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Problems and Reflections on the Discipline Construction of Security Intelligence Studies (Post-print)

Authors: Wang Bing, Wu Chao

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Abstract

[目的/意义] In recent years, the discipline construction of safety informatics has ushered in a springtime of development. However, as the field remains extremely young and immature, its discipline construction is currently in a “period of confusion.” Therefore, it is timely to explore issues concerning the discipline construction of safety informatics. [方法/过程] From the perspective of discipline construction and employing theoretical speculation methods, this paper addresses prominent issues in four aspects of safety informatics discipline construction (namely, discipline origins, definition and understanding of basic disciplinary concepts, disciplinary identity, and perspectives on discipline construction), analyzes the causes of these problems, and identifies solutions. [结果/结论] The study finds that the discipline construction of safety informatics should be grounded in safety science, scientifically define the basic concepts of the safety informatics discipline, actively absorb theories and methods from information science, and under the guidance of the “comprehensive safety” perspective and “comprehensive safety informatics” perspective, orient toward safety management, integrate and unify various types of safety informatics, extract common problems, theories, and methods in safety informatics, and construct a scientific, unified, and practical theoretical system for the safety informatics discipline.

Full Text

Preamble

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Problems and Reflections on the Disciplinary Construction of Safety & Security Intelligence Science

Wang Bing^{1,2} Wu Chao^{1,2}

¹ School of Resources and Safety Engineering, Central South University, Changsha 410083

² Safety & Security Theory Innovation and Promotion Center (STIPC), Central South University, Changsha 410083

Abstract

[Purpose/Significance] In recent years, the disciplinary construction of safety & security intelligence science has entered a period of vigorous development. However, as an extremely young and immature discipline, its construction is currently in a state of “confusion.” Therefore, it is timely to explore the problems in its disciplinary construction. **[Method/Process]** From the perspective of disciplinary construction and using theoretical speculation, this paper examines four prominent issues in the disciplinary construction of safety & security intelligence science: its disciplinary origin, the definition and understanding of basic concepts, disciplinary identity, and disciplinary construction perspectives. It analyzes the causes of these problems and identifies solutions. **[Result/Conclusion]** The study finds that the disciplinary construction of safety & security intelligence science should be grounded in safety science, scientifically define its basic concepts, actively absorb theories and methods from intelligence science, and under the guidance of the “big safety” concept and “big safety intelligence” concept, orient toward safety management, integrate various types of safety intelligence, extract common problems, theories, and methods, and build a scientific, unified, and practical disciplinary theoretical system.

Classification Number: G203

Keywords: safety & security intelligence; safety & security intelligence science; disciplinary construction; problems

In today’s era of big data, artificial intelligence, and high risk—especially following the promulgation of China’s National Intelligence Law and National Security Law, and with President Xi Jinping’s proposal of the “Overall National Security Concept”—the value of Chinese intelligence science (particularly safety & security intelligence science) has become increasingly prominent. Consequently, the mission of intelligence science and intelligence work in the new era is to serve the security and development of the nation, society, and other organizations, providing effective safety intelligence support for national, social, and organizational safety management (governance). Against this backdrop, the status of safety & security intelligence science has shifted from passive and subordinate to active and leading. Moreover, the birth and development of safety & security intelligence science helps advance the in-depth development of safety science and intelligence science research in the new era. In summary, the disciplinary construction of safety & security intelligence science has now entered a springtime of development.

However, as a discipline that has only emerged in the past two years, the construction of safety & security intelligence science lags behind its practice. Its basic disciplinary theoretical system has yet to be formed, and fundamental theoretical research remains extremely weak. Currently, safety & security intelligence science is in a “confusion period,” manifesting primarily in four aspects: unclear disciplinary origin, ambiguous definition and understanding of basic concepts, uncertain disciplinary identity, and problematic disciplinary construction perspectives. These issues severely hinder the construction of a scientific and rational disciplinary theoretical system. Therefore, it is urgent to analyze the causes of this confusion and find a way forward. Building on existing research related to the disciplinary construction of safety & security intelligence science, this paper examines these four prominent issues from a disciplinary construction perspective, aiming to help the discipline emerge from its confusion and promote its construction, research, and development.

2. Disciplinary Origin

Currently, the academic community has not clearly defined the origin of safety & security intelligence science. From a scientific perspective, it is the product of a “Safety +” approach. Both “+Safety” and “Safety +” represent important methodologies in safety science—two meta-approaches to safety science research and practice. Their basic meanings and emphases are shown in Table 1. As the table indicates, their commonality lies in being essentially cross-disciplinary integrations of safety science with other disciplines or fields. Their differences lie in their standpoints, dominant actors, and advantages for safety science development.

From a methodological perspective, the methodology of safety science basic theoretical research transforms “+Safety” inputs into “Safety +” outputs, while safety science applied research methodology transforms “Safety +” inputs into “+Safety” outputs. From the perspective of these two approaches, the concept of safety intelligence is a product of “Safety + Intelligence.” Similarly, safety & security intelligence science is a product of the “Safety +” approach. Therefore, from a scientific standpoint, safety & security intelligence science takes safety science as its dominant framework, applying theories, methods, technologies, and principles from intelligence science to the field of safety science to serve its development.

Of course, safety & security intelligence science also represents a vast practical application domain for intelligence science—it is an applied branch of intelligence science. Its birth and development will inevitably expand the research frontiers of intelligence science, thereby 顺势发展 intelligence science. The core task of safety & security intelligence science researchers is to transform “+Safety” inputs (i.e., intelligence science theories, methods, technologies, and principles related to safety) into “Safety +” outputs (i.e., universal safety science theories, methods, technologies, and principles). In other words, researchers should adapt and reformulate theories, methods, principles, and technologies from intelligence

science into those of safety science.

It must be emphasized that the disciplinary construction of safety & security intelligence science should be grounded in safety science for three main reasons: First, intelligence science is an applied discipline, and practice shows that applied branches of intelligence science should be constructed with the applied discipline as the main body, absorbing intelligence science theories and methods to give the branch discipline unique connotations and greater applicability. Second, relatively speaking, safety science researchers are better positioned to propose relatively accurate and more easily consensual disciplinary meta-concepts (especially “safety”). Third, only from the more “scientific” perspective of safety science can we dilute the traditional “sensitive” and “political” connotations of safety intelligence, truly realizing its important value in safety management. Additionally, currently, fundamental theoretical research in safety & security intelligence science is scarce, with most of its basic theories being slightly modified versions of intelligence science research results, showing insufficient distinctive characteristics. Therefore, the “safety-ization” degree of safety & security intelligence science theoretical research results should be further strengthened.

3. Definition and Understanding of Basic Disciplinary Concepts

Theoretically, understanding and positioning the disciplinary attributes, research objects, and research methods of safety & security intelligence science must be built upon its conceptual system. Therefore, basic disciplinary concepts play a crucial role in its construction and development. Clarifying these basic concepts is the foundation for conducting disciplinary construction and research. It should be noted that although academic research and discussion need not be obsessed with the original 考证 of a concept or adhere to a certain 定论, clarifying and unifying basic disciplinary concepts is still essential. In particular, to construct a scientific and rational disciplinary theoretical system and conduct healthy academic dialogue, a minimal platform of basic disciplinary concepts is indispensable. Therefore, to construct the disciplinary system based on these concepts, it is necessary to accurately define and understand the basic concepts of safety & security intelligence science.

Unfortunately, the academic community’ s definition and understanding of its basic concepts, especially its disciplinary meta-concepts (the most fundamental concepts of a discipline, upon which the entire disciplinary conceptual system can be deduced and constructed), remain very vague. For safety & security intelligence science, its meta-concepts include three notions: safety (security & safety), intelligence, and safety & security intelligence. This vagueness leads to biased or even incorrect understanding of its research objects, scope, and disciplinary attributes. In summary, current confusion in defining and understanding these meta-concepts manifests in four main aspects: (1) The definition of safety in modern safety science remains unclear, particularly regarding its connotation, extension, and attributes; (2) The definition of intelligence is not unified,

leading to diverse and conflicting definitions of safety intelligence; (3) Although partial explanations of safety intelligence exist in specific safety fields or industries (such as national security, military security, scientific and technological security, and public safety & emergency management), a universal definition is lacking; (4) The distinction between safety intelligence and safety information remains unclear, causing safety management understanding to remain at the safety information level rather than transitioning to the safety intelligence level.

The reasons for these problems are: First, both “safety” and “intelligence” are highly controversial concepts, with definitions varying across different disciplinary fields, making unification difficult. Second, most safety & security intelligence science researchers have backgrounds in intelligence science and management disciplines but lack safety science backgrounds, resulting in limited understanding of safety science’s connotations and development, unclear knowledge of mainstream safety definitions in modern safety science, and examination of safety intelligence concepts lacking a safety science perspective.

From a theoretical perspective, as an interdisciplinary field between intelligence science and safety science, clarifying its basic concepts requires joint participation and dialogue between scholars from both fields. Based on this, the authors, leveraging their safety science background and actively learning intelligence science knowledge or discussing with intelligence science scholars, have been committed to fundamental theoretical research in safety & security intelligence science. Through long-term research, exploration, reflection, and discussion with intelligence science scholars, we believe that the academic community is gradually reaching consensus on the definitions and understanding of the three meta-concepts (safety, intelligence, and safety intelligence), which helps solidify the foundation of the discipline. Therefore, we have summarized the current mainstream definitions that align with the characteristics of safety & security intelligence science to help researchers overcome confusion regarding basic concepts, as shown in Table 2 .

4. Disciplinary Identity

Any discipline (especially in its infancy) inevitably experiences an identity crisis, and safety & security intelligence science is no exception. Scholars should clearly recognize that as a young and immature new discipline, experiencing disciplinary crises is inevitable and should be confronted directly while actively seeking solutions.

The current disciplinary identity crisis manifests in three aspects: (1) Unclear disciplinary attributes (especially the relationship between safety & security intelligence science and safety informatics) leading to questions about its independence; (2) Unclear disciplinary functions generating concerns about its identity; (3) Lack of fundamental theoretical research resulting in a weak theoretical foundation. Here we focus on resolving the first two crises, as addressing

the weak theoretical foundation is a long-term task requiring continuous and in-depth fundamental research.

Both disciplinary attributes and functions are issues of disciplinary identity. To resolve this confusion, we must first clarify the distinction and connection between safety intelligence and safety information. From a systems safety perspective (the advanced stage of safety science development), safety intelligence refers to safety information that affects system safety management, while safety information refers to the self-display of system safety status and its changes. Thus, the essence of safety intelligence is a type of safety information (in other words, all safety intelligence is safety information), but not all safety information is safety intelligence. Based on this understanding, it is clear that safety intelligence differs from safety information, and safety & security intelligence science should be precisely positioned in safety intelligence research, strictly distinguished from safety informatics to promote academic recognition of its disciplinary independence.

From a research and practice paradigm perspective, the differences between safety intelligence and safety information have led to the emergence of two paradigms in the “informatization” development of safety science (especially safety management): the safety informatics paradigm and the safety intelligence science paradigm. Based on literature [5-9, 13-15], we compare these two paradigms in Table 3 .

As shown in the table, the most significant difference between the two paradigms is that safety informatics is characterized by openness, sharing, and public service, while safety & security intelligence science emphasizes providing “one-to-one” safety intelligence services, with limited sharing or even confidentiality. It should be noted that we should change the traditional perception of safety intelligence as “absolutely secret” –not all safety intelligence is secret. In peacetime, similar to safety information, we should establish a sharing consciousness for safety intelligence in certain areas. “One-to-one” safety intelligence service refers to personalized, tailored safety information services aimed at ensuring maximum utilization of safety information and improving its effectiveness and security in an environment of information overload and confusion. Clearly, “one-to-one” safety intelligence services can not only meet audiences’ precise needs for safety information but also significantly improve service quality.

Another difference is that safety intelligence exists only when valuable (i.e., safety intelligence is useful safety information), whereas safety information objectively exists regardless of its value. Therefore, relatively speaking, the volume of safety information is large while safety intelligence is small. In the big data era, safety informatization has entered its own “big data era,” where the problem is not scarcity but excess, disorder, and complexity, making the acquisition of safety intelligence (useful safety information) increasingly difficult. This makes the “one-to-one” safety intelligence service of safety & security intelligence science even more precious. The reason safety intelligence is not called safety information (or safety knowledge) mainly reflects the principle that “scarcity

increases value.”

Although the two paradigms differ significantly in many aspects, they are highly correlated at the foundational level: both share safety data as a common foundation, and their work processes (collection, processing, dissemination, utilization) are roughly similar, both being forms of service. Therefore, we must both clarify the differences between safety & security intelligence science and safety informatics and rationally recognize the foundational supporting role of safety informatics.

Furthermore, based on Table 2, we can clarify the disciplinary function of safety & security intelligence science: to provide safety intelligence services for safety management (especially safety decision-making). In summary, the traditional “informatization” paradigm of safety science (especially safety management) is primarily the safety informatics paradigm, addressing universal safety variables with the aim of safety information utilization services. It has not yet formed a new understanding of safety management—elevating from safety information to safety intelligence and proposing the safety intelligence paradigm. The safety intelligence paradigm addresses specific safety variables, aiming to provide safety intelligence services for safety management (especially decision-making), thereby achieving precise and intelligent safety management. Clearly, the two paradigms are complementary, each with its own advantages and emphases.

Therefore, we should not 纠结 over which paradigm is more important. We should abandon the 困扰 of “which paradigm is more important?” and achieve coexistence and development of both paradigms. Particularly, safety & security intelligence science, which has been neglected, diluted, or avoided, should receive sufficient respect and attention. Only then can both disciplines accurately find their development directions and achieve joint innovation, development, and prosperity.

5. Disciplinary Construction Perspective

The perspective on disciplinary construction directly determines the research objects, scope, overall architecture, scientific rationality, and healthy sustainable development of safety & security intelligence science, making the choice of perspective crucial. Currently, the academic community remains confused about this perspective, making it necessary to determine a scientific approach.

Theoretically, only by discussing the disciplinary construction perspective from a philosophical standpoint can we determine a scientific and appropriate perspective that most comprehensively and profoundly elaborates the characteristics, connotation, and extension of safety & security intelligence science. Based on this philosophical height, and combining the connotation and development trends of modern intelligence science and modern safety science, while highlighting the applied practical attributes and value embodiment of safety & security intelligence science, its construction should adhere to the “big safety” concept and “big safety intelligence” concept, and orient toward safety management.

5.1 Big Safety Concept

Since the 21st century, an increasing number of safety issues have exhibited characteristics of complex giant systems—greater complexity, openness, and interweaving. Consequently, safety science research and practice have entered the era of big safety. Through comprehensive analysis of scholars' core viewpoints on big safety, we can derive the evolution of the safety concept and comprehensively understand the connotation of big safety from multiple dimensions (see Figure 1 [Figure 1: see original paper]). It should be noted that the safety definition in Table 1 is the safety definition in the sense of big safety. Big safety represents a new safety thinking involving extensive fields, industries, and content that has emerged under the trend of integrated development of Safety (Safety) and Security (Security) sciences in response to the holistic and intertwined nature of contemporary safety issues.

Since the safety concept is the 上位概念 of the safety intelligence concept, the meaning of “safety” in safety intelligence should be consistent with the big safety concept. Obviously, to ensure the universality of the disciplinary theory of safety & security intelligence science, its construction should be discussed from the perspective of big safety. For example, literature [5] explores several basic disciplinary issues of safety & security intelligence science from the big safety perspective. The big safety concept fully aligns with President Xi Jinping's “Overall National Security Concept.”

5.2 Big Safety Intelligence Concept

To adapt to the big safety concept, the disciplinary construction of safety & security intelligence science should be based on the big safety intelligence concept, which combines the “big intelligence” concept with the big safety concept. The big intelligence concept is a philosophical paradigm in intelligence studies, emphasizing that intelligence research should solve intelligence problems across various fields and evolve from single-domain intelligence systems to comprehensive social intelligence systems, advocating for the construction of big intelligence science.

The big safety intelligence concept symbolizes a “big service concept,” implies a “big process concept” (extending from emergency intelligence for emergency management to safety intelligence for the entire safety management process), and means a “big methodology concept” (constructing universal safety intelligence science methodologies). From this perspective, the safety intelligence recognized by the big safety intelligence concept is a complex mixture with extensive content, rich extension, broad scope, and blurred boundaries. It essentially refers to an all-encompassing domain of safety intelligence, requiring safety intelligence services to adapt to the development needs of safety science and safety management practice, break through traditional limitations, closely integrate with safety intelligence from various safety-related fields, face big safety and the entire safety management process, enhance the safety management service

functions of safety intelligence, and meet the growing safety intelligence needs of safety management practice.

From the perspective of big safety intelligence, safety intelligence research and practice in various branch fields share common principles and similar methods. Under its guidance, safety & security intelligence science should study not only traditional single-domain safety intelligence (such as in Security, emergency management, and national security) but also all safety intelligence from a holistic perspective, particularly focusing on common issues across fields. In other words, safety & security intelligence science is not the science of a specific department or field but a science that studies safety intelligence as a universal phenomenon and its general laws from a broader perspective for research universality.

Regarding the disciplinary system, we should construct a big safety intelligence science system that incorporates various safety intelligence subsystems (such as emergency intelligence systems, public safety intelligence systems, military safety intelligence systems, scientific and technological safety intelligence systems, and resource safety intelligence systems) into one big safety intelligence system, forming an organic complex.

Traditionally, the core 思路 of disciplinary construction has two aspects: (1) using the basic workflow of safety intelligence work as the logical 主线 of disciplinary construction; (2) conducting construction with an applied practice orientation under this 主线, forming departmentalized safety intelligence work content. We agree with the former (it follows the internal regularity of the discipline) but disagree with the latter (although it reflects the actual situation of theoretical research and practice, it does not conform to the universality, scientificity, and developmental nature pursued by disciplinary construction). Therefore, we should conduct disciplinary construction under the guidance of the big safety intelligence concept, breaking the single, closed, and fragmented thinking mode, which conforms to the universality, inheritance, and development of disciplinary construction, helps enhance coordination among various safety intelligence systems, expands the disciplinary scope, promotes the formation of an academic community, and helps cultivate interdisciplinary safety intelligence professionals.

5.3 Oriented Toward Safety Management

The core task or purpose of safety intelligence work is to solve the problem of incomplete safety information (more accurately, safety intelligence) in safety management decision-making processes. To fully embody the applied practical attributes and value of safety & security intelligence science (supporting safety management), its construction should orient toward safety management, viewing providing effective safety intelligence services for safety management as its basic task and ultimate goal. Literature [5] has detailed the specific reasons for this orientation, which will not be repeated here.

In summary, we should combine the background and trends of safety management informatization development, highlight the characteristics and actual needs of safety management work, orient toward safety management to construct the disciplinary system, analyze the internal development and transformation needs of safety intelligence work under this background, focus on how to more effectively promote intelligence-led safety management, and aim to improve safety management work.

Conclusion

The confusion in safety & security intelligence science disciplinary construction essentially represents various dilemmas and conflicts in its development. This paper has 梳理 four prominent confusions (disciplinary origin, basic concept definition and understanding, disciplinary identity, and disciplinary construction perspective) and, from a disciplinary construction perspective combined with the discipline's own connotation and characteristics, identified ways to overcome this confusion.

This research can guide the establishment of a scientific and rational construction paradigm: grounded in safety science, scientifically defining basic concepts, absorbing intelligence science theories and methods, and under the guidance of the big safety concept and big safety intelligence concept, orienting toward safety management, integrating various types of safety intelligence, extracting common problems, theories, and methods, and building a scientific, systematic, unified, and practical disciplinary theoretical system. Through this study, we deeply recognize that facing the transformation of contemporary safety science and intelligence disciplines, the theoretical system of safety & security intelligence science should be built on a more comprehensive and broad vision, seeking its own scientific development path amidst confusion and 致力于 the comprehensive improvement of its disciplinary system. In short, accelerating the disciplinary construction of safety & security intelligence science and developing it into a mature discipline remains an important mission for all scholars in the field.

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Author Contributions:

Wang Bing: Proposed the research direction and framework, wrote and revised the paper;

Wu Chao: Provided suggestions for improvement and revised the paper.

Some Problems and Thinking on the Discipline Construction of Safety & Security Intelligence Science

Wang Bing^{1, 2} Wu Chao^{1, 2}

¹ School of Resources and Safety Engineering, Central South University, Changsha 410083

² Safety & Security Theory Innovation and Promotion Center (STIPC), Central South University, Changsha 410083

Abstract: [Purpose/significance] In recent years, the disciplinary construction and development of safety & security intelligence (SI) science has gone into its spring time. However, SI science is still very young and immature, and the disciplinary construction of SI science is in a period of confusions. Therefore, it is the right time to discuss the disciplinary construction of SI science. [Method/process] On the disciplinary construction level, and by using the theoretical thinking method, this article aimed at outstanding problems in four aspects of the disciplinary construction of SI science (namely, the disciplinary origin, the definition and understanding of basic disciplinary concepts, the disciplinary identity, and the disciplinary construction perspective) to analyze the causes of these problems and to find out the way to solve them. [Result/conclusion] Results of this study show that, to build a scientific, unified and practical system of the disciplinary theory of SI science, the disciplinary construction of SI science should be based on safety science, scientifically define the basic disciplinary concepts, as well as absorb intelligence science theories and methods. Moreover, it should integrate and unify all kinds of SI and refine common SI science problems, theories and methods under the guidance of the big safety & security concept and the big SI concept and for safety & security management.

Keywords: safety & security intelligence (SI); SI science; disciplinary construction; problems

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

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