The Diffusion and Impact of Theoretical Models of User Information Behavior: A Case Study of Wilson's Information Behavior Model (Postprint)

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Date: 2023-04-01T00:00:00+00:00

Abstract

[Objective/Significance] This study examines the diffusion and impact of Wilson' s information behavior model, specifically how its components are cited in subsequent literature, with the aim of exploring the interdisciplinary nature of user information behavior research. [Method/Process] Employing citation analysis and content analysis methods, this research reveals the model' s citation patterns across temporal dimensions, document types, and disciplinary dimensions, as well as the co-occurrence relationships of model concepts, utilizing Gephi for visualization. [Results/Conclusion] The findings indicate that the influence of Wilson' s information behavior model has increased over time and is more frequently cited by empirical studies. Secondly, due to the model' s interdisciplinary perspective, its impact is particularly pronounced in fields beyond library and information science, such as social sciences, computer science, and medicine. Finally, literature citing the model emphasizes discussion of its content, with various aspects diffusing to varying degrees, yet lacking in-depth analysis.

Full Text

Research on the Diffusion and Influence of Theoretical Models of User Information Behaviors: Taking Wilson' s Information Behavior Model as an Example

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Abstract:
[Purpose/Significance] This study analyzes the diffusion and influence of Wilson'

s information behavior model, specifically how each component of the model is cited by other literature, to explore the interdisciplinary characteristics of user information behavior research. [Method/Process] Citation analysis and content analysis methods were employed to reveal the model' s citation patterns across temporal, literature type, and disciplinary dimensions, as well as the co-occurrence relationships of model concepts, with visualizations created using Gephi. [Result/Conclusion] The study found that the influence of Wilson' s information behavior model has increased over time and is more likely to be cited by empirical papers. Due to its interdisciplinary perspective, the model' s impact is particularly evident in non-library and information science fields such as social sciences, computer science, and medicine. Finally, while citing literature demonstrates attention to the model' s content with various aspects diffusing to different degrees, in-depth analysis remains lacking.

Keywords: Wilson information behavior model; user information behaviors; theoretical diffusion; citation content analysis

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2 Literature Review

2.1 Research on Characteristics and Patterns of Theoretical Diffusion

Existing research has analyzed citation patterns of various theories from different dimensions. The first category examines how theories diffuse within their own disciplines or into others. Song Ge analyzed the primary diffusion fields of structural holes theory, identified key literature citing the theory across different domains, and predicted its future diffusion patterns [**?**]. Wang Jingjing et al. examined international digital humanities research, finding its status gradually rising in arts, humanities, and engineering while its centrality in library and information science (LIS) declined [**?**]. In contrast, Yang Ruixian et al. found that archival science knowledge primarily contributed to its own and related disciplines with limited exchange with technical support disciplines [**?**].

The second category focuses on citation types. T.D. Wilson studied the diffusion of theoretical models in information behavior research, finding that the most common citation type was commentary citations (44%), followed by perfunctory mentions (36%), with no negative citations identified [**?**]. Similarly, S. Stremersch et al.' s study of marketing journals found that 85% of citations were either commentary or perfunctory, with application, affirmation, and negative citations accounting for only 15% [**?**].

The third category explores citation locations. L.E.F. McKechnie et al. examined the diffusion of postmodern approaches in user information behavior research, finding they were typically used as supplementary explanations to other theories or as endnotes, rarely mentioned directly in the main text [**?**]. A. González-Teruel and M. Pérez-Pulido analyzed citation patterns of the ELIS model, discovering that 60.9% of citations appeared in introduction and liter-

ature review sections, while only 24.8% appeared in discussion and conclusion sections [?]. S.H. Dewey' s findings aligned with this, showing that citations rarely appeared in discussion sections [?].

The fourth category investigates the relationship between theoretical diffusion and conceptual growth. Hou Jianhua et al. measured knowledge diffusion of H-index research themes using quantitative indicators, finding that new growth points primarily emerged in applied H-index research [?]. S.J. Kim and D.Y. Jeong analyzed LIS literature, discovering that 41.4% of articles contributed to theoretical development or application [?]. F. Wang et al. found that theories extend corresponding concepts during diffusion and integration [?], while R. Savolainen' s results contradicted this, showing that citing literature did not contribute to conceptual growth of the ELIS model [?].

2.2 Theoretical Diffusion Research in User Information Behavior

Research on theoretical diffusion in user information behavior can be divided into two categories. The first explores macro-level diffusion patterns of the entire field. T.D. Wilson' s 2018 preliminary analysis found that information behavior theories significantly influenced computer science, health and nursing, information systems, and psychology [?]. Subsequent research by T.D. Wilson examined differential impacts across disciplines, revealing the greatest influence in health and nursing [?]. Similar conclusions were reached by B.D. Lund, who found information behavior theories had developed and been applied across various disciplines to describe individuals' and groups' information needs, seeking/searching/sharing behaviors, and information use in diverse contexts [?].

The second category focuses on micro-level analysis of specific theories' diffusion and influence. Y.W. Chang analyzed citations of R.S. Taylor' s question negotiation model, demonstrating its pioneering role in user information behavior and its contribution to LIS development [?]. A. González-Teruel and F. Abad-García examined E.A. Chatman' s middle-range theories, finding limited influence beyond LIS [?]. Later, A. González-Teruel and M. Pérez-Pulido explored the diffusion of R. Savolainen' s ELIS model, discovering that computer science primarily drove its citations [?].

These studies demonstrate that theoretical diffusion facilitates conceptual growth in research. While scholars have extensively examined diffusion of various classic information behavior models and theories, no studies have analyzed the diffusion and influence of T.D. Wilson' s interdisciplinary information behavior model.

3 Research Methods

3.1 Data Sources

T.D. Wilson' s 1997 information behavior model includes components such as information need context, activating mechanisms, intervening variables, informa-

tion seeking behavior, and information processing and use, with a clear structure and explicit relationships [**?**]. To ensure accurate retrieval of citing literature and facilitate clear analysis of relationships between citing documents and the theoretical model, this study focuses on this model' s diffusion and influence. Using Web of Science and Scopus databases, citing literature for "Information behaviour: an interdisciplinary perspective" was retrieved on December 12, 2020. The databases yielded 281 and 454 records respectively, with 487 unique citing documents obtained after manual deduplication.

Due to challenges in analyzing citations within entire books, 26 records of type Book and Book Chapter were excluded. Language restrictions led to removal of 24 non-English records. Subsequent full-text retrieval of 437 citing documents yielded 409 complete texts. After preliminary review, 23 documents were found not to actually cite the work, resulting in a final analysis of 386 citing documents.

Citing literature was categorized into five types: (1) Empirical: describing original research that collects and analyzes primary data to solve specific research problems, typically structured with introduction, methods, results, and discussion; (2) Bibliometric: reviewing existing materials including bibliometric studies, content analyses, and literature reviews using secondary data; (3) Theoretical: tracing theoretical development, extending existing theories, or proposing new ones; (4) Methodological: introducing new methods or improving existing ones with empirical data for illustration; and (5) Others: brief reports, book reviews, letters, etc.

Citing documents' disciplinary attributes were determined by their journals' fields using Scopus' s All Science Journal Classification Codes (ASJC), covering 27 primary disciplines. Code 3309 represents Library and Information Sciences, allowing classification into LIS and non-LIS literature.

Citation types were classified as: (1) Direct quotation from the original text; (2) Explicit mention of one Wilson work without direct quotation; (3) Explicit mention of multiple Wilson works; and (4) No explicit mention. Citation intensity and location were also recorded, with locations categorized by function as: introduction/literature review, theoretical basis/methods, results, and discussion/conclusion.

3.2 Data Analysis

Scholars primarily use mathematical statistics, social network analysis, and knowledge mapping to measure and analyze knowledge diffusion [**?**]. This study adopts the Citation Content Analysis (CCA) framework proposed by G. Zhang et al. [**?**] to examine Wilson' s model diffusion and influence. This framework supplements traditional citation analysis with semantic analysis of citation content and has been applied in studies of information behavior theoretical model diffusion [**?**, **?**], demonstrating its scientific validity and applicability. Using this framework for Wilson' s model enables comparative analysis with similar studies and facilitates identification of this model' s unique diffusion characteristics.

4 Results

4.1 Temporal Distribution of Citing Literature

Figure 1 [Figure 1: see original paper] shows citations of Wilson' s information behavior model from 1998-2020, demonstrating a clear upward trend. The model received its first citation in 1998, averaging 16.8 citing documents annually. Before 2007, annual citations rarely exceeded 10; from 2007-2013, citations remained around 15 per year; after 2014, annual citations mostly exceeded 30, peaking at 36 in 2016. This indicates that despite being proposed 20 years ago, the model maintains influence that continues to grow over time.

4.2 Distribution of Citing Literature Types

The majority of citing documents were empirical papers (63.7%), followed by bibliometric (16.8%) and theoretical papers (15.5%). Methodological papers (2.3%) and other types (1.6%) constituted only a small fraction. Figure 2 [Figure 2: see original paper] shows changes in citing literature types over time. Empirical papers consistently dominated and increased substantially, particularly during 2009-2014. Bibliometric and theoretical papers also increased but never surpassed empirical papers, with bibliometric papers generally outnumbering theoretical ones. Methodological and other paper types appeared only sporadically.

4.3 Disciplinary Distribution of Citing Literature

Among documents citing Wilson' s model, 46.6% belonged to LIS, while 53.4% came from other disciplines. Figure 3 [Figure 3: see original paper] shows temporal changes in citations from LIS versus non-LIS fields. While early citations primarily came from LIS, later periods saw increasing contributions from other fields, often exceeding LIS citations. This demonstrates the model' s diffusion both within LIS and across other disciplines.

The model was cited by 21 disciplines. Table 1 shows non-LIS disciplinary distribution, with Social Sciences (45.1%), Computer Science (38.8%), and Medicine (18.0%) representing the largest shares.

4.4 Citation Intensity

The 386 citing documents referenced Wilson' s model 737 times total, averaging 1.9 citations per document. 66.6% cited the model once, 28.2% cited it 2-5 times, and 5.2% cited it six or more times. In LIS literature, 65.0% cited it once, 29.4% cited it 2-5 times, and 5.6% cited it six or more times. In non-LIS literature, 68.0% cited it once, 27.2% cited it 2-5 times, and 4.8% cited it six or more times.

The LIS document with most citations (17) was R. Savolainen' s "Conceptual growth in integrated models for information behaviour" [**?**], which analyzed integrated model construction methods using seven classic models including Wilson'

s. The non-LIS document with most citations (14) was E.M. Cramer' s "Health information behavior of expectant and recent fathers" [**?**] in Medicine, which used Wilson' s model as a framework.

Figure 4 [Figure 4: see original paper] shows average citations per document over time. Apart from peaks created by these two documents, the average remained stable between 1-2 citations, showing slight growth.

4.5 Citation Types

Table 2 shows citation type distribution. The most common type was "explicit mention of one Wilson work without direct quotation" (54.7%), followed by "no explicit mention" (30.5%), "explicit mention of multiple Wilson works" (12.1%), and "direct quotation"(2.7%). Direct quotation and explicit mention of one work represent deeper engagement, as they reference specific model content, while multiple mentions and no explicit mention indicate more superficial engagement. Thus, 57.4% of citations were deep, while 42.6% were superficial. Both LIS and non-LIS fields showed similar patterns.

4.6 Citation Locations

Citation locations were categorized into four functional sections: introduction/literature review, theoretical basis/methods, results, and discussion/conclusion. Analysis of 308 IMRaD-structured documents revealed 605 total citations. The introduction/literature review section contained the most citations (46.8%), followed by theoretical basis/methods (28.9%), discussion/conclusion (16.7%), and results (7.6%). Both LIS and non-LIS fields showed identical patterns.

Figure 5 [Figure 5: see original paper] shows temporal changes in citation locations. Before 2000, citations concentrated in introduction/literature review and theoretical basis/methods sections. From 2000 onward, citations increasingly appeared in results and discussion/conclusion sections. Early periods saw increasing citations in introduction/literature review with fluctuations in other sections, while later periods showed consistent trends across all sections.

Table 3 cross-tabulates citation location and type, revealing consistent patterns across locations: "explicit mention of one Wilson work without direct quotation" was most frequent, while "direct quotation"was least frequent. Citations combining direct quotation or explicit mention of one work in introduction/literature review or theoretical basis/methods sections represented the deepest engagement, occurring 205 times (33.9%).

4.7 Citation Content Analysis

Twenty-one concepts were extracted from Wilson' s model. Table 4 shows how many citing documents included each concept. "Information seeking" appeared most frequently (205 documents, 53.1%) and was the sole concept cited in 27

documents. Other frequently cited concepts included "information need"(29.5%), "information behavior" (28.0%), and "context" (24.1%). These three concepts were also the only concepts cited in multiple documents.

Co-occurrence analysis revealed strong relationships: "information seeking" co-occurred frequently with "information need" (71 times), "context" (51 times), "intervening variables" (51 times), "information behavior" (50 times), and "environmental variables" (47 times). "Information need" co-occurred often with "intervening variables" (36 times), "context" (35 times), and "environmental variables" (33 times). Other strong co-occurrences included "environmental variables" with "role-related variables" (37 times), "active" with "passive" (36 times), and "context" with "environmental variables" (34 times).

Figure 6 [Figure 6: see original paper] visualizes concept co-occurrence networks. Central, large-labeled, dark-colored concepts indicate higher frequency. "Information seeking," "information need," "information behavior," and "context" form the core concepts, with most other concepts (14) appearing in over 10% of citing documents, indicating balanced diffusion across model components.

5 Discussion and Conclusion

To explore theoretical diffusion and influence in user information behavior research, this study analyzed Wilson' s model from both macro (citing documents) and micro (citation content) perspectives, examining temporal, literature type, and disciplinary dimensions alongside concept co-occurrence relationships. Key findings include:

First, as a classic user information behavior model, Wilson' s influence has grown over time, particularly guiding empirical research. Empirical studies have continuously validated and expanded the model.

Second, the model' s interdisciplinary perspective incorporating psychology, economics, and sociology has created significant impact beyond LIS. Non-LIS fields, especially social sciences, computer science, and medicine, increasingly cite the model, with non-LIS citations surpassing LIS citations after the model' s eighth year. This diffusion of LIS knowledge into other domains promotes interdisciplinary exchange and benefits the field' s development.

Third, regarding citation depth, 66.6% of documents cited the model only once —higher than the LRT model' s 53.8% and IPT model' s 64.4% [**?**]. Research suggests that lacking explicit mention indicates superficial discussion [**?**]. For Wilson' s model, the most common citation type was "explicit mention of one Wilson work without direct quotation" (54.7%), while "direct quotation" was rarest (2.7%). Compared to the ELIS model, Wilson' s model shows less deep citation, though more documents (93.5% vs. 63%) referenced specific concepts rather than just the model name.

Fourth, concept diffusion was relatively balanced. While "information seeking," "information need," "information behavior," and "context" were most

widely diffused core concepts, 14 other concepts appeared in over 10% of citing documents. However, 23.0% of citing documents referenced only one concept, lacking depth or multi-dimensional analysis. Compared to IPT (5 concepts >10%) and ELIS models (4 concepts >10%), Wilson' s model shows richer concept relationships.

Wilson' s model influences subsequent research through three mechanisms: (1) theoretical discussions of its merits and limitations, (2) methodological guidance for quantitative and qualitative research designs, and (3) application to diverse populations (farmers, pregnant women, students, online users, disease groups) in non-work contexts. The model' s limitations include needing further concept specification and over-emphasis on users versus systems. Its influence persists through focused exploration of specific elements (self-efficacy, national culture, information needs) and integration with other models (Berrypicking, communication models) to address these limitations.

This study has limitations. Book and non-English literature were excluded, potentially introducing slight bias. Literature and citation type classifications were broad and could be refined. Citation content analysis extracted concepts only from citation locations and immediate context; future research could analyze entire documents.

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Liu Yunting: data collection and analysis, manuscript writing;
Zhai Ranran: data analysis;
Han Zhengbiao: research design and methodology, manuscript revision and finalization.

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