

Knowledge Management: From 1 to N to N² Post-prints

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Abstract

[Purpose / Significance] Guided by the integration of theory and practice, this study provides guidance for enterprises to achieve scenario revolution, knowledge empowerment, and practical pathways in knowledge management, facilitating the deepened development of enterprise knowledge management from 1 to N to N². [Method / Process] Through scenario revolution across four dimensions—business field, knowledge field, interpersonal field, and technology field—and application of the “1+4” model to transform knowledge from “management” to “application”, the practical pathways of knowledge management are interpreted in stages. [Results / Conclusion] The operational procedures for the four dimensions of scenario revolution are clarified, with coordinated implementation of various scenarios; knowledge empowerment is provided for knowledge assets, individuals, teams, organizations, and business according to the “1+4” model; by referencing the practical pathways, enterprises can identify their own development pain points and tailor knowledge management solutions to provide better empowerment for enterprises and employees.

Full Text

Preamble

Knowledge Management: From 1 to N to N² Xia Jinghua¹, Zhu Luying^{2,3}

Abstract: [Purpose/Significance]

Guided by the integration of theory and practice, this paper provides guidance for enterprises to achieve a scene revolution in knowledge management, knowledge empowerment, and practical pathways, helping enterprise knowledge management develop in depth from 1 to N to N². [Method/Process] Through a scene revolution across four dimensions—business field, knowledge field, interpersonal field, and technology field—and applying the “1+4” model to shift knowledge

from “management” to “use,” the paper finally interprets the practical pathways of knowledge management in stages. [Result/Conclusion] The paper clarifies the operational aspects of the four dimensions of scene revolution and implements various supporting scenarios; according to the “1+4” model, it provides knowledge empowerment for knowledge assets, individuals, teams, organizations, and business; by comparing practical pathways, enterprises can identify their own development pain points, tailor knowledge management solutions, and provide better empowerment for enterprises and employees.

Keywords: Scene Revolution, Knowledge Empowerment, Practice Path

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1 Introduction

In today's new technological environment, knowledge has become the primary source of competitive advantage among enterprises and a necessary condition for innovation. Knowledge management and knowledge services are also advancing toward a new stage of in-depth development, promoting on-demand knowledge aggregation, multi-dimensional mining, and knowledge discovery, thereby driving technological innovation and industrial upgrading in Chinese enterprises in the new era. The goal of knowledge management is to implement and achieve the overall strategic objectives of the enterprise [1]. How to integrate knowledge management into corporate strategy and enhance enterprise innovation and development capabilities is of paramount importance. Different enterprises exhibit different stages in promoting knowledge management. Some enterprises only practice basic knowledge asset management, while others may not yet have engaged with knowledge management. However, most enterprises hope that knowledge management can better integrate with their business, R&D, marketing, human resources, and other functional departments to achieve the transition from 1 to N. Then, through massive knowledge accumulation and new digital technologies, they can unlock greater value from knowledge, thereby achieving N² and promoting the in-depth development of enterprise knowledge management.

2 Scene Revolution: Business Field + Knowledge Field + Interpersonal Field + Technology Field

2.1 Guiding Ideology for Knowledge Management

Currently, enterprises generally follow two guiding ideologies for knowledge management. First, a function-oriented approach. Many enterprises, when implementing knowledge management, first think of launching a knowledge management system and establishing functional modules such as knowledge repositories,

knowledge communities, and knowledge maps. However, after system launch, there remains a gap between the system and actual effectiveness, with many unanswered questions regarding what knowledge the system should manage and whether knowledge is being learned and used by employees. Second, a theory-guided approach based on the knowledge spiral. Nonaka and Takeuchi's SECI model, which describes the knowledge conversion process [3], has theoretical significance for guiding specific knowledge management applications. However, in practice, a gap still exists between theory and reality, including insufficient answers to questions such as what constitutes tacit and explicit knowledge, how they manifest in different businesses, and whether different business domains emphasize externalization or combination.

2.2 Enterprise Knowledge Management Practice Approaches

Based on the above issues, Shenzhen Landray Software Co., Ltd. (hereinafter referred to as "Landray") introduces knowledge management thinking from five levels: macro vision, strategic capability, blueprint planning, specific operations, and employee behavior. This framework addresses how to implement knowledge management from dimensions such as organization, process, technology, and content, how to promote participation from employees at all levels, and summarizes three key points—scene revolution, knowledge empowerment, and practice pathways—to elaborate on specific practices for the development of knowledge management.

Through reviewing specific practices of numerous domestic and foreign enterprises, we find that current enterprise knowledge management practices can be categorized into four approaches, which can be termed "Bad Idea," "Heavy-handed Approach," "Quick Wins," and "Strategic Prescriptions" (see Figure 1 [Figure 1: see original paper]). The specific content is as follows:

2.2.1 "Bad Idea"

If an enterprise treats knowledge management merely as a technology-oriented project, considering it purely from a technical perspective—such as building a document library or knowledge repository without paying attention to business requirements and management objectives—this approach often falls into the "Bad Idea" category. Many enterprises do this, typically resulting in two outcomes: first, a system without knowledge; second, a system with knowledge that few people use. This leads to poor input-output-effectiveness-sustainability and makes it difficult to maintain long-term vitality [4].

2.2.2 "Heavy-handed Approach"

The "Heavy-handed Approach" refers to top-down unified planning and deployment of knowledge management at the corporate level, with comprehensive construction of a knowledge management platform and full-scale implementation. However, this approach often involves wide scope, requires substantial resource investment, and has long effect cycles. Without foresight and firm determination from leadership, and without effective organizational coordination, the

“heavy medicine” often fails to take root in the enterprise and is difficult to produce results [4]. The gap between ideal and reality becomes particularly evident when the company is large, making it challenging for the “Heavy-handed Approach” to solve actual business problems.

2.2.3 “Quick Wins”

“Quick Wins” are obvious, short-term, and quickly effective knowledge management initiatives. This approach targets specific groups and positions for empowerment, such as standardizing onboarding for new employees, passing on expert wisdom to marketing personnel, or mining experiences from marketing experts. This type of knowledge 梳理, extraction, and empowerment for specific groups and positions typically combines knowledge assets with training and learning. For example, Juwei Duck Neck’s rapid onboarding for new employees, Laobaixing Pharmacy’s store manager knowledge portal, and Tongce Real Estate’s front-line elite case harvesting campaign all have clear service targets, clear objectives, and clear value points, often achieving good results [4]. Similarly, when enterprises engage in group innovation, both IBM and Siemens include idea generation stages in their processes, which provide support for subsequent innovation programs [5]. This represents a typical practice of tightly integrating knowledge management with innovation scenarios.

2.2.4 “Strategic Prescriptions”

“Strategic Prescriptions” are more complex than “Quick Wins,” focusing not only on a specific group or position but also on particular business scenarios or pilot departments. This approach integrates knowledge management into different business scenarios such as R&D, projects, marketing, customer service, and maintenance, enabling better knowledge management around processes on top of functional departments. It focuses not only on knowledge accumulation but also on knowledge contextualization to achieve the goal of knowledge management empowering business. For example, Huawei’s pre-project, during-project, and post-project learning tightly integrates knowledge management with R&D project processes; Huaxia Fund’s intelligent customer service knowledge base emphasizes scripted description, atomic disassembly, and intelligent application of knowledge [4].

Therefore, more and more enterprises are abandoning the traditional “Bad Idea” and are less willing to adopt the “Heavy-handed Approach.” Instead, they prefer to generate “Quick Wins” or provide “Strategic Prescriptions.” Combining corporate strategic objectives with business scenarios and using problem orientation to find entry points for knowledge management will enable better implementation of knowledge management in enterprises, thereby achieving the scene revolution of knowledge management.

2.3 Knowledge Management Scene Revolution

The scene revolution refers to the increasing emphasis on integrating knowledge management into scenarios to empower business. The scene revolution

in knowledge management focuses on the integration of four types of scenarios: business field, knowledge field, interpersonal field, and technology field. Overall, the business field emphasizes analyzing the knowledge work characteristics of different businesses; the knowledge field builds four types of knowledge field models based on Nonaka and Takeuchi's SECI model; the interpersonal field provides management resource support from dimensions of knowledge demand, supply, operation, and governance; and the technology field constructs a technical support field for knowledge management from dimensions of documentation, theming, refinement, and intelligence. Through scenario integration actions such as business object matching, model alignment, management support, and technical support, knowledge management will gain new vitality, as shown in Figure 2 [Figure 2: see original paper].

2.3.1 Business Field

The premise of enterprise knowledge management is to clarify the objects of knowledge service. To effectively 沉淀, share, and apply knowledge, it must rely on business. Business is where knowledge is applied, and knowledge is generated in these businesses [6]. Therefore, enterprises need to understand the characteristics of business work, the situation of business fields, and whether different businesses are carried out independently or through multi-department collaboration, whether work is routine or complex, and whether it can be operated according to institutional processes or requires substantial tacit experience. Based on these different characteristics, we summarize four business models: 1) Transaction Model: Following transactional SOP (Standard Operation Procedure) guidelines, business that can be completed by individuals and is relatively easy to standardize. 2) Expert Model: Complex business that can be completed by individuals, such as traditional Chinese medicine practitioners, which is the expert model. 3) Process Model: Business that usually has standardized systems, processes, and standards but requires multi-department and multi-person collaboration, where “process pipelines, knowledge running water” is most suitable. 4) Project Model: Usually innovative and highly complex work that requires multi-department and multi-person collaboration but lacks mature processes.

2.3.2 Knowledge Field

The four models of the business field described above have different requirements for knowledge, so they need supporting knowledge fields for collaboration. Based on Nonaka and Takeuchi's knowledge conversion process SECI model, there are four types of knowledge fields: 1) Experiential Knowledge Field: This is the difficulty of organizational memory because this knowledge is mostly hidden in the minds of experts and employees and is personalized knowledge, such as work experience, handling of emergencies, and customer preferences. Generally, this can be achieved by establishing expert directories and using expert location methods to enable more people to share this personalized experiential knowledge [7]. For example, knowledge inheritance from traditional Chinese medicine practitioners in the expert model is experience-oriented, tacit-to-tacit, and master-apprentice based. 2) Execution Knowledge Field: Particularly emphasizes learning existing explicit standardized knowledge and internalizing it

into individual capabilities of each employee. The transaction model especially emphasizes training and learning of standardized knowledge, such as in chain companies like McDonald's and KFC. 3) Analytical Knowledge Field: Involves organizing, analyzing, and refining explicit knowledge to a higher level, usually manifested as business process manuals and business process knowledge maps, emphasizing cross-departmental processes, systems, and standards for standardized execution and continuous improvement. 4) Dialogue Knowledge Field: Emphasizes achieving externalization from tacit to explicit knowledge through establishing dialogue spaces. For example, the starting point of product innovation is often high-level conceptual innovation, which is stimulated, brewed, and generated in dialogue and interaction among cross-professional and cross-departmental personnel. Different business fields match different knowledge fields: the transaction model emphasizes execution, the expert model emphasizes experience, the process model emphasizes analysis, and the project model emphasizes dialogue.

2.3.3 Interpersonal Field

Enterprise knowledge management practice increasingly emphasizes “unity of knowledge and action,” with decision-making authority delegated, making all employees “knowledge workers.” The operation process of an enterprise can be viewed as an interactive process of individual and organizational decision-making at various levels [8]. After the knowledge conversion model is tightly integrated with business characteristics, both knowledge and people are indispensable in the knowledge management promotion process. There are knowledge suppliers, knowledge demanders, and knowledge operators. In the HR field, there are HR BPs (Business Partners); now in the knowledge management field, there are also KMPs (Knowledge Management Partners) whose work is responsible for operation, platform building, and connection making, enabling matching between supply and demand. In addition to operators, there are knowledge governors, mostly senior enterprise managers, who need to formulate supporting systems, assessments, incentives, and other institutional frameworks for knowledge management.

2.3.4 Technology Field

In addition to the interpersonal field, there is a corresponding technology field that enables technology to better support the implementation of knowledge management behavior. This can be summarized as the “four modernizations” of knowledge management technology: 1) Documentation: The most basic and traditional approach, organizing existing scattered knowledge, making it explicit, turning it into documents, and providing better classification, search, and tagging—something many enterprises are already doing. 2) Theming: Forming many knowledge themes through knowledge extraction methods such as maps, special topics, and clustering, providing precise services for specific themes. 3) Refinement: If document granularity is too large, it needs to be broken down into wikis, atoms, Q&As, test questions, etc., refining it to provide more forms of scenario-based knowledge application. 4) Intelligence: Introducing new technologies such as Natural Language Processing (NLP) and knowledge graphs into

the entire lifecycle of knowledge to achieve higher-level automation of knowledge work.

3 Knowledge Empowerment: From “1” to “1+4”

3.1 Knowledge Empowerment Dimensions

The goal of the knowledge management scene revolution is to better facilitate organizational empowerment. Empowerment should be purposeful, determining who to empower and what scenarios to empower, which enterprises have not clearly considered in past practices. Regarding empowerment, there is a very classic model—Gilbert’s Behavioral Engineering Model [9]. Gilbert found that six factors affect work performance in companies or organizational teams, some related to organizational environmental factors and some to individual employee factors. Environmental factors refer to whether employees can obtain needed information in a timely manner, whether they have matching resources, and whether there are rewards and subsequent consequences. Individual factors refer to employees’ personal knowledge and skills, mastered tacit experiential abilities, and work motivation (see Table 1).

From Table 1, we can see that “knowledge/skills” in individual factors only accounts for 11%. Therefore, empowerment cannot focus solely on employee training and learning—this is far from sufficient. From the perspective of Gilbert’s Behavioral Engineering Model, empowerment should have a broader concept. To improve business performance through empowerment, we need to understand knowledge empowerment from four dimensions: 1) Individual Empowerment (individual efficiency improvement); 2) Team Empowerment (team collaboration); 3) Management Empowerment (management support); 4) Business Empowerment (scenario integration). By providing high-quality knowledge products and services in these four dimensions, and supporting them with organizational cultural mechanisms, authorization models, and support platforms, we can create real value for users and further enhance the level of organizational empowerment.

3.2 The “1+4” Knowledge Empowerment Model

Based on the four dimensions of empowerment, we propose the “1+4” knowledge empowerment model, which consists of one knowledge asset foundation and four dimensions of empowerment (see Figure 3 [Figure 3: see original paper]). Many enterprises only focus on the middle dimension when doing knowledge management—building enterprise knowledge repositories and extracting knowledge assets—but this is only the foundation. More importantly, they need to empower across the four dimensions.

3.2.1 Enterprise Knowledge Assets

We believe that enterprise knowledge asset management should follow the “631” model: 1) 60% doing things right, including management of process systems,

guidelines, and form templates; 2) 30% doing things well, referring to management of key outcomes, case summaries, benchmarking analysis, training courseware, FAQs, and other knowledge; 3) 10% doing things excellently, referring to management of knowledge such as policies and regulations, industry information, and competitor intelligence [10].

3.2.2 Individual Efficiency Empowerment: Precision

We propose an individual empowerment model of role-based knowledge pathing—diversified role learning—online learning interaction—closed-loop role testing and training. Targeting new employees, frontline staff, and key positions, and based on role knowledge path maps, this model employs learning methods such as newcomer guidance, training, role assistants, and intelligent portals. It focuses on training and empowerment of key positions, delivering precise knowledge tailored to roles, helping newcomers quickly get up to speed, frontline employees improve capabilities, and achieving effective knowledge inheritance for key positions [10]. Various channels are utilized, including seminars, study sessions, corporate training, discussion groups, chat rooms, electronic meetings, and E-learning, to communicate concepts, methods, and skills to personnel at all levels [11]. For example, Midea’s “Engineer Assistant” empowers enterprise employees by effectively pushing knowledge, demonstrating knowledge value in application [7].

3.2.3 Team Collaboration Empowerment: Openness

From the experience of knowledge management pioneers, they all adopt a common approach—knowledge communities, which is the most direct method to achieve value multiplication effects through knowledge sharing [11]. For example, Huawei pays special attention to forming many communities oriented toward projects and professions, where tacit knowledge is exchanged through interactive communication, making the team’s overall combat capability stronger. Samsung established communities of practice in 1996, with the main goal of promoting a knowledge-sharing culture through these communities. Companies like P&G apply and establish cross-enterprise open innovation community platforms for effective external knowledge introduction. In 2008, Guangdong Mobile built a comprehensive team blog platform composed of multiple Web2.0 technology platforms to promote company information connectivity and emotional connectivity [12]. All of these are practices of team collaboration empowerment. In Landray’s knowledge management practice, we have built a project-oriented and team-oriented knowledge management model that takes project processes as the main line, integrates project knowledge management activities, and uses methods such as project communities, professional communities, learning communities, and development communities. This model focuses on self-operating knowledge communities, uses knowledge assets to solidify essence, promotes role knowledge empowerment and improvement, and enhances team collaboration empowerment. The model particularly emphasizes pre-project learning, during-project learning, and post-project learning, and how to integrate these into project work scenarios [10].

3.2.4 Management Support Empowerment: Servitization

Management support empowerment focuses more on the support, constraints, and guidance of common knowledge assets, such as corporate systems, processes, standards, and back-office normative formulation departments in finance, legal, and human resources. It also emphasizes knowledge application, doing embedded approval processes and intelligent Q&A, rather than just publishing documents, systems, and standards. Landray believes that we can promote standardized corporate process and system management from four aspects: system and process systematization, knowledge interpretation atomization, knowledge point embedding, and intelligent knowledge services, to strengthen employees' mastery of processes and systems and enhance corporate process execution. For example, Alibaba has introduced "gamification management" thinking within the enterprise, combining the fun, achievement, and reward elements of games with business processes, systems, or structures, which is also worth learning from [10].

3.2.5 Business Scenario Empowerment: Intelligence

An enterprise can be viewed as a collection of numerous business processes, a chain running through inputs, outputs, and corresponding target audiences, essentially a process of "from knowledge content, through knowledge activities, to creating knowledge value" [1]. Business scenario empowerment focuses on specialized knowledge templates for business scenarios (such as design, R&D, customer service, etc.), emphasizes thematic knowledge base construction, and integrates intelligent knowledge application assistants into work scenarios. For example, by integrating internal structured and unstructured data and external data, different thematic knowledge graphs [10] can be established to form different scenario-based thematic knowledge bases and thematic knowledge services.

4 Practice Path: How Knowledge Management Develops from 0-1-N-N²

The practice path of knowledge management from 0-1-N-N² mainly includes four stages: 1) Stage 0: Soil Preparation. Currently, many enterprises are in the soil preparation stage, not knowing where to start with knowledge management or how to build the system. At this stage, conducting knowledge management introduction training, top-level planning consulting, and workshop services is crucial. 2) Stage 0-1: Knowledge Assets. Some enterprises are not greedy for scale and only focus on the 0-1 stage, where knowledge management foundations are weak and knowledge asset accumulation and sharing need to be strengthened. This stage requires introducing basic knowledge repository application systems, supporting knowledge system 梳理 consulting services, and combining knowledge extraction. 3) Stage 1-N: Scenario Empowerment. Enterprises have urgent needs in specific business and management scenarios, requiring knowledge management empowerment and continuous operation. This stage requires developing specialized scenario-based knowledge management solutions for positions, projects, business, and functions. 4) Stage N²: Knowledge Intel-

ligence. Enterprises have a good knowledge management foundation and need to strengthen intelligent knowledge processing and application. This stage requires introducing knowledge graph platform tools and implementing intelligent knowledge scenarios to demonstrate knowledge intelligence.

4.1 Stage “0: Soil Preparation”

At this stage, strategy and business goal-oriented knowledge management strategy planning is particularly important. Only when knowledge management is closely integrated with corporate strategy and business can it truly play its role. It can be said that the strategy is to formulate the overall plan and blueprint for knowledge management to “come from business and go to business” [11]. In the past, there were many knowledge management initiatives, such as establishing knowledge repositories, conducting knowledge extraction, and building knowledge communities, but questions abound regarding what business objectives these initiatives serve and what business changes knowledge management can bring. As shown in Figure 4 [Figure 4: see original paper], only when each action can bring about real business change can knowledge management more easily gain support. In the past, enterprises lacked such connections, with business people only thinking about business and knowledge management people only thinking about knowledge management, resulting in insufficient correlation. Therefore, the TCL online workshop also addresses these questions: how to prepare the soil, how to find direction, and how to identify entry points—these are the prerequisites.

Currently, many enterprises have begun to promote knowledge management but remain in the soil preparation stage. During the pandemic, Landray conducted an online knowledge management planning workshop with TCL Financial, a subsidiary of TCL. TCL Financial had already purchased a knowledge management system platform with many functions but didn’t know who the functions were for or what kind of knowledge they could manage. After analysis, Landray concluded that TCL Financial had not formed a unified and clear “knowledge management objective.” When objectives are unclear, all aspects of knowledge identification, acquisition, reorganization, sharing, and application lack clear goals and solutions. They didn’t know how to combine corporate strategy and business needs to meet the demands of core employees. Therefore, Landray organized online planning workshops to collect management and employee-level needs and pain points of TCL Financial through this format, ultimately forming an action plan to guide its knowledge management direction.

4.2 Stage “0-1: Knowledge Assets”

Knowledge asset-oriented knowledge management differs from process-oriented knowledge management. Its focus is not on directly supporting the efficient operation of daily business processes but on identifying the organization’s core knowledge information and best practices [12]. Currently, many enterprises are in the “0-1 Knowledge Assets” stage, which focuses more on considering issues from an

organizational strategic perspective [12]. Landray proposes the “1+1+1” model for knowledge asset construction at this stage, enabling rapid knowledge asset implementation. Its core is to help enterprises answer three questions: how to build a knowledge system framework; how to construct a management system from organization, process, assessment, incentives, and security; and what kind of knowledge management platform supports it, ultimately achieving a “knowledge system + management support + knowledge platform” model.

Taking a real estate company’s knowledge asset implementation as an example, their core problem was unclear 沉淀 and transfer of standardized knowledge regarding projects, management, and products, with many repetitive issues recurring across engineering projects and properties. Regarding knowledge collaboration, the first issue was internal knowledge sharing—for example, the marketing department reported inconsistent sharing of promotional materials, leading to errors. The second was guideline transfer—for example, engineering, design, and marketing departments reported single-channel transfer of internal standard guidelines. The third was Q&A—for example, finance departments found themselves repeatedly answering the same questions from city companies. The fourth was external knowledge introduction—for example, engineering departments found it troublesome to access external standards and specifications, requiring payment. The fifth was business system integration requirements—for example, HR, design, engineering, and landscape departments raised questions about how to integrate with design systems, planning systems, and learning platforms. All these aspects pose challenges.

Based on these challenges, Landray built a “1+1+1” system for the real estate company, also called the “Seven Libraries,” including a system and standard library, brand resource library, product standard library, local policy library, project outcome library, negative product library, and experience case library. The “Seven Libraries” can answer questions about how to plan implementation, how to establish standards, gather outcomes, and build case libraries, how to enable processes from knowledge collection, review, classified storage, and sharing application, and how to use better systems to support implementation. This is the knowledge asset implementation service provided by Landray, but it remains at the foundational stage, requiring further thinking on how to continuously drive progress based on this foundation.

Taking Li-Ning Co., Ltd. as another example, the company possesses brand marketing, R&D, design, manufacturing, distribution, and retail capabilities. Projects are a common form of business operation for Li-Ning, and each project inevitably generates substantial knowledge during implementation, such as solutions, training courseware, and case experiences. In 2008, the company specifically launched the “Olympic Marketing Knowledge 梳理 Project.” Under the promotion of its KCC (Knowledge Collaboration Center), it fully summarized the experiences and lessons of Olympic marketing work. Based on this, it built the “Olympic Project Knowledge Asset Library,” forming a complex project management framework, clarifying operational norms for similar projects, deepening

understanding of Olympic marketing, and simultaneously creating a methodology conducive to new employee growth and work efficiency improvement, while preparing for the 2012 London Olympics-related marketing planning work [12].

4.3 Stage “1-N: Scenario Empowerment”

How to develop applications around different business scenarios and how to advance knowledge management vertically toward scenarios are the main tasks of the “1-N Scenario Empowerment” stage. In discussions with many enterprises, Landray has identified some relatively common scenarios. For example, in HR and academy scenarios, how to integrate knowledge and learning to help individuals improve efficiency; in finance, HR, and legal institution/process/standard scenarios, how to structure and atomize knowledge to help functional services; in marketing scenarios, how to create a mobile intelligent briefcase to serve as a marketing knowledge assistant and enable online knowledge content marketing; in R&D and scientific research scenarios, how to transform from manufacturing to creation, build the best knowledge partner for PDM (Product Data Management) systems, and achieve better integration between PDM work platforms and knowledge management support platforms; in customer service and operations scenarios, how to atomize knowledge and feed it to intelligent robots for intelligent responses, making it the best assistant for intelligent customer service. The following sections briefly introduce these scenarios with specific cases.

4.3.1 HR & Academy Scenario

This scenario particularly emphasizes providing precise knowledge empowerment for specific positions and personnel. In the past, many enterprises used E-learning platforms to manage training courseware and courses, but these were not people-oriented and lacked precision. Many enterprises’ newcomer training is in a “631” state: 60% free-range with no standards or paths, relying on newcomers to grow through trial and error; 30% master-apprentice style but often without mechanisms or motivation, resulting in low efficiency and unsatisfactory effectiveness; 10% centralized training with only simple or fragmented knowledge training, without systematic design of newcomer onboarding paths, making it neither systematic nor grounded [13]. Based on this, Landray proposes an individual empowerment model of role-based knowledge pathing—diversified role learning—online learning interaction—closed-loop role testing and training. Targeting newcomers, frontline employees, and key positions, and based on role knowledge path maps, this model employs learning methods to help newcomers quickly get up to speed, frontline employees improve capabilities, and achieve effective knowledge inheritance for key positions [10].

Taking Juwei Duck Neck as an example, the company uses a knowledge management platform to achieve rapid newcomer onboarding. Previously, newcomer onboarding knowledge materials were not systematic, lacking information system support, and training results were difficult to assess. Based on this, they standardized newcomer onboarding, setting learning tasks for each stage on

a weekly basis, conducting learning on PC/mobile terminals, and issuing employee onboarding certificates at the corporate level after passing assessments. This achieves 100% newcomer coverage, 100% knowledge repository 沉淀, 100% common knowledge coverage, and 100% management closed-loop for newcomer empowerment.

4.3.2 Institution, Process & Standard Scenario

For many enterprises in the scale development stage, there are increasing numbers of institutions, processes, and standards. However, most enterprises manage such knowledge using document publishing methods, with insufficient scenario-based knowledge services. Can enterprises, after creating, updating, reviewing, and publishing process and system documents, form thematic knowledge bases and proactive knowledge services through knowledge-based processing? This would enable better implementation of institutions and processes. Some enterprises adopt the following knowledge processing methods: 1) Wiki: Converting documents into structured Wikis to enable structured presentation and querying of institutions and processes. 2) Atomic Knowledge: Disassembling documents into atomic knowledge and embedding them in process nodes or intelligent robots. 3) Test Questions: Parsing documents to form corresponding question banks for testing and answering knowledge about institutions and processes. 4) Association: Forming search and associated presentation of relevant positions, institutions, and processes.

Taking Tencent's HR system as an example, when previously transferring HR policies, guidelines, templates, and FAQs, knowledge sources were diverse and transfer channels were extensive, making it impossible to efficiently achieve knowledge services. Therefore, the enterprise hopes to achieve unified HR knowledge classification, knowledge publishing processes, knowledge permissions and versions, and knowledge acquisition and querying. Based on this, they built an HR knowledge service platform to achieve knowledge sharing across the entire HR domain for all employees and to transfer headquarters HR policies, guidelines, and directions to HR professional departments in different business units and product lines.

Taking Alibaba as another example, the legal department specifically established a knowledge management portal. It forms an online management platform for external consulting materials such as legislative feedback and regulatory compliance, and conducts business empowerment around institutionalization, process, and standardization. For common legal issues, intelligent robots can automatically answer them, enabling self-service knowledge application.

4.3.3 Marketing Scenario

In many marketing-oriented organizations, the combat effectiveness of frontline marketing personnel determines corporate competitiveness. How to provide comprehensive knowledge empowerment to frontline marketing personnel is crucial, with three specific dimensions: 1) Role Empowerment: Prepare product knowledge, solutions, customer cases, and other marketing materials. 2) Business Empowerment: Understand full marketing process SOP scenario support,

such as sharing experiences from opportunity expansion, project initiation and follow-up, bidding, and negotiation to clarify marketing routines. 3) Customer Acquisition Empowerment: When connecting with customers, understand customer basic information, purchase motivation, and other customer knowledge, integrate relevant content from CRM (Customer Relationship Management) systems to proactively conduct knowledge content marketing, and create a mobile intelligent briefcase to digitize traditionally offline-distributed cases, manuals, and whitepapers for online dissemination with tracking and insights into browsing and reading data.

Taking Landray as an example, the company has specialized knowledge management applications for marketing scenarios. Internally, each link is standardized to support marketing standardization, with knowledge 沉淀 of bidding proposals and presentation PPTs, design of professional course progression paths to help newcomers advance through learning, and promotion of certification exams linked to personnel skill certification. Externally, they created a mobile marketing “intelligent briefcase” that provides users with online intelligent business cards, brochures, case libraries, posters, and videos to 挖掘 potential customers and combine knowledge marketing with customer acquisition.

4.3.4 R&D & Scientific Research Scenario

For R&D and scientific research scenarios, many enterprises hope to build knowledge management platforms to create the best knowledge partner for PDM systems and achieve better integration between knowledge management and PDM systems. R&D knowledge management systems need to use IT tools such as system integration, tool collaboration, and knowledge refinement to achieve “comprehensive, convenient, and refined” knowledge management. For example, they need to integrate with business systems such as PLM (Product Lifecycle Management) and standards, provide Office collaborative editing and design plugins, refine knowledge granularity, and provide proactive knowledge services for scenarios.

Taking China FAW as an example, they built an enterprise knowledge management platform that particularly focuses on how to achieve interconnectivity with R&D domain systems, patent systems, archive systems, standard systems, and PM (Project Management) systems, how to gather collective R&D wisdom, and support better R&D work.

Taking Sany Heavy Industry as another example, the R&D knowledge management platform includes eight units: knowledge repository, knowledge map, atomic knowledge, knowledge experts, knowledge community, knowledge Q&A, knowledge points, and web crawler. It 梳理, integrates, and uploads R&D project knowledge such as R&D outcomes, work guidelines, lessons learned, scientific and technological information, work diaries, and department-shared documents for sharing and application on mobile and PC terminals. Knowledge application adopts both proactive and passive methods, meeting both R&D personnel’s active knowledge query needs and pushing R&D knowledge to R&D personnel as work references through page embedding. Proactive application refers to use

through directory search, keyword search, and intelligent Q&A; passive application refers to forcefully pushing knowledge to PLM to handle each task node for deeper integration and integration.

4.3.5 Customer Service & Operations Scenario

Customer service and operations scenarios are often essential for knowledge management. When service personnel answer customer questions and provide operations diagnostics, the core lies in knowledge—such as what standard scripts are available and what previous problem solutions can be quickly reused. Moreover, the more standardized the problem, the less it needs manual answering and can be replaced by machines, thereby reducing error probability and improving service levels and efficiency. Therefore, for customer service and operations scenarios, in addition to document-based knowledge publishing, wiki-based and atomic knowledge management is needed. For example, quickly parsing Word document content and converting it into wiki knowledge that can generate atomic knowledge enables application in multiple scenario knowledge services such as intelligent Q&A, process approval, and customer self-service.

Taking Fujian Rural Credit Cooperatives as an example, the company's knowledge management platform has a very important unit—the atomic knowledge library. It manages not traditional document knowledge but atomic knowledge that has been restructured from institutional manuals, script guidelines, and common problems. For example, how to apply for timely repayment, how financial cards can repay, etc., and these atomic knowledge points can be directly fed to intelligent Q&A robots to achieve intelligent customer service functions. Through this unified knowledge maintenance capability, the customer service knowledge library becomes the best knowledge partner for building intelligent customer service.

4.4 Stage “N²: Knowledge Intelligence”

AI-driven knowledge management manifests as intelligent knowledge services, with intelligent assistant engines in every scenario. Its core idea is to convert existing structured and unstructured knowledge content and other graphite data in enterprises into more valuable diamond data through thematic knowledge modeling engines provided to thematic knowledge graphs. Through data processing, graph construction, graph application, and semantic structure reorganization, it ultimately provides intelligent knowledge services for business scenarios through intelligent scenario assistant engines.

Knowledge graphs are key supporting technologies for achieving cognitive intelligence and intelligent knowledge management applications. Big Data plus Knowledge Graph equals Big Knowledge. Big Knowledge is more important than Big Data. When Big Data is not integrated with expert knowledge from industries or business domains, its data effect is not high, and its intelligence capabilities are often difficult to explain, resulting in insufficient credibility in applications. Knowledge graph applications involve numerous industries, form-

ing a closed loop based on information, knowledge, and intelligence—obtaining knowledge from information, developing intelligent applications based on knowledge, generating new information from intelligent applications, and then obtaining new knowledge from new information. This continuous iteration can continuously produce richer knowledge graphs and more intelligent applications. In enterprises, knowledge graphs are increasingly used in various scenarios. For example, in marketing decision-making, knowledge graphs are used to analyze potential customer characteristics, match them with closed customer characteristics, recommend the most valuable potential customers, and conduct fine-grained analysis such as comparing competitor data and analyzing consumer data. In supply chain optimization, finding suppliers and timely understanding supplier information depends on knowledge graphs. In product R&D, searching, analyzing, and 统计 knowledge points in massive patent documents and user profiles cannot be done without knowledge graphs. In financial and legal scenarios, knowledge graphs and cognitive computing play significant roles in processing large volumes of professional documents and improving processing accuracy.

Currently, many enterprise architectures include not only data middle platforms and business middle platforms but also knowledge middle platforms, particularly intelligent knowledge middle platforms. Introducing knowledge graphs transforms existing scattered, unstructured, and structured but poorly associated knowledge content into more valuable resources. The scene planning and knowledge modeling capabilities of knowledge graphs will become increasingly important. As shown in Figure 5 [Figure 5: see original paper], for example, when enterprises build standard, R&D, or production knowledge graphs, they need to consider how to construct the graphs and how to provide intelligent knowledge applications, intelligent recommendations, and knowledge mining capabilities for front-end applications.

The knowledge management 0-1-N-N² practice path (see Figure 6 [Figure 6: see original paper]) is Landray's distillation of years of practical experience. By comparing the path map, enterprises can clearly understand which stage they are in and what development pain points they have, enabling them to tailor knowledge management solutions to provide better empowerment for business and employees. This is the true value of knowledge management.

5 Conclusion

Based on knowledge management theory and extensive practical cases, this paper enumerates the key points and existing problems under various enterprise knowledge management approaches. Starting from scenario characteristics, it clarifies the connotation and implementation operations of the scene revolution. Using the “1+4” model, it provides knowledge empowerment for knowledge assets, individuals, teams, organizations, and business. By interpreting the practice pathways of knowledge management in stages, it helps enterprise knowledge management achieve the progression from 1 to N to N². The process of knowledge management will not stop. In the future, we will conduct

in-depth research on strategic connections, operational methods, and artificial intelligence applications in knowledge management, promoting knowledge management from empowerment to intelligence and driving the automation and intelligent development of knowledge work [14].

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Knowledge Management: From 1 to N to N²

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Abstract: [Purpose/significance] Guided by the integration of theory and practice, it provided guidance for the realization of scene revolution, knowledge empowerment and practical path of enterprise knowledge management, and helped enterprise knowledge management to realize from 1 to N to N square. [Method/process] Through the scene revolution of the four dimensions of business field, knowledge field, interpersonal field and technology field, and applied the “1+4” model to make knowledge from “Management” to “Use”, and finally interpreted the practice path of knowledge management in stages. [Result/conclusion] Clarify the four dimensions of scene revolution and implement various scenarios; according to the “1+4” model, provide knowledge empowerment for knowledge assets, individuals, teams, organizations and businesses; comparing the path of practice, companies find their own development pain points, tailor-made knowledge management program, and provide better empowerment for enterprises and employees.

Keywords: scene revolution; knowledge empowerment; practice path

Note: Figure translations are in progress. See original paper for figures.

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