Drawing on the Past and Embracing the New, Carrying Forward the Legacy and Opening Up the Future: A Review of the Postprint of *Research Methods and Technical System of Information Science*

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Abstract

[Purpose/Significance] This paper provides a review of the book "Research Methods and Technical System of Intelligence Science", aiming to enable readers to understand the basic research methods encompassed in the intelligence science discipline, as well as the construction process and outcomes of the research methods and technical system. [Method/Process] The book comprehensively employs theories and technologies such as information organization, natural language processing, and machine learning to construct a research methods and technical system for intelligence science, develop a knowledge base and retrieval system for intelligence science research methods, and explore issues related to the methodological system of intelligence science in specific scenarios. [Results/Conclusion] The book offers a unique perspective and innovatively utilizes machine learning to assist in constructing a disciplinary research methods system, which plays a significant role in promoting the expansion of intelligence science research methods and the construction of the academic system of intelligence science, while also providing a key to solving practical problems in the discipline and industry.

Full Text

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Adopting the Past and Absorbing the New, Carrying Forward the Cause and Forging Ahead into the Future: A Review of *Taxonomy of Research Methods and Technologies in Intelligence Studies*

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Abstract: *[Purpose/significance]* This article reviews the book *Taxonomy of Research Methods and Technologies in Intelligence Studies*, aiming to help readers understand the fundamental research methods in intelligence studies and the construction process and outcomes of the methods and technologies taxonomy. *[Method/process]* The book comprehensively employs theories and technologies from information organization, natural language processing, and machine learning to construct a taxonomy of research methods and technologies in intelligence studies, develop a knowledge base and retrieval system for these methods, and explore methodological issues in specific scenarios. *[Result/conclusion]* The book offers a unique perspective by innovatively using machine learning to assist in constructing a disciplinary research methods taxonomy. It significantly promotes methodological innovation in intelligence studies and contributes to building the academic system of the field, while providing a key to solving practical problems in both academic and industrial contexts.

Keywords: intelligence studies; research methods taxonomy; academic system

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A complete methodological system is a fundamental marker of a discipline's independence and maturity. After years of development, intelligence work both domestically and internationally has provided rich practical resources for intelligence studies research. Meanwhile, intelligence studies has developed numerous academic schools, foundational theories, and research methods through research practice. Research methods serve as a driving force for disciplinary development and in-depth research, playing a pivotal role in the scientific process. Systematically reviewing, summarizing, and synthesizing relevant methods and technologies in intelligence studies to form a taxonomy of research methods and technologies holds important guiding significance for both intelligence studies research and intelligence work.

It should be noted that in the current big data environment, intelligence studies methods and technologies continue to undergo new changes, generate new content, and present new characteristics. Against this backdrop, Professor Zhang Chengzhi and his team have systematically reviewed research methods and technologies related to intelligence studies based on their years of research achievements in academic text mining and intelligence research methods, and have constructed a taxonomy of intelligence studies methods and technologies. The book *Taxonomy of Research Methods and Technologies in Intelligence Studies* [**?**] represents the crystallization of these research efforts and is one of the team's representative works in recent years. The book demonstrates originality in its theoretical framework, research design, methodology, and presentation of findings, making it an excellent work with four distinctive features.

1 Unique Research Perspective

Constructing a systematic research methods taxonomy for intelligence studies presents significant challenges. Especially in the big data era, intelligence studies as an interdisciplinary field must break down disciplinary barriers to effectively absorb and integrate theories and methods from other disciplines, thereby ensuring greater innovation space for theoretical research and expanded knowledge systems [**?**]. To ensure comprehensiveness and applicability, this book builds upon previous research on methods taxonomies while incorporating current characteristics of intelligence studies and intelligence work, constructing a multi-level taxonomy based on rich empirical data. The academic community urgently needs new approaches that comprehensively consider both traditional and emerging research methods in intelligence studies, extracting methodological commonalities across different domains and application scenarios to build a broad and adaptable taxonomy.

The monograph first surveys existing intelligence theories and methods, manually identifying general research methods (first-level categories) and specialized research methods (first-level categories) in intelligence studies. It then collects large-scale academic publications in intelligence studies to build a foundational corpus and employs natural language processing techniques to automatically extract research method entities from the corpus. Subsequently, hierarchical

clustering methods are used to cluster these entities and construct second- and third-level categories. Finally, the book combines traditional categories with machine-generated categories to establish the intelligence studies methods and technologies taxonomy. This innovative approach represents a unique research perspective.

3 Interdisciplinary Characteristics of Research Methods

This book comprehensively employs multiple research methods including content analysis, empirical research, and meta-synthesis. Its research content covers academic literature collection and corpus compilation, academic text information extraction and mining, and system development and visualization, involving multiple disciplines such as intelligence studies, linguistics, and computer science, thus demonstrating strong interdisciplinary characteristics.

First, in academic literature collection and corpus compilation, the book uses search engines and domestic and international academic databases to collect and summarize concepts related to intelligence and intelligence studies. It extracts intelligence methods from existing literature, monographs, encyclopedias, and intelligence work cases using a combination of rule-based and machine learning approaches to build an intelligence methods corpus.

Second, in academic text information extraction and mining, the book uses deep learning methods to automatically classify sentences in academic papers, identifies research method entities from sentences describing methods based on deep learning models, and employs hierarchical clustering to generate the hierarchical system of the intelligence methods taxonomy, which ensures stability and interpretability to a certain extent.

Additionally, the book constructs a knowledge base and retrieval system for intelligence method entities and hierarchical systems based on academic literature in intelligence studies. The retrieval platform provides intuitive visualization of method entities and taxonomies, offering valuable assistance to researchers in quickly understanding the discipline's methodological system.

Finally, the book explores methodological issues in specific scenarios, including: (1) constructing a "process-problem" oriented intelligence methods and technologies taxonomy, (2) research methods taxonomy for specific domains (using China's economic intelligence research as an example), and (3) constructing intelligence methods and technologies taxonomy in the big data environment. These explorations provide valuable references for practice in related fields.

4 High Practical Value of Research Findings

The book features a clear logical framework and well-organized structure. Its research content comprises three main components: (1) a traditional intelligence research methods taxonomy obtained through manual review, (2) an automatically generated taxonomy of emerging intelligence research methods, and (3)

research on intelligence methods taxonomy in specific scenarios.

Unlike traditional manual construction of methods taxonomies, this book adopts a hybrid model combining manual review with machine learning to build a multi-level discipline-specific research methods taxonomy. Manual content analysis is used to obtain first-level categories, while machine-based deep learning techniques automatically extract second- and third-level method sentences and entities from full-text academic papers and explore hierarchical relationships. This model not only accelerates the construction process but can also be generalized to other disciplines. Furthermore, the team organized researchers to annotate the intelligence studies methods corpus. This annotation work is foundational, providing both a demonstration effect and corpus support for future improvements in extracting method description sentences, method entities, and entity clustering [**?**]. These aspects demonstrate the book's strong innovative character and important theoretical and practical significance for intelligence studies discipline construction.

In the current big data era, systematically reviewing methods and technologies related to intelligence studies and constructing a taxonomy is essential foundational work for the discipline. This book enriches the research content in this area and will undoubtedly provide important support for intelligence studies discipline construction and talent cultivation. Moreover, integrating the methods and technologies taxonomy with intelligence work can offer references for the future development path of intelligence practice. The book employs diverse research methods, integrates manual annotation with machine learning results, and provides an intelligence studies methods and technologies taxonomy tailored to specific scenarios. It offers high reference value not only for researchers and graduate students in intelligence studies but also for researchers in related fields.

At a time when interdisciplinary integration is increasingly prominent and disciplinary boundaries are increasingly blurred, with new technologies and methods emerging constantly, the eternal question for the discipline is how to both maintain the original mission of intelligence studies while remaining open and inclusive, adjusting and improving the methods and technologies taxonomy to adapt to disciplinary and era development. We look forward to Professor Zhang Chengzhi's team continuing to explore this direction and achieving even richer research outcomes.

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Abstract: *[Purpose/significance]* This book review examines *Taxonomy of Research Methods and Technologies in Intelligence Studies*, aiming to help readers understand the fundamental research methods and the construction process and outcomes of the methods taxonomy in intelligence studies. *[Method/process]* The book comprehensively employs theories and technologies from information organization, natural language processing, and machine learning to construct a taxonomy of research methods and technologies in intelligence studies, develop a knowledge base and retrieval system, and explore methodological issues in specific scenarios. *[Result/conclusion]* The book offers a unique perspective by innovatively using machine learning to construct a discipline-specific research methods taxonomy. It plays an important role in promoting methodological innovation in intelligence studies and building the field's academic system, while providing a key for solving practical problems in both academic and industrial contexts.

Keywords: intelligence studies; research methods taxonomy; academic system

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