers individuals and teams, aligning freedom with the business mission, and can improve R&D efficiency. This concept has recently been accepted & implemented in some organizations globally^[3] (Saroja Asthana & Vilas Pharande, 2023).

Today, Chinese enterprises encounter three key challenges in their R&D processes. Firstly, many companies rely on outdated methodologies. The top-down decision-making approach, coupled with weak R&D awareness and ineffective measures, results in sub-optimal efficiency. Secondly, although managers engage in seminars like the "Huawei Experience", they struggle to implement acquired knowledge upon returning to their companies. Thirdly, a "lack of consensus" hinders enterprise management. There is a gap that persists between aspirations and implementation. The CEO exhibits innovative enthusiasm, but departmental managers resist

risk-taking. Some departments embrace reform eagerly, while others exhibit reluctance to cooperate. These challenges highlight the inadequacy of traditional research and development (R&D) models for seamless integration into enterprise research and innovation. Innovation demands a departure from convention and the shackles of traditional systems.

To align with the management innovation and industrial developing trends driven by the Industry 4.0, enterprises are embracing novel ideas and processes. Organizational and process innovation are essential for ensuring R&D efficiency. The enterprise R&D process must discard traditional institutional mechanisms, achieve innovative breakthroughs, and leverage the latest technology to seamlessly integrate the command chain, control chain, and business chain.

To address this imperative, the cooperative design of an organizational operating system requires a new structure. A revamped design has demonstrated exceptional organizational and R&D efficiency in practice, yielding significant enterprise performance^[4](Daoud Jerab,2023). This study explores the mechanism, implementation, and path of cooperative design in enterprise management innovation and R&D process Re-engineering, offering both theoretical and practical insights.

2 Literature review

The concept and related theories of Business Process Re-engineering (BPR) were first proposed by Hammer and Champy^[5](1993). This theory emphasizes that in order to achieve significant improvements in cost, quality, service, and speed, it is necessary to fundamentally rethink and thoroughly rebuild the business processes of an enterprise, "so that the enterprise can adapt to the modern business environment characterized by customers, competition, and change to the fullest extent possible." Businesses have performed various business activities over the years^[2] [Ghazanfari, 2020] and ^[6][Liu,2020], from providing strategic sourcing to order fulfillment, and customer relationship management (CRM). Business Process Re-engineering (BPR) employs advanced manufacturing technology, information technology, and modern management methods to comprehensively revamp an enterprise's existing business processes. The aim is to establish a new process-oriented organizational structure, seamlessly integrating technology and functional management for innovative and sustainable development. Redesigning the enterprise R&D process enhances performance, cost, project, knowledge, and risk management. This encompasses the entire life cycle, from idea generation to marketing new products, and involves a full system Re-engineering of organizational subsystems like R&D strategy, portfolio, project, enterprise resources, customer relationship management, and foreign product data management systems. Enterprise process Re-engineering models, including "Capability Maturity Model Integration" (CMMI), "Integrated Product Development" (IPD), "Product and Cycle-time Excellence" (PACE), and "Agile Project Management System" (APMS), facilitate this trans-formative approach.

R&D process Re-engineering centers on standardizing, proceduralizing, and sustaining process design. The "holonization" model, inspired by Koestler's research^[7](1967), addresses the needs of modern R&D for adaptable, flexible, and multifunctional organizations. Derived from nested hierarchical structures in self-organizing biological systems, the "holon enterprise" model is based on holonic levels. In a holonic level, holons exhibit autonomous

behavior as collaborative parts, simultaneously belonging to different clusters and governed by rules. Rules define the system as a circle with its own identity, structural configuration, and functional mode ^[8](Ulmer, Brennan, and Walker, 2002).

Holacracy draws inspiration from the efficiency and effectiveness inherent in lean management's pursuit of streamlined and value-driven processes. The application of Holacracy in enterprises partially borrows elements and principles from lean management^[9](Abdulmalek, Rajgopal, Needy, 2006), and incorporates self-organizing elements. Hock^[10] (1995) believes that self-organization is the process by which chaotic systems form dissipative structures when randomly identified. The stronger the self-organizing function, the stronger its ability to maintain and generate new functions. The theory of the organizational properties and their interrelationships between chaos (representing competition) and order (representing cooperation) of complex adaptive systems is the basis of the Holacracy organizational model. Brian Robertson^[11] proposed the new organizational structure model based on agile software development and lean management theory, and formulated the Holacracy Constitution, which defined roles, circle structures, governance methods, and operating processes^[12] (Holacracy One, 2015). Rebecca Greenfield^[13] (2015) compiled the Holacracy Dictionary to explain the content of terms. Kastle^[14] (2013) conducted a case analysis of the Gore Company, which adopted the Holacracy organizational structure. Komposo and Sridevi's ^[15](2010) research shows that the self-organizing nature of the Holacracy R&D process can increase employee dedication, and more dedicated employees can bring higher than average revenue growth to the enterprise, thereby further enhancing employee dedication. Macey and Schneider^[16] (2008) believe that high employee dedication can make a significant contribution to enterprise performance. Therefore, Holacracy can play key a role in improving enterprise performance.

Holacracy process is established for companies to evolve into self-managing organizational structures. Its purpose is to make the R&D process flexible and able to use multiple R&D frameworks simultaneously, with efficiency varying depending on the organization using it. The traditional hierarchical organizational structure is pyramid-shaped, with fixed positions for each department. In these organizations, managerial authority provides a simple and effective way to establish goals and clarify the responsibilities of each employee^[17] (Magee, Galinsky, 2008; Nickerson, Zenger, 2004) . Chinese scholar Li Aimin^[18] (2006) believes that in today's information age, companies need to tightly integrate the command chain, control chain, and business chain, and place management activities in the business process to effectively achieve the integration of management and business processes. Holacracy can precisely meet this requirement. Many studies have analyzed the role of R&D process Re-engineering in improving R&D performance by examining cases of companies implementing the Holacracy model. Ackermann, M., Schell, S., and Kopp, S.^[19] (2021) analyzed how Zappos replaced positions with distributed units, enhancing the company's agility and efficiency.

3 Holacracy organizational design and process innovation in R&D

3.1 Concept of Holacracy and team governance

A company's R&D efficiency is closely tied to its organizational structure. The traditional hierarchy divides power based on functions, specializes work, and adheres to formal, centralized rules. The decision-making process follows a clear chain of command, organizing the company into functional departments and business units.

However, an ideal organizational structure for modern R&D process is decentralized, flat, highly participatory, informal, cross-functional, and an organic network. Holacracy embodies these qualities and serves as a contemporary organizational structure suitable for the digital economy. It replaces bureaucratic features with multi-functionality, strong flexibility, smooth information flow, precise decision-making, agile response, and quick adjustment. Holacracy is a governance framework that aims to replace traditional and hierarchical top-down structures in organizations by distributing authority and power to each employee^[20] (Bernstein et al., 2016). The transformation toward holacracy is radical in that it addresses all levels from organizational up to the individual level and identity^[21] (Kammerlander et al., 2018).

Holacracy model replaces the traditional pyramid-shaped organization with autonomous sub-circles, fostering decentralized, self-managing units. This shift overcomes bureaucratic challenges, unleashes grassroots organizational vitality, and enhances team advantages. The information flow becomes node-based, accelerating multi-directional transmission, reducing time delays and distortions for quality communication. Roles are diversified, establishing an organic structure geared towards projects, optimizing organizational benefits. The driving mechanism shifts from traditional health factors to incentive factors. This approach, respecting employees' personalities and values, significantly boosts organizational commitment. Unlike the bureaucracy enterprise, the decision-making process in holacracy is made by leaders in the circles. These are small autonomous units of members, such as working groups, committees, subcommittees, circles, or pods^[22] (Mueller, 2022). The decision-making process shifts from a single vertical model to a multi-polar parallel model. This structure allows for multiple sub-circles within an organization, enabling specialists to work within their domains while contributing to the overall productivity^[23] (Arca, 2022)

Holacracy outshines the traditional bureaucratic model in many ways. Firstly, it emphasizes flattening over verticalization, fostering a networked, self-organizing structure that motivates employees and sparks creativity. Secondly, Holacracy employs circles instead of departments, creating orderly, authorized, and dynamic organizational units. The transition from departmentalization to circulation evolves knowledge management communities. These communities provide task experts for each stage and enable continuous feedback. Engineers within Holacracy circles contribute to ongoing validation of needs and feedback, allowing employees to continually redesign their roles within the organization and in the R&D process. At the team and individual level, processes are adapted over time and adapted to the requirements of the organization^[24] (Schell & Bischof, 2019).

The operation of Holacracy can be explained using the Boehm spiral model^[25] (Figure 1).

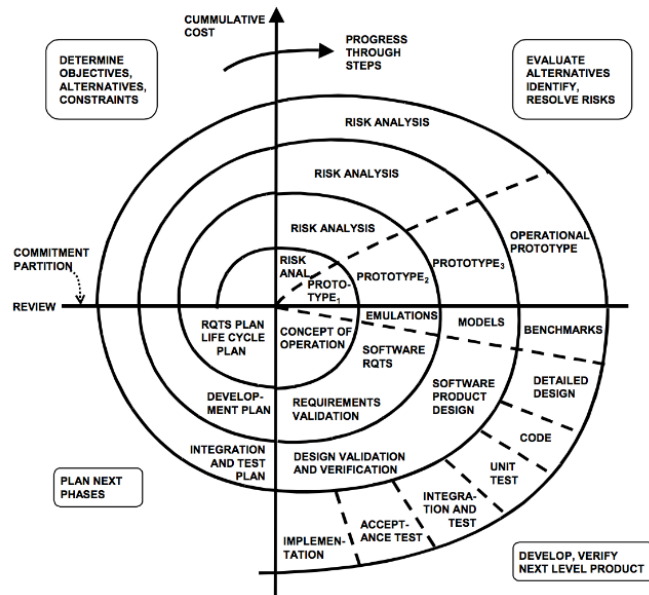


Figure 1 Boehm spiral model.

Here "Plan next phase" aligns with "Defining Objectives," "Execute" corresponds to "Identifying and Resolve Risks," "Check" aligns with validating requirements in "Develop and Test," and "Deliver" is akin to "Planning the Next Iteration." Recognizing changes in each part of the Boehm Spiral is vital in understanding evolving employee roles in Holacracy. R&D process Re-engineering involves two main approaches: radical change, redesigning from scratch to address internal and external factors, and gradual improvement, introducing alternative process models and monitoring effectiveness. Holacracy may be more suited for knowledge-intensive industries, because organizations can benefit from allowing employees to access information as it will provide an opportunity for them to develop favorable skills^[26] (Kretschmer & Khashabi, 2020)

4 Path of R&D Process Re-engineering: A Mathematical and Model-Based Approach

To operationalize the Holacracy framework within R&D processes, this paper propose a structured path of Re-engineering that incorporates mathematical modeling to identify, analyze, and optimize the various stages of R&D. This path is delineated into four key steps: Decomposition, Quantification, Optimization, and Integration.

4.1 Decomposition of the R&D Process

The first step involves decomposing the R&D process into discrete stages or activities. Each stage is examined to identify critical decision points and associated variables. For instance, we can represent the stages as a sequence (S1, S2, ..., Sn), where each stage (Si) is a subset of activities within the R&D process.

4.2 Quantification of Process Efficiency and Innovation

Once decomposed, we introduce quantifiable metrics to assess both efficiency and innovation at each stage. Let (E_i) denote the efficiency and (N_i) denote the innovation potential at stage (S_i). These can be defined as:

$$[E_i = \frac{O_i}{I_i + T_i(D_i)}]$$

$$[N_i = k \cdot (O_i - O_{i-1})]$$

Where:

- (O_i) is the output of stage (S_i),
- (I_i) is the input of stage (S_i),
- $T_i(D_i)$ is the time consumed at stage (S_i), as a function of decision variables (D_i),
- (k) is a constant representing the innovation scaling factor.

4.3 Optimization Model for R&D Process

The third step is to construct an optimization model that aims to maximize efficiency and innovation across all stages while adhering to organizational constraints such as budget, time, and personnel:

$$\text{Maximize } E = \sum_{i=1}^n w_i \cdot E_i$$

$$\text{Maximize } N = \sum_{i=1}^n v_i \cdot N_i$$

Subject to:

$$C_j : g_j(I, D) \leq B_j, \quad j = 1, 2, \dots, m$$

Where:

- w_i and v_i are weights reflecting the relative importance of efficiency and innovation at stage (S_i),
- C_j represents the set of constraints,
- $g_j(I, D)$ represents the constraint functions,
- B_j represents the bound for each constraint.

4.4 Integration into Team Governance

Finally, we integrate this model within the Holacracy or team governance framework by assigning roles to self-organized teams responsible for different stages of the R&D process. Each team operates with autonomy to make decisions within the bounds of the optimization model's results. This integration ensures that decisions are made quickly and are data-driven, aligning with both the efficiency and innovation objectives.

4.5 Implementation Strategy

To implement this Re-engineering path within an enterprise, a phased approach is recommended:

- a. Preliminary Analysis: Assess current R&D processes against the proposed model to establish a baseline.
- b. Model Customization: Tailor the mathematical model to fit the specific context and constraints of the enterprise.
- c. Pilot Testing: Apply the model to a small-scale project within the enterprise to evaluate its effectiveness.
- d. Full-scale Implementation: Roll out the optimized R&D process across all projects within the enterprise.
- e. Continuous Improvement: Use feedback loops to refine both the model and team governance structures.
- f. Visualization: Create visualizations such as bar charts or line graphs to illustrate the efficiency improvement over time.
- g. Sensitivity Analysis: Perform sensitivity analysis to identify factors influencing efficiency. For example, examine how changes in team size or decision-making speed affect the efficiency index.

5 The operation mode of R&D holacracy and environmental adaptation

5.1 Decision-making model of R&D organization under Holacracy

Peter Drucker argued in "The Concept of the Corporation" that organizations shouldn't rely on geniuses or superheroes for survival but should be manageable by ordinary leaders. Choosing an empowering organizational structure for ordinary employees is a common challenge. Holacracy's R&D organization embraces a self-organizing decision-making mode, granting employees significant participation and decision-making power. To stay competitive, organizations must effectively utilize human resources for business operability, innovation, and adaptability, supporting the value of "self-organization." Unlike hierarchical organizations with top-level design, Holacracy's decision-making occurs within each "sub-circle," shifting from "single-pole vertical" to "multi-pole parallel." This forms a decision-making mechanism with clear goals, defined responsibilities, deployment, execution, supervision, and feedback. Holacracy's networked structure lacks top, middle, or bottom layers, enabling everyone to engage in self-management and decision-making. This distributed decision-making enhances agility and innovation in problem-solving throughout the R&D process.

Decision-Making Dynamics Model

1) Define Variables:

Define variables that represent key aspects of team dynamics:

D_t : Decision-making speed at time (t)

I_t : Information flow within the team at time (t)

A_t : Adaptability of the team at time (t)

2) Decision-Making Speed Model:

A simple linear model could represent decision-making speed based on the number of team members actively involved in the decision-making process:

$$D_t = \alpha \times \text{Number of Active Team Members} + \beta$$

Here, α and β are parameters that can be calibrated based on historical data.

3) Information Flow Model:

Information flow can be modeled as a function of communication channels and team size:

$$I_t = \gamma \times \text{Number of Communication Channels} \times \text{Team Size}$$

The parameter γ reflects the impact of communication channels and team size on information flow.

4) Adaptability Model:

Adaptability can be represented as a function of the diversity of skills within the team:

$$A_t = \delta \times \text{Skill Diversity}$$

Here, δ captures how skill diversity contributes to the team's adaptability.

5) Holacratic Integration:

Integrate Holacratic principles by allowing these variables to be influenced by the dynamic governance structure. For instance, adaptability might increase if decision-making authority is distributed across roles rather than concentrated in a few individuals.

6) Simulation:

Develop a simulation model that allows for the dynamic updating of these variables over time. This can provide insights into how team dynamics evolve under Holacracy.

7) Visualization:

Use visualizations, such as time-series plots, to illustrate the changing dynamics of decision-making speed, information flow, and adaptability over the course of an R&D project.

8) Sensitivity Analysis:

Conduct sensitivity analysis to identify critical factors influencing team dynamics. For example, assess how changes in team size or the introduction of new roles affect decision-making speed and adaptability.

This is a basic framework for modeling team dynamics within a Holacratic R&D team. Depending on the specific characteristics of companies' team and the Holacracy

implementation, companies could refine and expand these models to capture more nuances in team interactions and decision-making processes.

5.2 The organizational mode of R&D organization under Holacracy

Holacracy is the R&D enterprise's self-organizational model. In systems theory, traditional organizations have ordered structures, while self-organization involves chaotic systems forming dissipative structures randomly. For a competitive edge, organizations must effectively use human resources for operability, innovation, and adaptability, aligning with the value of self-organization. In a self-organized team, individuals need knowledge and dedication to work efficiently without fixed leadership. In the future, more companies may adopt modern organizational models like Holacracy, making it a potential dominant structure. The elements of self-organization will become valuable tools for all companies^[20] (Bernstein et al., Harvard Business Review, 2016). In addition, the self-organizing model can be presented in different forms in different companies.

5.3 The management mode for R&D organizations under the Holacracy system

Self-management is the organizational management mode under Holacracy. Lee and Edmondson^[27](2017) were the first to define and comprehensively outline the self-management organization, which has three defining characteristics centered around power delegation and the absence of managers and subordinate relationships. In the current complex and dynamic environment, effective management hierarchy may not suffice, necessitating alternative organizational designs. Self-organization, as seen in Holacracy, allows quick responses to change and fosters employee participation for sustained development. Holacracy's role-based model requires clear definition, execution, and adaptability of roles. Common challenges in Holacracy R&D organizations include issues with promotion channels. Due to the elimination of traditional management positions, employee career advancement channels are different^[28](Lyons et al., 2015). The shift in Holacracy R&D organizations demands that companies meet employees' evolving career aspirations within the new framework, balancing stability, agility, and flexibility, by offering diverse promotion paths, allowing employees to challenge various roles based on their abilities or qualifications. This flexibility, including the option to transition to different departments, provides a more customized and accessible route compared to traditional enterprises.

5.4 The operation mode of the R&D process Under the Holacracy system

The operating mode of the research and development process in Holacracy adopts a system process model. The system process model "is a network sequence that can reflect activities, objects, tasks, relationships, and events related to the complete project strategy. They are repeatable, consistent, adaptable, measurable, understandable, guided, complete, and allow for verification, optimization, and implantation of new technologies. They are efficient processes in which stakeholders can participate"^[29] (Bersson, Mazzuchi, Sarkani, 2012) . The Waterfall model^[30](Larman and Basili, 2003) , V-model^[31] (Plögert, 1996) , and Spiral model^[25] (Boehm, 1988) commonly used in software development belong to this category. Unlike the three process models commonly used in engineering projects, the Holacracy research and development process system model is a systematic process model that focuses on distributed authority and decision-making. Its operating mode is a self-evolving system.

This study is based on the case of Mercedes-Benz.io which operates under the holacracy model. The framework of the holacracy organizational structure has been moderately adjusted and supplemented, as shown in Figure 2. The reference architecture includes sub-circles such as enterprise business operations circle, product support circle, project development circle, data support circle, strategy and business consulting circle, product production circle, and flexible demand circle that maintains agility and flexibility.

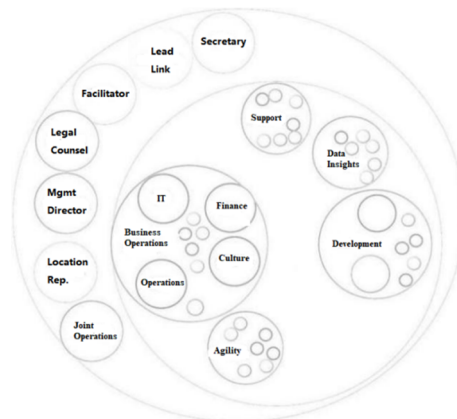


Figure 2 Holacracy organizational structure.

By defining roles, creating rules, and understanding their purpose, the model maximizes role freedom, aiding comprehension of the entire R&D process. A goal-oriented organization is more suitable for R&D in companies, especially with the increasing participation of new-generation employees who seek more personal fulfillment ^[32](De Hauw and De Vos, 2010).

5.5 The adaptive environment of the agile development process

The organizational environment is crucial, influencing the type of organizational structure in agile development. In an agile setup, tasks and roles adapt to the enterprise's internal environment, impacting the effectiveness of agile development processes. A successful adaptive environment for agile development includes key elements like the degree of Holacracy. This reflects the autonomous allocation of organizational power, resulting in a flattened structure and enhanced collaboration. Traditional hierarchical structures have low collaboration attributes, whereas Holacracy promotes equality and self-management, maximizing collaboration within the enterprise. The organizational environment plays a pivotal role in regulating the relationship between agile organizational structure and research and development performance.

5.6 Power distribution form

Restructuring improves organizational adaptability because it allows for "coordination and delegation without the typical pathologies of 'leaderless' groups or micromanagement that slows everything down"^[12] (Holacracy One, 2015). In Holacracy, decision-making is decentralized to front-line employees who self-organize to achieve given goals. This fosters agility and flexibility in responding to changing external environments. Zhang

Xiaoqin^[33](2015) notes that power distribution in Holacracy directly impacts organizational agility, replacing traditional hierarchies with interconnected autonomous sub-circles. The distributed power element measures how employees are empowered to make decisions at the lowest level, contrasting with strict power delegation in traditional models. Successful application of power distribution ensures true empowerment, whereas organizations lacking this element have managers overriding decisions and lack true empowerment.

5.7 Adaptability of systems.

System adaptability, prevalent in agile systems and knowledge-based enterprises at the "chaos edge," involves updating organizational structures through transparency and innovation. Traditional company structures are rigid, hindering quick responses to external changes. In contrast, holacratic enterprises regularly revise roles and processes based on team operations, promoting adaptability. The frequency and origin of restructuring measure a system's adaptability. Rapid, team-driven restructuring indicates stronger adaptability, while infrequent, top-down reviews suggest weaker adaptability.

5.8 Job Description Clarity

Traditional company structures with fixed roles often lack precision and timely updates. In Holacracy, roles are relatively fixed, aligning with employees' work, and are flexible, allowing for creativity. Multiple roles accommodate employees working in different teams, and role descriptions are regularly updated based on actual work. This dynamic structure is crucial for maximizing performance in Holacracy. A clear measure of employee role positioning, including job roles and responsibilities, is essential.

5.9 Fairness and transparency in processes

Fairness and transparency, crucial in Holacracy, ensure equal application of rules. In traditional companies, opaque rules and implicit norms favor those "in the know." Holacracy establishes transparent rules, binding everyone equally. The CEO delegates management power through the company's Holacracy Constitution, reorganizing small teams. Every employee, serving as a company sensor, can voice concerns about goal alignment at governance meetings, reducing office politics. Cultural transparency, replacing office politics with transparent rules, is essential. Establishing a new corporate culture during business process Re-engineering ensures alignment with re-engineered processes.

6 Re-engineering of R&D processes under Holacracy

The five main dimensions related to the success or failure of process Re-engineering are management change, management capability, organizational structure, project planning and management, and information technology and infrastructure^[34] (Al-Mashari and Zairi, 2001) . This study proposes exploring process Re-engineering in holacracy through the lens of organizational structure. The key in holacracy lies in integrating workflows, consolidating work times, and enhancing efficiency. Successful Re-engineering requires breaking down traditional structures, optimizing and combining resources (mainly human), and eliminating unnecessary steps for improved enterprise efficiency. In holacracy's research and development

process(see figure 3), sub-circle leaders must optimize their own processes, clarify responsibilities, define business terms, reduce redundancy, and streamline operations. Simultaneously, they guide collaborative development with other sub-circles by relinquishing unnecessary power, merging relevant elements, and removing redundancies to facilitate coordinated work processes and achieve collaborative development.

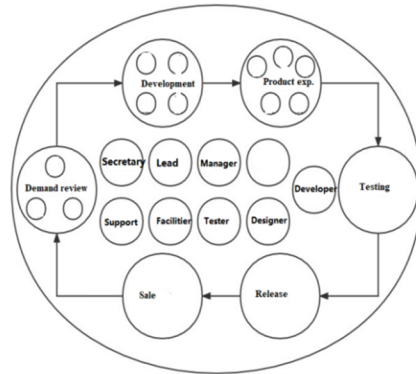


Figure 3 Upgraded R&D process and roles.

The Qian Xuesen Laboratory's adoption of Holacracy, as documented by Gao Lei^[35] (2020), demonstrates the practicality and effectiveness of Holacracy in process Re-engineering to enhance research efficiency. Holacracy aims to eliminate hierarchy, fostering an efficient and flexible internal operation system through goal-oriented processes. The laboratory's experience highlights the optimization of organization, processes, and systems, promoting transparency, cultural alignment, and efficiency in line with Holacracy's results-oriented culture. Breaking down department boundaries, Holacracy in the digital and network economy era emphasizes setting up R&D task forces around major projects, with specialized research groups collaborating for project completion. The core of Holacracy's process Re-engineering lies in standardizing, refining, and personalizing work, production, and research procedures. Standardization involves uniformity in products, processes, and services, while fine management utilizes technology and cultural guidance to enhance enterprise research and development. Personalized management tailors strategies and goals based on different projects, links, teams, and employees. Supervision, crucial for overall execution ability, involves using big data, visualization, and information technology to improve inspection and assessment efficiency. A visual supervision service platform aids in managing key tasks, project scheduling, information management, and performance evaluation, achieving full-process supervision and motivation stimulation.

7 Application of Holacracy management model

7.1 Application cases of the Holacracy model

The successful operation of Crisp, a UK management company that practices Holacracy, proves that distributed authority reduces response time and increases employee initiative and

satisfaction. In addition, large organizations can also seek to partially allocate control, such as Alphabet Inc., which implemented a Holacracy reorganization to "better build teams that can generate the fastest, most concentrated innovation for our moonshot projects" ^[36](Alphabet Inc., 2015). Amazon also uses Holacracy to assist decision-making, improve organizational agility, and reduce costs and risks associated with change, as Holacratic organizations can restore themselves without waiting for another top-down, large-scale reorganization^[37] (Amazon's annual report for 2015).

7.2 The localization application of Holacracy

The Qian Xuesen Laboratory of Space Technology aimed to foster original innovation and explore innovative management models in the aerospace industry. By implementing the Holacracy organizational management model, the laboratory addressed drawbacks of the bureaucratic system, optimizing organizational management, and enhancing creativity. Leadership played a vital role in ensuring Holacracy acceptance, involving promoting concepts, analyzing feasibility, publishing proposals, guiding employees to think differently, breaking free from traditional roles, and decentralizing power.

7.3 Countermeasures for localizing the application of Holacracy

7.3.1 Innovative thinking

To implement Holacracy in Chinese enterprises' R&D process, it's essential to overcome three thinking obstacles. First, address "unwillingness" thinking by changing outdated R&D concepts. Second, tackle "unrelated" thinking, shifting employees' dependence on upper-level management decisions to enhance innovation autonomy. Finally, combat "doing nothing" thinking, dispelling the belief that innovation is costly and risky, encouraging a break from routine. Overcoming these obstacles, especially among managers, requires eradicating ingrained thinking patterns, challenging the comfort zone, and accepting change. Start by transforming managerial thinking, optimizing R&D workflows, compressing departmental boundaries, standardizing power distribution, and enhancing institutional efficiency to promote innovation in the enterprise.

7.3.2 Precision

Implementing holacracy involves mechanism innovation and process Re-engineering, guided by precision in accordance with scientific principles. Precision implementation relies on systems, dynamic, and fine thinking. For effective enterprise R&D process Re-engineering, transformation should align with the inherent laws of the Re-engineering process, considering external environmental factors and operational uncertainties. Rigorous cost-benefit analysis and risk assessment are essential, leading to informed decision-making and contingency strategies. Recognizing R&D as an individual innovation activity, creating an optimal environment for personnel, allowing expansive thinking and operational space, and facilitating the formation of voluntary, like-minded "research teams" are crucial aspects of this trans-formative process.

7.3.3 Balance and coordination

Promoting process innovation doesn't necessitate overturning all existing company rules; instead, it involves defining the implementation scope within the authorized company systems. For instance, the Qian Xuesen Laboratory introduced the Holacracy system, strategically limiting its implementation scope to certain departments, adhering to the China Academy of Space Technology's requirements. Non-compatible functions with Holacracy's management were left unaltered, primarily applying the system to various R&D activities to prevent organizational turbulence.

7.3.4 Gradual progress

R&D process Re-engineering is not just the establishment of a new mechanism; it involves adjusting interests. Roles' diversification and decentralization can lead to conflicts and losses among employees, so a gradual approach is crucial. For instance, when Holacracy was introduced in the R&D department, the shift from a dependency to an equal relationship prompted psychological imbalances. To adapt to Holacracy, the R&D department should spend considerable time transforming the organizational management process while adjusting interest relationships through various methods for a smoother implementation and normalization.

8 Implications

This study focuses on theoretical and model development for enterprise research and development (R&D) process Re-engineering, a systematic project in the digital information age. Holacracy has gained significant attention in academia due to its potential as an optimal organizational structure for promoting R&D process Re-engineering. The proposed approach is based on the holacracy model, emphasizing its effectiveness in enhancing innovation and efficiency in enterprise R&D. The model offers advantages such as flexible decision-making, autonomous teams, and improved adaptability to market and technological changes.

9 Conclusion and Future research

9.1 Conclusion

Holacracy R&D processes and governance structures offer greater flexibility and adaptability compared to traditional enterprises. The decentralized nature and role clustering make it a platform for diverse talents. Members can contribute creative ideas and projects within the framework rules, fostering a relay-team dynamic that facilitates spontaneous innovation. Holacracy's organizational structure is conducive to incubating multiple projects or "sub-circles," making it ideal for small and medium-sized, especially knowledge-intensive, enterprises. Implementing holacracy in large enterprises may pose challenges, requiring a strong corporate culture as a foundation.

Holacracy's iterative speed surpasses traditional hierarchical models, allowing for a more flexible relay race of ideas within the organization. The governance structure is anti-monopoly,

promoting open communication, reducing costs, and enhancing R&D efficiency. The Holacracy development process resembles a grand stage, allowing continuous iteration and development, unlike traditional companies that face challenges in adjusting initial goals. Holacracy's innovative vitality persists, making it a dynamic and adaptable organizational model.

9.2 Future research

Holacracy, positioned as a crucial milestone in the global digital economy era, remains an evolving organizational model requiring continuous innovation and refinement. As technological innovation accelerates and market competition intensifies, holacracy would emerge as a viable solution for fostering innovation and competitiveness in enterprises.

Future research on Holacracy R&D process Re-engineering should delve into multidimensional theoretical exploration and empirical analysis and providing suggestions for companies. Key aspects such as R&D motivation mechanisms and goal establishment are central to the ongoing development of Holacracy R&D process innovation.

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