Intelligent Analysis Methods and Methodology of Banking Regulation Rules - Real Issues and Improvements in the Implementation by Commercial Banks

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Abstract:

Banking regulation rules serve as the institutional basis for promoting commercial banks' healthy and sustainable development. The linguistic complexity within the regulation discourse system leads to challenges in overall comprehension and execution, as well as disparities in interpretation and enforcement. By introducing intelligent analysis methods, the author conducts comparative analysis and historical research on regulation rules from both cross-sectional and historical development perspectives. This approach maximizes the exploration of regulation essence and the identification of laws of change, thus enhancing the effective implementation of regulation rules in the design of commercial banking systems.

Keywords: Regulation rules, intelligent analysis, comparative and historical analysis, relational databases

Introduction

The developmental history of human society and civilization, in a sense, is a history of language communication, the transmission of knowledge across generations, and the evolution in line with the times. General linguistic theories consider language as a tool of thought and a symbol of ideas. The philosopher's elixir is clearly defined, precise, and aptly expressed words. Words and their meanings are of utmost importance, as they form the cornerstone of viewpoints. The importance of logically sound definitions is self-evident.

From a linguistic application perspective, the purpose of a definition is to determine the nature or meaning of things and answer the question, "What is it?". Naturally, logicians believe that the highest genus, the summum genus, and the individual or the lowest species, infima species, cannot be defined (William Leslie Davidson, The Logic of Definition, 2022, p. 31). All definitions are based on individuals or the lowest-level objects that cannot be defined. However, the influence of authority cannot be ignored, as the influence of those in power shapes the original nomenclature and meaning. Augustine wrote in his *Confessions*: "Assuming that adults have named an object and simultaneously turned toward it, I observed this fact and understood that those sounds they emitted while intending to point to the object were used to represent it." (Ludwig Wittgenstein, Philosophical Investigations, p. 7).

Simultaneously, fundamental principles of linguistics reveal that linguistic phenomena have a triple nature of meaning function. In other words, the functions of human language manifest in three aspects: expression (Ausdruck), elicitation (Appell), and representation (Darstellung) or, more aptly, expression, appeal, and representation (Karl Bühler, 2022, p. 47). Meaningful propositions can be constructed through certain syntactic structures based on word and word meaning concepts. Moreover, to some extent, all sentences independently reveal contextual relationships without transitional phenomena. They exist in a context with specific situational factors (Karl Bühler, 2022, p. 210). Naturally, statements that are logically related can have independent domains. A widely accepted viewpoint is that the triple semantics can lead to challenges in certain situations.

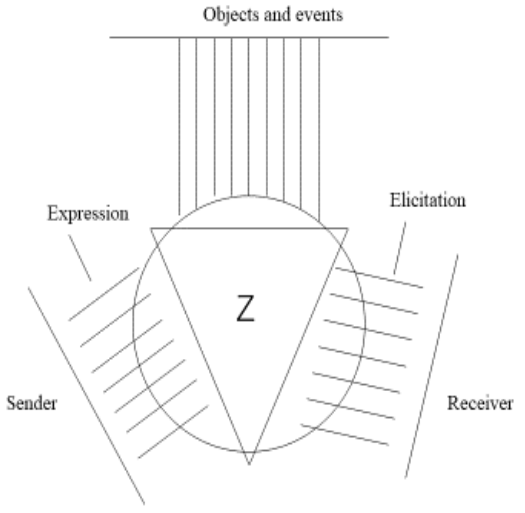

Figure: Diagram Illustrating the Triple Nature of Language

In the context of commercial banks' operation and management activities, they are influenced by general principles and external factors, with the most prominent impact being on considerations related to regulation rules and their changes. The discourse system of banking regulation rules exhibits discrepancies in completeness and consistency when it comes to their practical implementation by banks. Without exception, the regulation discourse system also faces the challenges of triple nature, where differences in understanding among different parties conflict with the pursuit of consistency, and disparities between understanding and execution are inevitable. Thus, the need for appropriate remediation work becomes a practical necessity.

It can be observed that regulation rules are mostly oriented toward addressing specific issues, and regulation requirements are becoming increasingly stringent and detailed. Therefore, it becomes increasingly important for commercial banks to establish modern internal control systems based on implementing regulation requirements. Specifically, this means resolutely implementing regulation requirements, strengthening institutional arrangements to address existing issues, and using best practices as a template to pragmatically address current and historical issues in the absence of regulation requirements.

In the context of rapid developments in information technology concerning problem-oriented approaches and methodologies, it is crucial to emphasize two aspects. Firstly, there is a focus on comparison and history, emphasizing comparative analysis and exploring historical changes to grasp the underlying essence and gain a comprehensive understanding of specific circumstances and historical development patterns. Secondly, there is a strong emphasis on applying technological achievements, highlighting intelligent analysis and the effective utilization of results.

Our fundamental understanding can be summarized as follows: without historical veins, the concept that "everything has a beginning and an end" is unknown, and understanding history and predicting the future becomes a castle in the air. Without comparisons, the knowledge of change and patterns is lacking, and grasping causality and the concept that "everything has its roots and its branches" becomes fruitless, making it difficult to fundamentally explain history and reality and infer the future. To explain and predict, searching for patterns amid change and exploring the constants' essence is essential. Furthermore, the essence should be common knowledge, the most basic knowledge we must possess. However, differences in perspectives between researchers and users and the lack of analytical tools have resulted in shortcomings in comprehensive, historical, and substantial research and analysis.

Of course, regarding historical research, we should recognize that "without the assistance of inference, people can explain the simplest historical facts, which is a self-delusion. In reality, people unconsciously engage in reasoning. Correct understanding often owes much to the fortunate help of instinct." For historical facts, both statements and reasoning are necessary to engage in comprehensive thinking about the essence of things. Essentially, "what people can discover from collective phenomena are statistical regularities" (Karl Bühler, 2022, p. 20). When it comes to regulation rules, analyzing them from an institutional rather than a policy perspective, grasping development patterns statistically, constructing logical chains of relationships, and subsequently taking appropriate actions to adapt to policy changes amid the variable and the constant are crucial to a healthy interaction between commercial banks and the external regulation environment.

1 Reflection on Traditional Approaches to Analyzing Banking Regulation Rules

1.1 General Framework and Methods

As an essential government function, bank regulation has deep historical roots and practical significance. As integral components of the financial sector, banks serve as pivotal players in economic and social development. Banks manage currency and function as the national economy's credit, payment, and information hubs. They are intricately linked to governments, businesses, social organizations, individuals, and financial markets, affecting numerous stakeholders and exerting significant economic and social influence. While pursuing economic interests, banks also bear critical social responsibilities. Moreover, their operational characteristics dictate a strategy of "small capital for substantial gain," relying on credit expansion to amass substantial assets. Consequently, while emphasizing economic profitability, banks must also strengthen risk management. To protect the interests of medium and small shareholders and safeguard the legitimate rights of depositors, as well as to maintain financial stability and promote healthy economic and social development, robust government oversight is necessary. Internationally, best practices in banking regulation primarily involve macroprudential oversight tailored to the operational characteristics and prominent issues. This includes both macroprudential oversight and microprudential behavioral regulation. Naturally, macroprudential oversight can be achieved by continuously monitoring operation and management indicators and reports for prudent operational oversight. However, microprudential behavioral regulation may face oversight gaps and poor execution and operation. Therefore, the implementation of regulation rules by commercial banks demands higher standards.

For commercial banks, ensuring the effective implementation of each regulation rule requires efficient compliance risk management. Regulation rules should serve as the benchmark guiding the design of internal control measures and the development of internal systems, regulating day-to-day operational management practices. Introducing new regulation rules typically triggers a reassessment of related institutional frameworks, leading to improvements in specific measures based on evaluating compliance risks. Simultaneously, problems can be identified through regulation inspections, internal supervision checks, cases, and disclosures of regulation violations, guiding improvements, and refinements in operational management practices. The main methods for implementing regulation rules can be categorized as proactive acting and reactive processing. Proactive measures involve understanding regulation intent and grasping regulation requirements as prerequisites, while passive, problem-oriented approaches are more direct and effective.

1.2 Analysis of Real-world Issues

Understanding the essential spirit of regulation and gaining knowledge of specific requirements are fundamental prerequisites for commercial banks to implement regulation demands (An Yinghui, Liu Sisi, March 2021, p. 220). However, the existing issues are evident:

1. Lack of comprehensive understanding and mastery of regulation rules: There is no unified view or knowledge graph; policy and institutional requirements are not strictly distinguished; there is a lack of comprehensive listing of regulation rules, leading to fragmented regulation information. Additionally, there is a deficiency in studying the regularity and essential attributes of historical changes, making it challenging to grasp the spirit and detailed regulation requirements from a holistic and historical perspective.

2. Flaws in the arrangement of institutional reassessment work: In routine work, institutional reassessment and the formulation of revision plans are typically carried out annually. Much of this process is superficial and dominated by formalism. Due to the campaign-driven concentrated arrangements in a short timeframe, the workload becomes immense, resulting in a lack of actual assessment and substantial exemptions. This issue is closely related to the shortcomings and deficiencies in grasping the essence of regulation.

3. Ongoing deepening needed for comprehensive institutional reassessment and improvement: Commercial banks should establish regular and irregular schedules, reducing the burden of concentrated efforts through daily work. Simultaneously, they can align and target their efforts more effectively by breaking down-regulation rules and using them as standards and references for internal institutional design.

2 Introduction of Intelligent Analysis Methods

2.1 Intelligent Deconstruction of Regulation Rules and Creation of a Relation Database

We can discern that the development or progression of regulation, when viewed through the lens of regular science, does not neatly fit in. In other words, regulation is about neutral and timely decision-making, involving change, which lacks any internal governing rules. The historical evolution of regulation is the continuous revision of individual clauses devoid of the concept of perfection. However, the elements of constancy within regulation rules can still reflect the essence of regulation, and the changes in regulation rules can demonstrate a form of regularity within historical transitions. Addressing the issues inherent in traditional analysis and considering the characteristics of regulation change mentioned above, we can employ statistical methods from the field of linguistics (Stefan Thomas Gries, 2018) to conduct comparative analysis and historical research, draw inferences, avoid relational ambiguity, ensure precision in understanding, and correctness in relationships. This serves as the foundation for comprehensive comprehension and specific practical implementation.

Comparative and historical research consists of two main components: cross-sectional research and historical study, which involve analyzing the comprehensive status at a particular time and studying changes over a timeline. These research approaches require deconstructing regulation rules according to certain standards and specifications, primarily manifested in understanding "three levels, three categories, three functions, two lines, and one closed loop."

1. Classification based on internal banking management levels, primarily governance, management, and operation; 2. Classification based on the mandatory nature of compliance with regulation requirements, mainly including compliance, restriction, and prohibition; 3. Division of business operations and management behaviors into production and auxiliary lines; 4. Classification based on the functional aspects of regulation rules, including enforcement, management, and supervision; 5. Classification based on the process stages of commercial bank business operations and management, including customer/market evaluation and access, business/transaction account opening, transaction contract signing, initiation of business/transactions, accounting processing, business/transaction process control, business/transaction reassessment, risk management measures, business/transaction status reporting, and business

termination; 6. Recording of the historical changes of all specific clauses within regulation rules and formation of a regulation rules relational database following internal control requirements (CCH, June 2009).

Table 1. Diagram of the Basic Database for Deconstructed Regulation Rule Clauses

NO.	Article Content	Document Name	Document Series Number	Department	Levels 1.Governance 2..Management 3.Business Operation	Nature 1.Compliance 2.Conditiona 3.Prohibition	Attributes of Lines 1.Production 2.Assistence	Functions 1.Operation 2.Management 3.Supervision	Pionts of Business Process 1.Marketing 2.Enrtance 3.Transactions/Business Process 4.Risk Management and Business Review 5.Reports 6.Completion of Business and Estimation 7.Performance	Historical Change
1	Article 5 ……	……	……	……	3	1	1	1	2	7
2										
3										
4										
5										
6										
7	Article 6 ……	……	……	……	3	1	1	1	2	N
……										

Through deconstruction, we aim to address issues related to regulation classification, clause breakdown, attribution to internal controls, and historical evolution, which serve as the foundation and standard reference for institutional design. The term "institutional design" here refers to using process stages as the sole dimension, deconstructing regulation rules or standards as the basic templates. This process emphasizes requirements for scientific, rational, adaptive, standardized, systematic, and effective design and distinguishes governance, management, operations, production, and auxiliary lines. The goal is to fully utilize the functions of execution, management, and supervision. The purpose is to establish and improve the institutional system and standardize the operation and management activities with the regulation rules as the standard or reference.

2.2 Cross-sectional and Historical Change Research and Analysis

With a specific time point as a reference, gathering all regulation rules, and employing artificial intelligence analysis tools, we deconstruct clauses based on the division of "three levels, three categories, three functions, two lines, and one closed loop." These deconstructed clauses serve as the standard basis for institutional or internal control design. Simultaneously, through historical records, we document the entire lifecycle information of clauses, including their creation, changes, and termination. This information serves as the source for historical change analysis, enabling us to identify the changing content and consolidate the constant parts and facilitating an understanding of the substantive content and the laws of change.

Cross-sectional analysis involves conducting vertical research on governance, management, and business operations based on deconstructed clauses, establishing logical relationships among regulation rules, and forming a logical chain from top to bottom. This can serve as the standard and basis for comparative research for system reassessment, enabling us to summarize process inconsistencies or gaps and propose improvement solutions.

Table 2. Diagram of Vertical Regulation Logic Database

NO.	Article Content	Document Name	Document Series Number	Department	Levels 1.Governance 2..Management 3.Business Operation	Nature 1.Compliance 2.Conditiona 3.Prohibition	Attributes of Lines 1.Production 2.Assistence	Functions 1.Operation 2.Management 3.Supervision	Pionts of Business Process 1.Marketing 2.Enrtance 3.Transactions/Business Process 4.Risk Management and Business Review 5.Reports 6.Completion of Business and Estimation 7.Performance	Level Link
1	Article 7 ……	.....	.....	.....	1	1	2	3	N	3
2										
3	Article 9	.....	.....	.....	2	2	2	2	N	7
4										
5										
6										
7	Article 6 ……	.....	.....	.....	3	1	1	1	4	N
.....										

Historical change analysis involves a comparative analysis of clauses with documented historical changes. We summarize and synthesize the content of changes, aiming to discover the trajectory of these changes. Through this, we attempt to uncover the logic and patterns behind these changes. This process allows us to observe the focal points of regulation policy changes and use the changing content as a reference and guiding indicator for policy adjustments. Ultimately, this serves as support for institution development and management decision-making. Simultaneously, the unchanged content is treated as a requirement for the continuity of policies during a certain period, regarded as equivalent to the essence of regulation or its fundamental principles, and is subject to long-term implementation.

Table 3. Diagram of Horizontal Regulation Change Logic Database

NO.	Article Content	Document Name	Document Series Number	Department	Levels 1.Governance 2..Management 3.Business Operation	Nature 1.Compliance 2.Conditiona 3.Prohibition	Attributes of Lines 1.Production 2.Assistence	Functions 1.Operation 2.Management 3.Supervision	Pionts of Business Process 1.Marketing 2.Enrtance 3.Transactions/Business Process 4.Risk Management and Business Review 5.Reports 6.Completion of Business and Estimation 7.Performance	Historical Change
1	Article 7 ……	.....	.....	.....	1	1	2	3	N	N
2										
3	Article 9 ……	.....	.....	.....	2	1	2	2	N	5
4										
5	Article 7 ……	.....	.....	.....	2	1	2	2	N	7
6										
7	Article 6 ……	.....	.....	.....	3	1	2	2	N	N
.....										

3 Application Analysis and Future Outlook

3.1 Application Scenario Analysis

The application of intelligent analysis tools can be viewed from the perspective of various users, including management, regulation managers, institutional developers, inspection supervisors, and others. They can utilize intelligent tools based on their responsibilities to process regulation rules and determine how to use them according to effective responsibility fulfillment requirements.

Managers can gain a comprehensive understanding of regulation requirements at the governance, management, and operational levels and grasp the essence and patterns of regulation changes through historical analysis. Institution managers can promote the scientific, rational, standardized, systematic, and adaptive development of institutional systems by assessing institutional design, institutional reassessment, and the effectiveness of institutional design. This enhances the effectiveness of institutional design and implementation. For specific institutional developers, the influence of regulation rules is substantial and forms a core element in the design of internal controls and the foundation for sustainable and healthy development. They can implement a closed-loop system design encompassing the definition, objective, design principle, and basis of internal control, the three roles of execution, management, and supervision, as well as the division of production lines and auxiliary lines. In other words, they can make institutional arrangements for the whole life cycle from the aspects of customer, market, government regulation, business and management processes, report (internal report and external report), performance, market analysis and policy review, system revision and improvement; For inspection supervisors, inspection based on regulation rules is of great significance for it can effectively prevent compliance risks and propel healthy and sustainable operations.

3.2 Specific Cases

For example, corporate lending operations fall under the category of production-line activities, so what should be considered are regulation rules at the operation level. However, one must also consider the requirements of regulation rules for operation at the governance and management levels. To better meet regulation requirements in this process, it is crucial to address the deconstruction of regulation rule clauses cross-sectional and establish logical relationships among different levels. Additionally, understanding and mastering the historical changes of relevant clauses allows one to discern the essence of regulation from the unchanged content and grasp the spirit of regulation and the laws of change from the changing content. On this basis, we can formulate control standards, clarify the basic requirements, implement the moral requirements, follow the industry's leading practices, and grasp the spirit of the essence of supervision and development laws. This ensures institutional design aligns with regulation requirements and meets practical business management needs. Only through these can business systems be established and improved, and the requirements of governance, management, and operational activities be incorporated into business policies and systems. Simultaneously, the institutional design and implementation capability can be enhanced through management strengthening and inspection supervision.

3.3 Future Outlook

In the context of artificial intelligence thinking and thinking rationally like humans and acting and acting rationally like humans, the development direction can be summarized as follows:

First, based on comparative and historical research, we can streamline regulation logic and developmental trends, clarify keywords and semantics within the regulation context, and establish a knowledge graph to provide information and knowledge support for a comprehensive understanding of regulation status-quo, dynamic development processes, and predictions of future development trends.

Second, with a more thorough understanding of the relationship between regulation rules and the internal systems of commercial banks, it is suggested to use regulation rules as a benchmark for real-time institutional reassessments. Simultaneously, we can achieve automated drafting and revision of systems to provide fundamental support for institution development. At the same time, the institutional system of commercial banks can turn into a self-generating system, with regulation rule changes as external environment factors, which automatically trigger internal institutional reassessment and revision to enhance the automation level of institution development.

Third, a human-machine interaction system can be established based on intelligent analysis. Through the utilization of machine learning tools and personalized training, we can create intelligent models with distinct individual characteristics. These models can be used for comparative analysis, historical research, automatic generation of analysis reports, document drafting, and other functions based on individual modes of thinking.

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