

Article

Evaluating the Intellectual Structure of the Knowledge Base on Transformational School Leadership: A Bibliometric and Science Mapping Analysis

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Abstract: Transformational leadership has been persistently studied in the educational administration field considering that it can be a viable tool to respond to the increasing demands on school systems for greater effectiveness. As a result, a rich knowledge base has been accumulated. Our study aims to investigate this knowledge base by combining bibliometric and science mapping analysis so as to exhibit its intellectual and conceptual architecture, and to reveal the strategic themes that emerged during the scientific evolution of transformational school leadership (TSL). 300 articles retrieved from the Scopus database were included in the analysis. The thematic evolution analysis was performed using the SciMAT software over three time periods: the Incubation Period (1989–2009), the Development Period (2010–2020), and the Maturation Period (2021–2022). The findings show that research during the Incubation Period mostly attempted to conceptualize TSL while it mostly focused on principals, instructional leadership, and self-efficacy during the Development Period. The mentoring theme emerged during the first period but disappeared later without being fully-developed. Teacher leadership emerged as a weakly-addressed theme during all periods. Work-family conflict and digital competencies were the two prominent themes during the Maturation Period while online learning and learning culture were found to be the emerging themes. The findings suggest significant implications for the sustainable development of the TSL research field.

Keywords: transformational leadership; bibliometric analysis; science mapping; school leadership; educational management; SciMAT



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1. Introduction

Numerous leadership models have been developed in parallel to the evolving needs and expectations in educational contexts [1,2]. Transformational leadership (TL), despite being born in the business management literature, has been one of the most influential and researched leadership models in the educational administration field [3,4].

Several reasons underlie this rapid adaptation and predomination of TL in the educational administration field. For one thing, during the early 1990s, when TL first emerged in the field, school restructuring and improvement were framing the educational policy context, and school leaders were expected to transform schools in a way that met escalating demands for accountability and performance [5,6]. Considering the proven success of TL in business organizations for fostering performance with its change-oriented, capacity-building nature [5], TL was considered to be a viable tool to meet the increasing demands on school systems for greater effectiveness [7,8].

Hallinger [1] also noted that the increasing attention to TL in school contexts could be a reaction against the top-down, policy-driven change expectations of the 1980s, and TL

corresponded well with newer inclinations in educational reforms such as organizational learning, shared/distributed leadership, and empowerment. Indeed, several scholars underlined that school principals cannot lead alone in the face of complex, ever-changing, ambiguous demands and problems in today's schools [2]. TL, as a bottom-up leadership model [9], fosters the involvement of teachers, stakeholders, and students in the change process, and builds capacity through challenging, empowering, and nurturing the entire school community to seek and achieve higher expectations [8,10].

With its aforementioned promises and strengths, TL has soon gained an image of ideal leadership practice in schools [4,9], and been promoted by the leading scholars of the educational administration field [3]. As a result of these growing empirical explorations, the TSL research field has expanded its boundaries and the aggregation of several key findings on its theory and practice accumulated a significant knowledge base. We herein aim to analyze this knowledge base through bibliometric and science mapping analysis to exhibit the intellectual and conceptual architecture of TSL research field and reveal the strategic themes that have emerged during its scientific evolution. The particular research questions addressed by the present study are as follows:

- RQ 1: What has the volume and impact of the scholarship on TSL grown throughout its development as a research field?
- RQ 2: What journals and authors made the greatest contribution to the TSL field with publications and citation impact?
- RQ 3: Studies from which countries have become prominent in the development of the TSL knowledge base?
- RQ 4: What themes have been prominent, emerging, weakly-developed, or declining themes during the evolution of the TSL research field?
- RQ 5: How have these themes evolved across different periods during the development of the TSL knowledge base?

Scholars contend that bibliometric science mapping makes a significant contribution to the development of a research field by determining its well-under-investigated aspects, and establishing the boundaries of knowledge [11,12], unveiling the research trends and the state-of-the-art knowledge in the field [13,14], guiding researchers new to the field through enabling insights into the thematic interests, networks, and structures of the research domain [15], supporting scientific inference through exhibiting the growth and flow of knowledge across periods of time [16,17], and providing a scientific base for future investigations and policy formulations through reflecting on diverse schools of thought emerged during its evolution [11,13].

Although the TSL literature includes several review studies, most of them have synthesized the results of a relatively small number of studies [9,18] and were mostly conducted more than 20 years ago. In addition, many of the reviews addressed the relationship between TSL and other variables such as student achievement, job satisfaction, school culture, or the changing school structures [5,8,19–22]. Likewise, some of these reviews either focused on unpublished work such as thesis/dissertations [23], some did not provide the scope of data included in the analysis [5], some investigated TSL as part of other school leadership models [24], and some reviewed research in specific country contexts [4,25]. As can be seen, the reviews existing in the literature all addressed a different aspect of TSL research, mostly employing a more focused synthesis of evidence from a smaller amount of published work. In this context, the present study makes an original contribution to the TSL literature by conducting a different method of analysis with the purpose of mapping the research trajectories, thematic trends, and establishing state-of-the-art knowledge regarding the developments in the TSL literature. In addition, to the knowledge of researchers, this study is the first to use SciMAT in conducting science mapping analysis. Unlike other similar software, SciMAT allows for period-based analysis of the themes, classifies the themes into four different categories, and yields not only the themes but the sub-themes related to them.

Conceptual Background

Transformational leadership (TL) was first conceptualized by the political scientist Burns [26], who defined leadership as ‘leaders inducing followers to act for certain goals that represent the values and the motivations—the wants and needs, the aspirations and expectations—of both leaders and followers’ (p. 19). He stated that a transformational leader ‘looks for potential motives in followers, seeks to satisfy higher needs, and engages the full person of the follower’ (p. 4) unlike the transactional leader who relies on the mutual exchange of rewards and performances. Burns’s theory was later developed by Bass and Avolio [27], who addressed some of the limitations and omissions in Burns’s theory. They developed the four ‘I’ model of TL: Idealized Influence (leader acting as a role model), Intellectual Stimulation (encouraging creativity and innovative thinking), Individualized Consideration (supporting the needs and potential of each follower), and Inspirational Motivation (creating motivation and enthusiasm through their own vision). Bass (1998) later included the dimensions of transactional leadership (i.e., contingent reward, management-by-exception, and laissez-faire leadership) in his model.

Based on Bass’s model, several other TL models were developed in the business administration field, each with slight variations [4]. However, it was Leithwood and his colleagues who introduced the TL model into the educational administration field in the 1990s [2,23]. Their initial model included seven dimensions (vision, shared goals, individualized support, intellectual stimulation, rewards, high expectations, and modeling), which was later developed into a more comprehensive framework including six leadership dimensions (building school vision and goals, providing intellectual stimulation, offering individualized support, symbolizing professional practices and values, demonstrating high-performance expectations, and developing structures to foster participation in school decisions) and four management dimensions (staffing, instructional support, monitoring school activities, and community focus) [28]. Leithwood et al. [29] then refined this model into a full TSL model that fits better in the educational context. The new model included three broad dimensions each comprising of three sub-dimensions: setting directions (building school vision, developing specific goals and priorities, and holding high-performance expectations), developing people (providing intellectual stimulation, offering individualized support, and modeling desirable professional practices and values), and redesigning the organization (developing a collaborative school culture, creating structures to foster participation in school decisions, and creating productive community relationships). Leithwood and his colleagues initiated exponential research on TSL as a school-level construct through their TSL model [2].

Although TSL is not a panacea or cure-all for the complex problems faced in contemporary schools, it is already assumed to be one of the most appropriate leadership models for the school setting with its salient qualities [5,23]. TSL is capable of establishing a shared vision and norms, supporting followers to learn new things and to develop new perspectives, creating a school culture whereby leadership becomes an organizational entity rather than a single leader coordinating and controlling from above and thereby fostering a school-wide change stimulated by bottom-up, collective efforts [1,10,30]. Transformational leaders achieve this by

‘elevat[ing] the concerns of followers on Maslow’s need hierarchy from needs for safety and security to needs for achievement and self-actualization, increase their awareness and consciousness of what is really important and move them to go beyond their own self-interest for the good of the larger entities to which they belong . . . , [which eventually] provides followers with a cause around which they can rally’ [31] (p. 467)

Thus, TSL builds school capacity that fosters increased commitment, effort, and productivity beyond expectations [32]. Another salient quality of TSL that reinforces its ideal leadership image has been its commitment to morality and ethics of care [33]. For one thing, transformational leaders act with a sense of duty or obligation to work for the benefit

of the whole school community, which makes them a moral exemplar [10]. Through their altruistic values that emphasize the followers' intrinsic worth and self-actualization, transformational leaders are also capable of raising school-wide morality [4,33]. In Burns's [26] terms, TSL 'raise[s] the level of human conduct and ethical aspiration of both the leader and led and thus it has a transforming effect on both' (p. 20). As a result of these strengths, TSL has evidently consolidated its place in the educational administration field and has become one of the most enduring leadership models [3,34].

2. Materials and Methods

The present study combines bibliometric and scientific mapping analysis with the purpose of identifying bibliometric performance and thematic evolution of the TSL knowledge base [35,36]. The bibliometric analysis was conducted to address RQ 1, RQ 2, and RQ 3 previously defined in the introduction section while the science mapping analysis was conducted to address RQ 4 and RQ 5.

2.1. Identification of Data

Data for bibliometric and science mapping studies are frequently searched and extracted using databases such as Google Scholar, Scopus, or Web of Science Core Collection (WoSCC). In the present study, we preferred to use Scopus because, in the literature, it is emphasized that Scopus covers more journals compared to WoSCC, and most articles indexed in WoS are also indexed in Scopus. Thus, Scopus was an efficient database to help reduce the risk of articles being missed and prevent data loss [37]. In addition, compared to other databases, Scopus offers more comprehensive meta-data that supports the bibliometric analysis [38]. According to Hallinger [13], Scopus is particularly useful for such research in the field of education because it includes more documents relevant to education literature in comparison to WoSCC.

The present analysis was conducted using 300 articles identified and selected after a meticulous data selection/extraction process. Details of the data identification process were shown in Figure 1 in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Reviews (PRISMA) guidelines [39].

The inclusion or exclusion of documents was determined using the criteria presented in Table 1. Based on these criteria, articles written in the English language and published in refereed journals were included in the analysis. English language was particularly selected since we had to include articles in the same language as the use of keywords in the same language was essential to conduct the science mapping analysis. Considering that English has become a lingua franca, particularly in the scientific world, and most internationally relevant studies are conducted in English, the inclusion of articles in English served better for the purpose of the present analysis. Similarly, we did not include conference papers as they often do not undergo a comprehensive review process in the way journal articles do. We also excluded books and book chapters because bibliometric and science mapping analysis are conducted using the cooccurrence of keywords and books/book chapters do not provide any/sufficient keywords. Therefore, they are not appropriate for the present analysis.

The following search string was used to conduct a search on Scopus on 5 May 2022.

TITLE-ABS-KEY ("transformational leader*" OR "transformational school leader*")
AND TITLE-ABS-KEY ("principal*" OR "school principal*" OR "school administrator*" OR "school administration" OR "leader*" OR "school manager*" OR "school management" OR "head*" OR "headteacher*" OR "head teacher*" OR "school leader*" OR "supervisor*" OR "inspector*" OR "school*" OR "teacher*" OR "student*" OR "learner*" OR "pupil*" OR "classroom*" OR "learning" OR "teaching" OR "secondary education" OR "high school" OR "primary education" OR "preschool education" OR "pre-school education" OR "K-12 education")

The keywords used in the search string were selected after reviewing the relevant literature on TSL, and they were also discussed with other field experts before reaching the final version of the search string. The search first yielded 2181 documents, but 1756

of them were excluded after applying the inclusion/exclusion criteria (see Table 1). Then the researchers scanned through the remaining 425 articles to ensure that they address transformational leadership in the K-12 school context. During this stage, an additional 99 articles were excluded from the dataset, and 326 articles were left. Finally, the researchers skimmed through the abstracts of these 326 articles and decided to exclude 26 articles because they were underpopulated and/or out of scope. Eventually, 300 articles remained to be submitted to bibliometric and science mapping analysis.

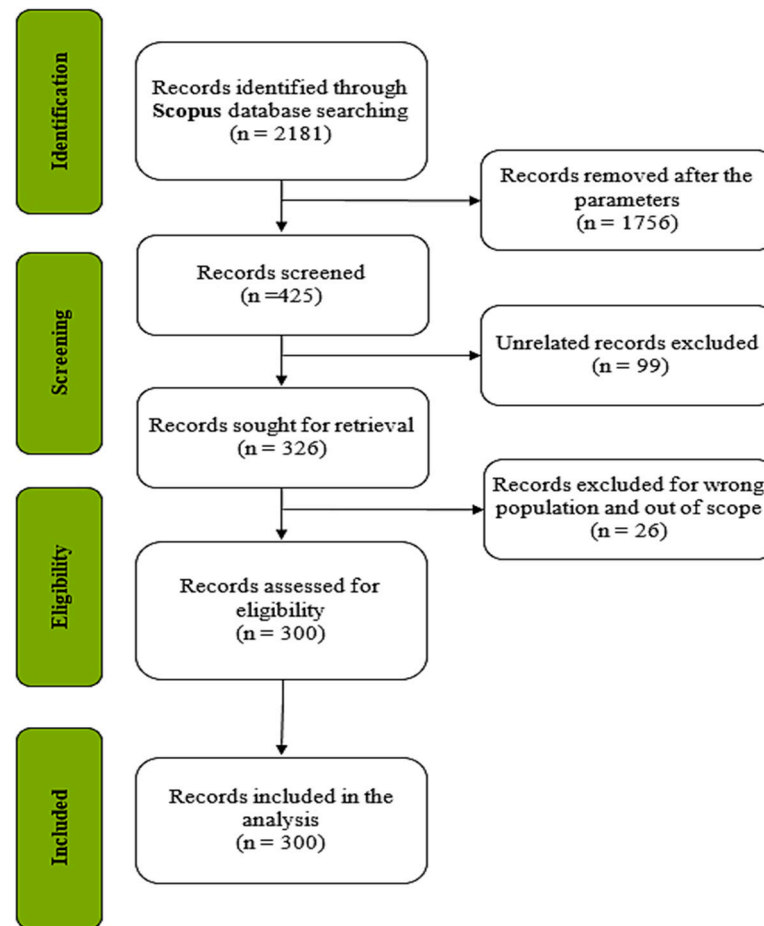


Figure 1. PRISMA flow diagram.

Table 1. Inclusion/exclusion criteria.

Criteria	Included	Excluded	Rationale
Language	English	Other languages	Authors' ability to understand content/international language
Context	All school types	Non-educational context/higher education	Study's focus on TSL in K-12 schools
Document Type	Journal articles	Books, book chapters, conference proceedings	Focus on high-quality peer-reviewed work; books/chapters for not providing keywords
Database	Scopus	Other databases	Wide coverage of journals

2.2. Data Extraction and Analysis

The meta-data of the selected 300 articles were first transferred into the SciMAT software to prepare them for analysis. During this stage, the researchers manually combined keywords with similar meanings such as 'teacher and teachers', 'leader and leaders', and

‘student and pupil’. This is a significant and necessary step to improve the quality of bibliometric and thematic analysis [40,41].

To determine the bibliometric performance of the TSL research field, we first performed an overall bibliometric analysis [15] and identified the distribution of TSL-focused articles by their year of publication, the average citations received per article, and the accumulated number of articles throughout the development of TSL field. We then performed science mapping analysis using SciMAT to analyze the thematic structure and evolution of the TSL knowledge base. We particularly selected SciMAT software for the present analysis because it allows for observing the evolution of a research field over sequential time periods [40,42–45], and helps reveal the structural and dynamic aspects of the field.

The science mapping analysis on SciMAT is performed automatically, and follows two main steps as suggested by several scholars [35,40,45–49]:

1. *Identification of themes/cluster networks*: During this stage, the researchers first created a standardized network of common words using the keywords extracted from the dataset. A clustering algorithm based on the co-occurrence of the keywords was then applied to a normalized network of common words, which allowed for identifying the research themes. Using the collection of closely related keywords, cluster networks were yielded to show the associated sub-themes to each previously determined main theme. This process allowed for identifying and visualizing the categories of themes yielded for each period as well as the thematic evolution of the research field across these periods.
2. *Visualization of themes/thematic networks*: The themes yielded by the science mapping analysis are presented using a strategic diagram and a thematic network structure. SciMAT automatically calculates the values of centrality (x -axis) and density (y -axis) for each theme and they are typically presented in a four-quadrant, two-dimensional strategic diagram. Here, centrality values reflect the extent of interaction between clusters and the strength of the relationship among them. The software uses this formula to calculate centrality values: $c = 10 \times \sum ekh$. In the formula, ‘ k ’ represents a keyword belonging to one theme, and ‘ h ’ represents a keyword belonging to another theme. Intensity values are used to reflect the extent of interaction between the keywords in a cluster and the strength of these internal relationships. The software uses this formula to calculate centrality values: $d = 100 (\sum eij/w)$. In the formula, ‘ i ’ and ‘ j ’ represent the keywords of the theme ‘ w ’ represents the number of keywords in the theme. As the internal relationship between keywords within a theme increases, the themes move upwards in the strategic diagram [36].

SciMAT performs the thematic analysis based on co-word and h-index analysis, and the results are presented in a strategic diagram including four quadrants and two dimensions (see Figure 2) [50]:

- i. Themes with high centrality and density are shown in quadrant 1 (Q1), and the themes appearing in this quadrant are labeled ‘**Motor Themes**’. Motor Themes are the most significant themes for the structuring and development of the research field.
- ii. Themes with high centrality and low-density values are shown in quadrant 2 (Q2), and they are labeled ‘**Basic and Transversal Themes**’. These themes are significantly related to the research field; however, they are not developed sufficiently. The high centrality values of these themes imply that they have the capacity to become motor themes in the following periods if they are investigated sufficiently.
- iii. Themes with low centrality and density values are shown in quadrant 3 (Q3), and they are labeled ‘**Emerging/Declining Themes**’. Whether these themes are newly emerging or disappearing during the period of analysis could be determined through in-depth qualitative analysis.
- iv. Themes with low centrality and high-density values are shown in quadrant 4 (Q4), and they are labeled ‘**Highly Developed and Isolated Themes**’. These themes could have been exchanged with some newer concepts or might have lacked the contextual/conceptual background to support the research field. These themes are

considered to be highly specialized on their own and remain peripheral for the investigated research field.

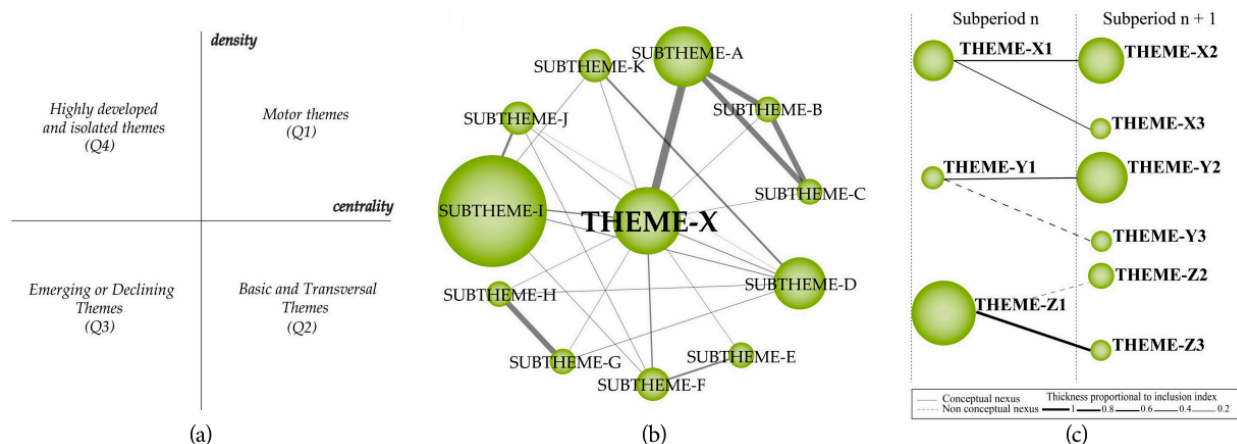


Figure 2. (a) Strategic Diagram; (b) Thematic Network Structure; (c) Thematic Evolution Structure [51].

The thematic network structure in Figure 2b illustrates the strategic themes in combination with other relevant subthemes for each. Each thematic network is labeled using the most central keyword in the associated cluster and the other interconnected keywords are presented around the central keyword. The size of the green spheres reflects the number of documents corresponding to a keyword while the thickness of lines connecting the keywords reflects the extent and strength of the relationship between the keywords.

The thematic evolution map in Figure 2c illustrates the originating period of themes as well as demonstrates the evolving interrelationships between themes across these periods. When the themes share the same keywords, this is shown with a solid line in the thematic evolution map. On the other hand, when the themes share some of the keywords, this is shown with dashed lines. As the extent of the relationship between themes increases, these lines become thicker. The size of the green circles on the map corresponds to the number of articles representing the theme.

A crucial step in the thematic evolution analysis is period creation [35]. For conducting a rigorous science mapping analysis on SciMAT, dividing the raw data into periods is often recommended to save the data from uniformity, and also to identify the thematic evolution of the research field [40,41]. Accordingly, we formed three periods depending on the empirical development of the TSL research field. As suggested in the literature, TSL research appeared in educational literature in the late 1980s and flourished as an emerging model of leadership for schools during the 1990s [51]. Berkovich [3] asserted that research during this period was mostly conducted in the Western context (particularly the United States, the United Kingdom, and Canada), and attempted to conceptualize TSL as a school-level construct. He also notified that, following this initial period till the mid-2000s, the scope of TSL research expanded into non-Western contexts (e.g., the Middle East, East Asia, Eurasia, Africa), and endeavored to start a new stage in its life cycle. Accumulated evidence from this diverse scope of research reinforced TSL to become a widely accepted and relevant theory in the educational literature [3,4]. In addition to these previous specifications on the development of TSL research, we also considered the accumulated distribution of publications while creating the periods (see Figure 3), and determined the last two years as the third period of analysis. Consequently, we labeled these three periods as the Incubation Period (1989–2009), the Development Period (2010–2020), and the Maturation Period (2021–2022), respectively. We used the term “incubation” to imply that research during this period began to grow in number but did not produce much effect other than framing TSL as a school leadership model. We used the term “development” to refer to the growing evidence and widening scope of research on TSL

while using the term “maturation” to imply that TSL gained stronger scientific recognition and produced significant effects during this period as indicated by the growth in citations and publications (see Figure 3).

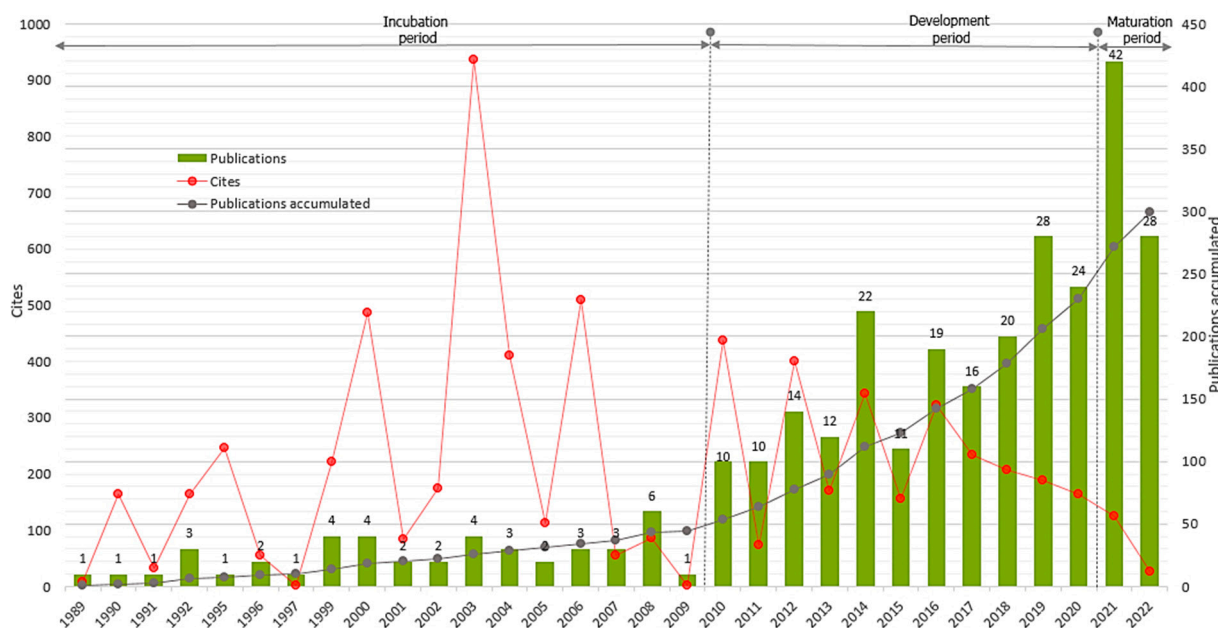


Figure 3. Distribution of publications and citations over time (1989–2022).

The conceptual link between themes across each period was determined using the inclusion index option on the SciMAT software. The equation for the inclusion index is $I_i = \#(U \cap V) / \min(\#U, \#V)$ [52,53]. The thematic evolution map is created by SciMAT via conceptual linking (i.e., linking of common keywords) between the U theme and the V theme, which exhibits their evolution over the commonalities of keywords. The more the number of keywords shared by the clusters between each period, the more evident the thematic evolution becomes.

3. Results

3.1. Overall Bibliometric Analysis

The bibliometric analysis was conducted to illustrate the international impact of publications on TSL [15], and identify the distribution of articles according to publication year, the accumulated number of publications, and citations per article. The analysis also revealed the most productive/cited authors, most cited articles, and most productive countries in contributing TSL knowledge base.

3.1.1. Chronological Distribution of Articles

The distribution of the 300 articles on TSL by year of publication, accumulated number of publications, and a graphical representation [41] of the average citations per article were determined after bibliometric analysis (see Figure 3).

Figure 3 illustrates that the studies on TSL within educational literature began in 1989, gradually increased until 2022, and accumulated a strong knowledge base, particularly within the last decade. These results align with previous notifications that TSL research began to flourish in the educational field starting from the late 1980s, and has garnered accelerating interest since then.

3.1.2. Most Influential Authors

The bibliometric analysis of 300 articles revealed that a total of 643 authors published research on TSL. Some of these authors also coauthored more than one article. We identified

the top 10 most productive researchers that contributed to the development of the TSL knowledge base by determining the authors with the highest number of publications and associated citations. Table 2 lists these researchers based on the number of citations received by their publications.

Table 2. Top 10 authors most cited in TSL.

Rank	Author	TC *	TP	h-Index
1	Leithwood, Kenneth A.	1599	13	30
2	Jantzi, Doris	1286	9	22
3	Hallinger, Philip	730	2	49
4	Sleegers, Peter J.C.	454	7	34
5	Sun, Jingping	263	2	12
6	Koh, William	247	1	4
7	Steers, Richard M.	247	1	23
8	Terborg, James R.	247	1	20
9	Geijssel, Femke P.	206	2	16
10	Moolenaar, Nienke M.	194	2	19

* TC: total citations. Data retrieved from Scopus on 5 May 2022.

As shown in Table 2, Leithwood and Jantzi were found to be the leading authors with the highest number of articles published and citations received, followed by Hallinger with 730 citations received for his two influential publications. The list comprises scientists from a variety of countries such as Canada, the United States, the Netherlands, China, and Singapore, which indicates an international level of contribution to the TSL knowledge base. It is likely that one can expect to see Burns, Bass, or Avolio as the leading scholars in the field of TL research. However, as the current study focuses on TL in the K-12 context, it is natural that Leithwood, Jantzi, and Hallinger are leading the list as they have contributed greatly to the study and understanding of TL as a school-level construct.

3.1.3. Most Influential Journals

Table 3 shows the top 10 journals having published the highest number of articles on TSL between 1989 to 2022.

Table 3. Top 10 journals in terms of number of publications on TSL.

Rank	Journal Name	TP *	TC	SJR	Scopus Quartile
1	Educational Management Administration and Leadership	20	449	1.28	Q1
2	Journal of Educational Administration	16	1207	1.01	Q1
3	International Journal of Leadership in Education	13	161	0.47	Q2
4	International Journal of Educational Management	8	82	0.46	Q2
5	Sustainability (Switzerland)	8	30	0.66	Q1
6	Procedia—Social and Behavioral Sciences	7	66	n/a	n/a
7	Malaysian Online Journal of Educational Management	6	13	0.17	Q4
8	Educational Administration Quarterly	5	440	1.95	Q1
9	School Effectiveness and School Improvement	5	824	1.05	Q1
10	Leadership and Policy in Schools	5	89	0.61	Q2

* TP: total publications; TC: total citations; SJR: Scientific Journal Ranking; n/a: not available/Data retrieved from Scopus on 5 May 2022.

As shown in Table 3, the Educational Management Administration and Leadership, Journal of Educational Administration, and International Journal of Leadership in Education journals contributed the most to the TSL knowledge base. Although many of the journals listed are from the journals of the educational administration field, two have a more interdisciplinary focus (i.e., Sustainability, and Procedia—Social and Behavioural Sciences) yet also contributed to the TSL field.

3.1.4. Most Cited Articles

Table 4 lists the top 10 articles that received the highest number of citations among the 300 analyzed articles.

Table 4. Top 10 articles cited in TSL.

Rank	Article Name	Journal	Author(s)	Year	TC *
1	Leading educational change: Reflections on the practice of instructional and transformational leadership	Cambridge Journal of Education	Hallinger, P.	2003	630
2	The effects of transformational leadership on organizational conditions and student engagement with school	Journal of Educational Administration	Leithwood, K. Jantzi, D.	2000	321
3	Transformational school leadership for large-scale reform: Effects on students, teachers, and their classroom practices	School Effectiveness and School Improvement	Leithwood, K. Jantzi, D.	2006	301
4	The effects of transformational leadership on teacher attitudes and student performance in Singapore	Journal of Organizational Behavior	Koh, W.L. Steers, R.M. Terborg, J.R.	1995	247
5	The nature and effects of Transformational School Leadership: A meta-analytic review of unpublished research	Educational Administration Quarterly	Leithwood, K. Sun, J.	2012	197
6	Transformational leadership and teacher commitment to organizational values: The mediating effects of collective teacher efficacy	School Effectiveness and School Improvement	Ross, J.A. Gray, P.	2006	191
7	Occupying the principal position: Examining relationships between transformational leadership, social network position, and schools' innovative climate	Educational Administration Quarterly	Moolenaar, N.M. Daly, A.J. Sleegers, P.J.C.	2010	170
8	Relation of principal transformational leadership to school staff job satisfaction, staff turnover, and school performance	Journal of Educational Administration	Griffith, J.	2004	170
9	Transformational Leadership: How Principals Can Help Reform School Cultures	School Effectiveness and School Improvement	Leithwood, K. Jantzi, D.	1990	164
10	Transformational leadership effects on teachers' commitment and effort toward school reform	Journal of Educational Administration	Geijssels, F. Sleegers, P. Leithwood, K. Jantzi, D.	2003	163

* TC: total citations. Data retrieved from Scopus on 5 May 2022.

As Table 4 illustrates, Hallinger's article published in 2003 has been the most influential work in the field although the concept was introduced by Leithwood and Jantzi in 1990. The other most highly cited articles were mostly written by Leithwood and his colleagues.

3.1.5. Most Productive Countries

Analysis was conducted to determine the most productive countries that contributed to the TSL research field (see Table 5).

Table 5. Top 10 countries with the most publications in TSL.

Rank	Country	TP *	TC
1	United States	63	1778
2	Malaysia	30	165
3	Indonesia	24	59
4	Canada	22	2001
5	China	14	70
6	Netherlands	14	676
7	Australia	13	208
8	United Kingdom	12	324
9	Iran	12	137
10	Israel	11	317

* TP: total publications; TC: total citations. Data retrieved from Scopus on 5 May 2022.

As presented in Table 5, the United States, where TSL was first conceptualized by Burns, heads the list, followed by two Eastern countries (Malaysia and Indonesia). The list in Table 5 illustrates a global interest and contribution to the TSL research field.

3.2. Science Mapping Analysis

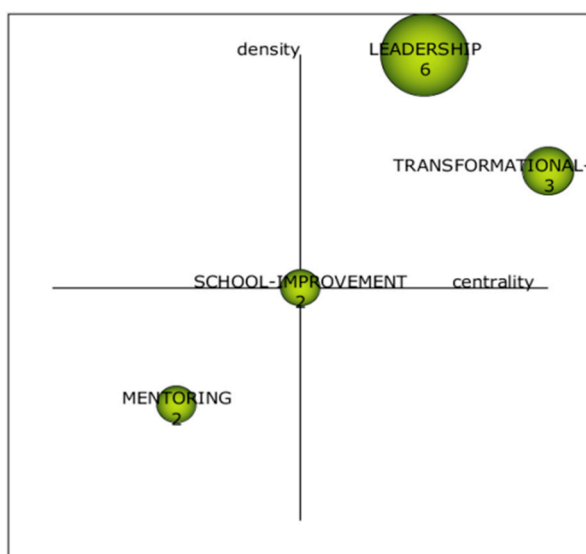
This section reports the results yielded by (i) period-based structural analysis and (ii) thematic evolution structure.

3.3. Scientific Thematic Structure

3.3.1. Incubation Period (1989–2009)

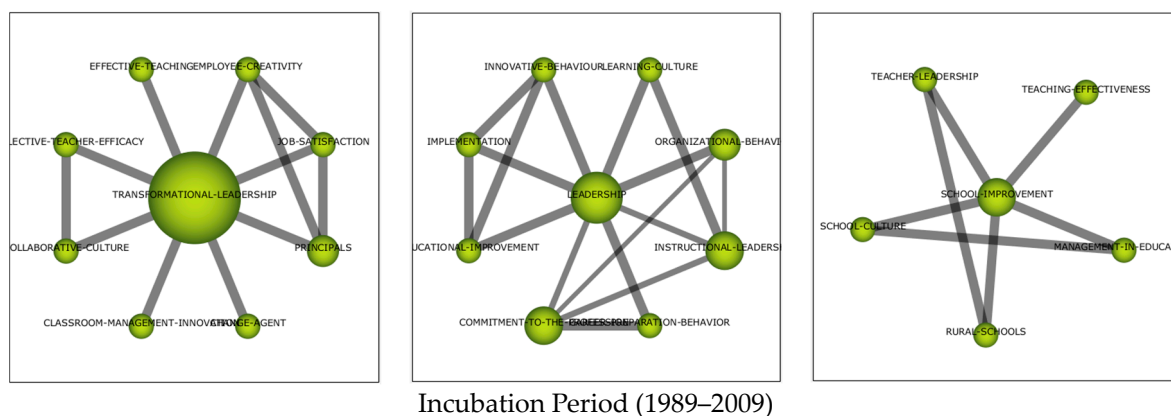
This first period was comprised of 44 articles published between 1989 and 2009. The strategic diagram and performance analysis revealed by the science mapping analysis of these articles are shown in Figure 4. The results regarding the thematic network structure for the central themes are illustrated in Figure 5.

During the Incubation Period, when research mostly concentrated on the conceptualization of TSL, three motor themes emerged: Leadership, Transformational-Leadership, and School-Improvement. Studies were mostly framed around these three themes and highly contributed to the field's development. Mentoring, on the other hand, was revealed to be an emerging and/or declining theme, indicating that research interest in the relationship between mentoring and TSL was weakly-addressed.

**(a)** Incubation Period (1989–2009)

Theme	H-index	Sum Citations	Centrality Range	Density Range
TRANSFORMATIONAL-LEADERSHIP	3	239	1	0.75
LEADERSHIP	6	843	0.75	1
SCHOOL-IMPROVEMENT	2	16	0.5	0.5
MENTORING	2	240	0.25	0.25

(b) Themes Performance**Figure 4.** (a) Strategic diagram; (b) Performance analysis; Source: SciMAT.



Incubation Period (1989–2009)

Figure 5. Thematic network structures.

The analysis of the terms associated with the motor themes during the Incubation Period revealed the cluster networks illustrated in Figure 5. The motor theme of Transformational-Leadership (1, 0.75) was associated with the themes of Effective Teaching, Collective Teacher-Efficacy, Employee Creativity, Job-Satisfaction, Principals, Classroom-Management-Innovation, Collaborative Culture, and Change Agent, while Leadership (0.75, 1) had associations with Innovative-Behaviour, Learning-Culture, Organizational-Behaviour, Implementation, Educational Improvement, Schools, Instructional-Leaders, Commitment-to-the-Profession, and Career-Preparation-Behaviour. The other motor theme, School-Improvement (0.5, 0.5), was associated with Teacher-Leadership, Teaching-Effectiveness, School-Culture, Management-Education, and Rural-Schools. Research during this initial period appears to have addressed TSL as a potential tool for school improvement by influencing teacher behavior and school climate.

Regarding the subthemes in the Transformational-Leadership cluster network, these studies on Effective-Teaching [54], Collective Teacher-Efficacy [55], Employee-Creativity [56], Job-Satisfaction [57], Classroom-Management-Innovation [58], Collaborative-Culture [59], and Change-Agent [60] could be illustrative. Likewise, the studies on Innovative-Behaviour [61], Learning-Culture [62], Organizational-Behaviour [63], Implementation [64], Educational-Improvement [65], Instructional-Leaders [66], Commitment-to-the-Profession [67], and Career-Preparation-Behaviour [68] illustrate the sub-themes in the Leadership cluster network.

The sub-themes in the School-Improvement cluster network, on the other hand, could be supported with the following research: Teacher-Leadership [69], Teaching-Effectiveness and School-Culture [70], and Rural-Schools [71].

3.3.2. Development Period (2010–2020)

This second period was comprised of 186 articles published from 2010 to 2020. The strategic diagram and performance analysis revealed by the science mapping analysis of these articles are shown in Figure 6. The results regarding the thematic network structure for the central themes are illustrated in Figure 7.

As presented in Figure 6a, the TSL research field developed significantly during the Development Period with a variety of themes and an increased number of motor themes. Self-Efficacy, Instructional-Leadership, School-Principals, Principals, School-Leadership, and Transformational-Leadership emerged as the motor themes, while Leadership, Leader-Member-Exchange, Counsellor-Education, Corporal-Punishment, and Cluster-Schools were found to be highly developed and isolated themes, as signified by their low centrality/high-density values. The Organizational-Learning, Innovative-Behaviour, SEM (structural Equational Modeling), Student-Achievement, and Job-Satisfaction themes were the basic and transversal themes, which were not developed well during this period despite being significant for the field. On the other hand, Teacher-Leadership, Teacher-Self-Efficacy, and Affective-Organizational-Commitment were found to be emerging/declining themes.

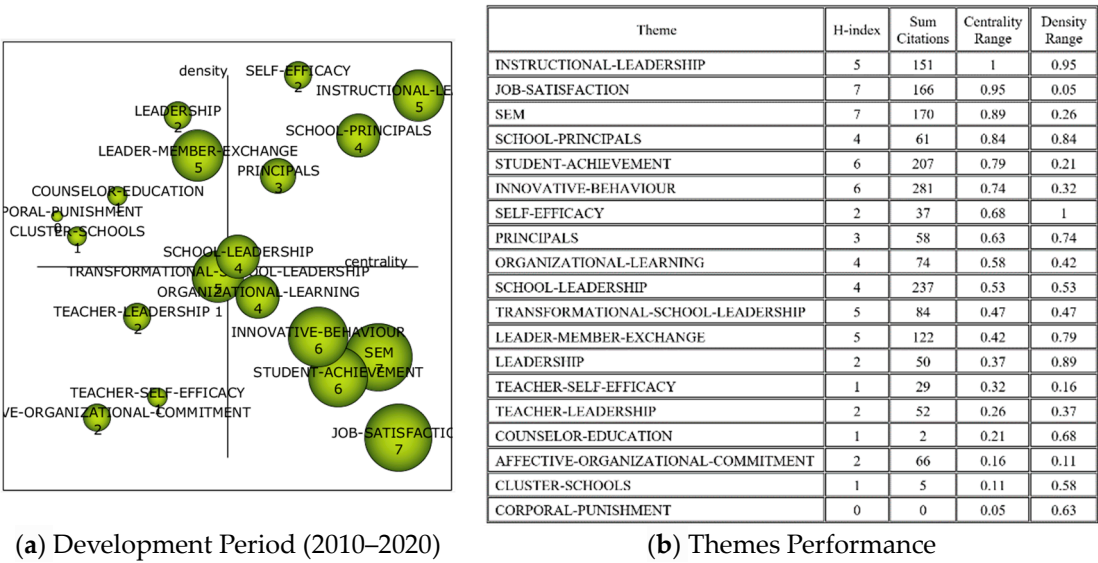


Figure 6. (a) Strategic diagram; (b) Performance analysis; Source: SciMAT.

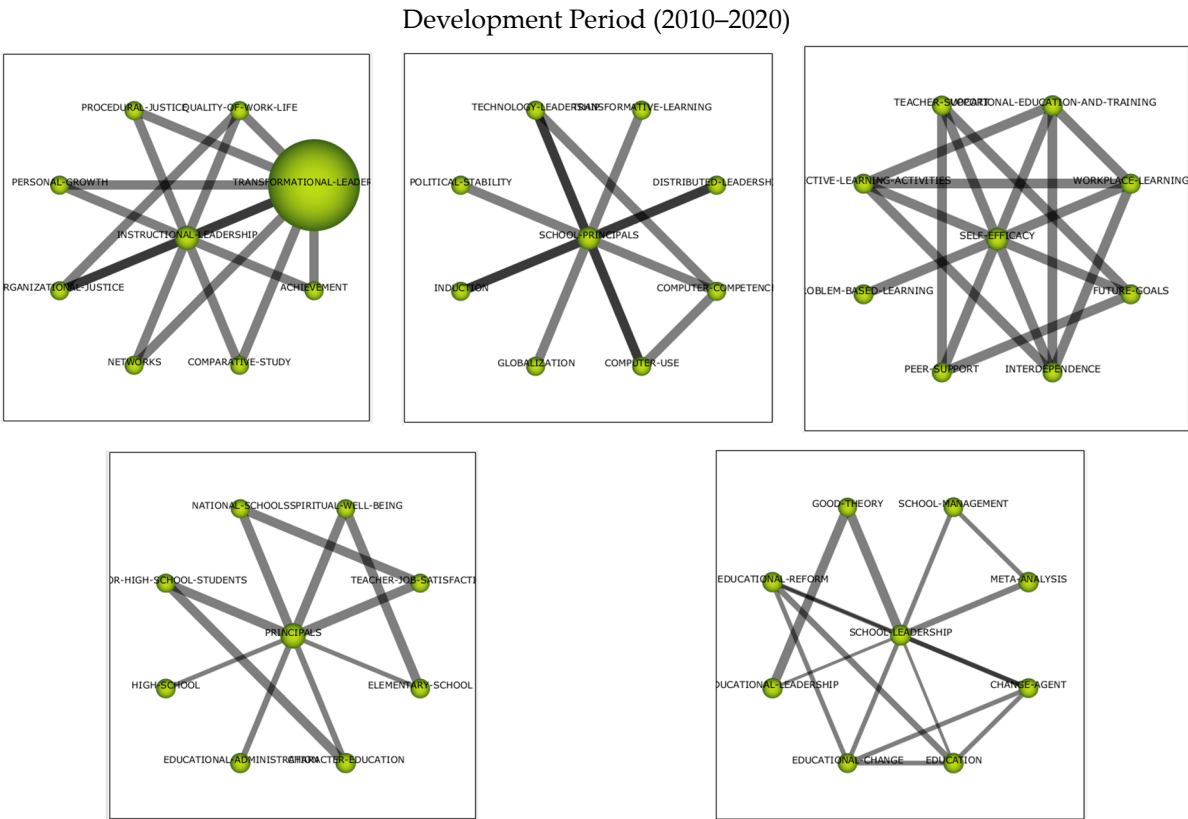


Figure 7. Thematic network structures.

The subthemes associated with the motor themes for the Development Period are illustrated in the cluster networks shown in Figure 7. The Instructional-Leadership theme was associated with Procedural-Justice, Quality-of-Work-Life, Personal-Growth, Transformational-Leadership, Organizational-Justice, Achievement, Networks, and Comparative-Study subthemes, while School-Principals theme was associated with the subthemes of Technology-Leadership, Transformative-Learning, Political-Stability, Distributed-Leadership, Induction, Computer-Competencies, Globalization, and Computer-Use. The Self-Efficacy theme had associations with Teacher-Support, Vocational-Education-and-Training, Active-Learning-

Activities, Workplace-Learning, Problem-Based-Learning, Future-Goals, Peer-Support, and Interdependence subthemes, while the Principals theme had associations with National-Schools, Spiritual-Well-Being, Junior-High-School-Students, Teacher-Job-Satisfaction, High-School, Elementary-School, Educational-Administration, and Character-Education subthemes. The School-Leadership theme, on the other hand, was associated with Good-Theory, School-Management, Educational-Reform, Meta-Analysis, Educational-Leadership, Change-Agent, Educational-Change, and Education sub-themes. The cluster networks illustrate the increased variety in the themes associated with TSL research during the Development Period.

To illustrate the subthemes in the Instructional-Leadership cluster network, these studies could be listed: Procedural-Justice [72], Quality-of-Work-Life [73], Personal-Growth [74], Organizational-Justice [73], and Comparative-Study [74]. These studies on Technology-Leadership [75], Political-Stability, Distributed-Leadership [76], Globalization [77], Computer-Competencies, and Computer-Use [78] illustrate the sub-themes in the School-Principals cluster network.

The sub-themes in the Self-Efficacy cluster network, on the other hand, could be supported with the following research: Teacher-Support [79], Vocational-Education-and-Training [80], Active-Learning-Activities [80], Problem-Based-Learning [80] and Interdependence [80], Workplace-Learning [81], and Peer-Support [82]. Regarding the sub-themes in the Principals theme, these studies on National-Schools [83], Spiritual-Well-Being [84], Teacher-Job-Satisfaction [85], High-School [86], Elementary-School [87], and Character-Education [88] could be illustrative.

As for the School-Leadership cluster network, these studies on Educational-Reform [67], Meta-Analysis [19], Educational-Leadership [89], and Educational-Change [90] could be listed as examples.

3.3.3. Maturation Period (2021–2022)

This third period comprises the last 2 years of TSL research examined in the current study and is represented by a total of 70 articles. The strategic diagram and performance analysis revealed by the science mapping analysis of these articles are shown in Figure 8. The results regarding the thematic network structure for the central themes are illustrated in Figure 9.

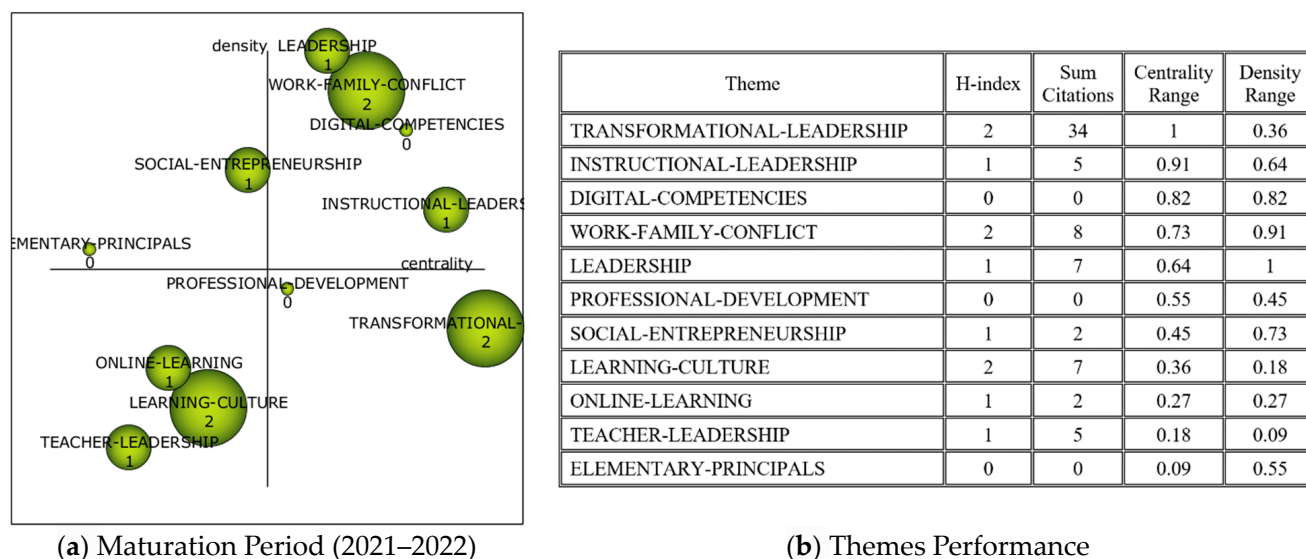


Figure 8. Strategic diagram (a). Performance analysis (b); Source: SciMAT.

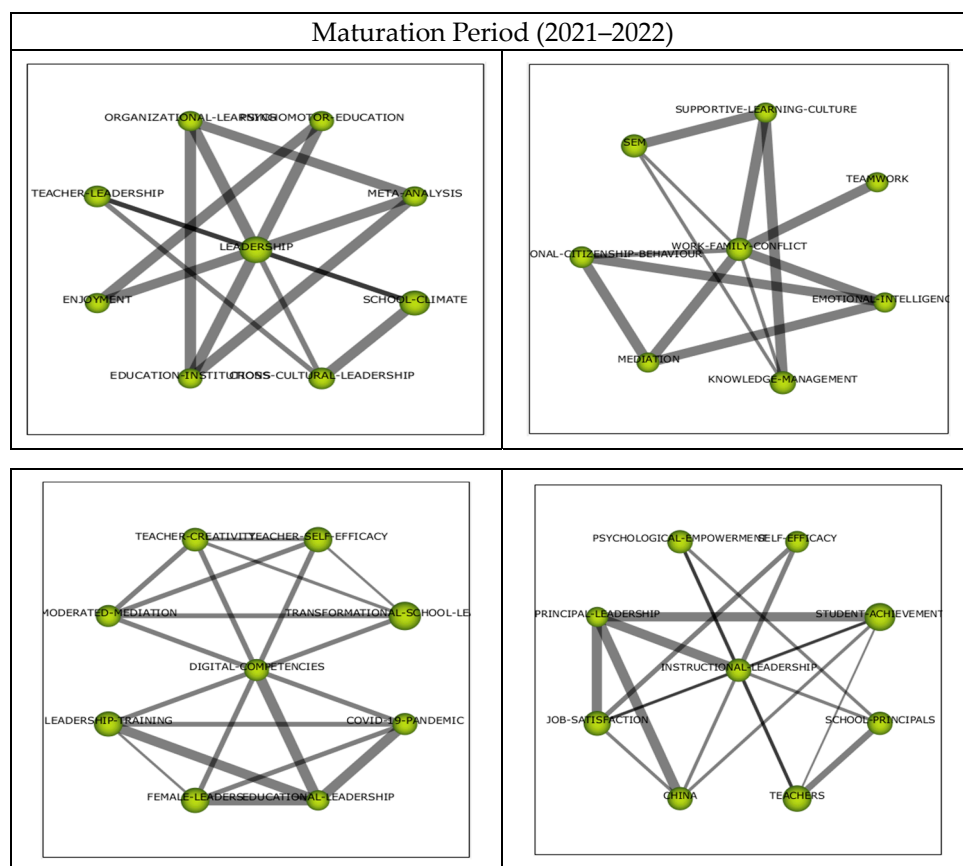


Figure 9. Thematic network structures.

Our analysis revealed 11 themes present in the Maturation Period, of which four emerged as motor themes: Leadership, Work-Family-Conflict, Digital-Competencies, and Instructional-Leadership. Social-Entrepreneurship and Elementary-Principals emerged as highly developed and isolated themes, while Professional-Development and Transformational-Leadership were found to be basic and transversal themes. On the other hand, Online-Learning, Learning-Culture, and Teacher-Leadership were found to be emerging/declining themes during the Maturation Period.

As the cluster networks in Figure 9 illustrates, the motor themes of the Maturation Period had associations with various subthemes. The Leadership theme was associated with the subthemes of Organizational-Learning, Psychomotor-Education, Teacher-Leadership, Meta-Analysis, Enjoyment, School-Climate, Educational-Institutions, and Cross-Cultural-Leadership, while Work-Family-Conflict was associated with Supportive-Learning-Culture, SEM, Organizational-Citizenship-Behaviour, Team-Work, Emotional-Intelligence, Mediation, and Knowledge-Management subthemes. The Digital-Competencies theme had associations with Teacher-Creativity, Teacher-Self-Efficacy, Moderated-Mediation, Transformational-School-Leadership, Leadership-Training, COVID 19-Pandemic, Female-Leaders, and Educational-Leadership subthemes, while Instructional-Leadership had associations with Psychological-Empowerment, Self-Efficacy, Principal-Leadership, Student-Achievement, Job-Satisfaction, School-Principals, China, and Teachers subthemes.

The sub-themes in the Leadership cluster network can be illustrated by these studies: Organizational-Learning [91], Enjoyment [92], School-Climate [92], and Cross-Cultural-Leadership [93]. The sub-themes in the Work-Family-Conflict cluster network, on the other hand, can be illustrated by these studies: Supportive-Learning-Culture [94], SEM [95], Organizational-Citizenship-Behaviour [96], Team-Work [97], and Emotional-Intelligence [98] subthemes.

These studies on Teacher-Creativity [99], Teacher-Self-Efficacy [100], the COVID-19 Pandemic [101], and Female-Leaders [102] illustrate the sub-themes that emerged in the Digital-

Competencies cluster network. Similarly, the studies on Psychological-Empowerment [103], Student-Achievement [104], Job-Satisfaction [105], and China [4] can be listed as examples of sub-themes in the Instructional-Leadership cluster network.

3.4. Thematic Evolution Structure

The results of the thematic evolution analysis are presented in Figure 10, which illustrates both the overlapping items (keywords) and the thematic evolution of the themes across periods.

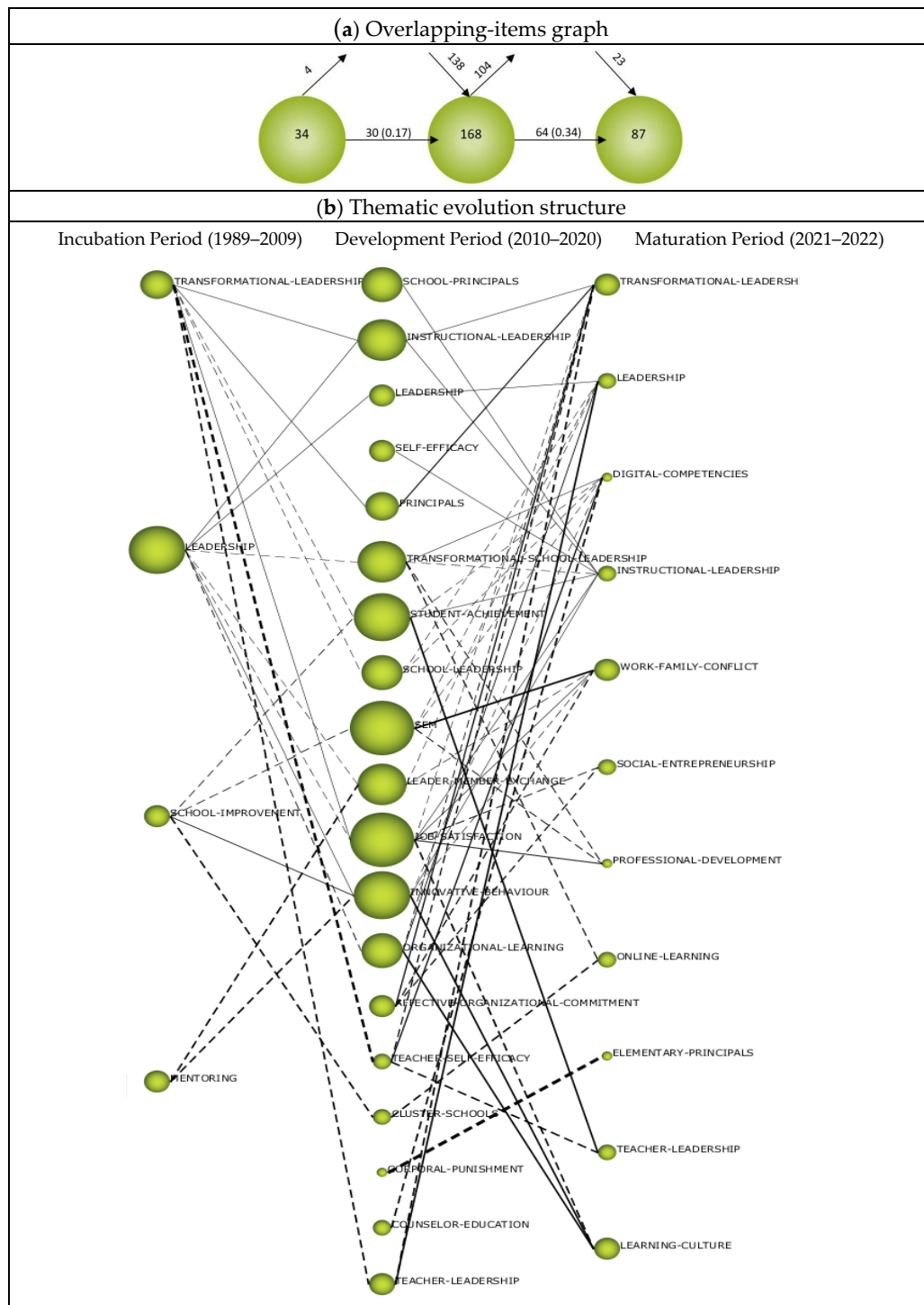


Figure 10. (a) Overlapping map (b) Longitudinal map; Source: SciMAT.

The overlapping map in Figure 10a shows the number of keywords for each period analyzed, as well as the keywords that were newly appeared, lost, or reused across the periods [106]. As seen in the overlapping map, 34 terms emerged during the Incubation Period. While 4 of these terms did not exist in the Developing Period, 30 terms continued to exist. During the Development Period, 168 terms emerged, and 64 of them were also used in the subsequent Maturation Period, while 104 were not.

As for the Maturation Period, 87 terms emerged in total. While the terms used for the first time during the Development Period totaled 138, it was 23 during the Maturation Period. The increase in the number of keywords from 34 to 87 implies a significant increase in the quantity of the articles published, which also indicates that the TSL research field has become diversified on a thematic basis. In addition, the increased number of words added during the Development Period indicates that the field developed to a greater extent during this period, while the number of disjointed terms reveals that the terms used in this research field were constantly being updated.

The thematic evolution structure presented in Figure 10b illustrates the emerging/declining themes over the three periods of analysis, as well as the cross-periodical associations between these themes. The four themes that emerged during the Incubation Period were Transformational-Leadership, Leadership, School-Improvement, and Mentoring. The themes were found to be highly diversified during the Development Period, with 19 themes in total: School-Principals, Instructional-Leadership, Leadership, Self-Efficacy, Principals, Transformational-School-Leadership, Student-Achievement, School-Leadership, SEM, Leader-Member-Exchange, Job-Satisfaction, Innovative-Behaviour, Organizational-Learning, Affective-Organizational-Commitment, Teacher-Self-Efficacy, Cluster-Schools, Corporal-Punishment, Counsellor-Education, and Teacher-Leadership.

The comparison between the Incubation Period and the Development Period shows that the Transformational-Leadership theme was exchanged for the Principal and Instructional-Leadership themes, while these two themes were transferred back to the Transformational-Leadership theme during the Maturation Period. The Leadership theme existed during all periods, and it had a significant relationship with the Instructional-Leadership theme during the Development Period. The School-Improvement theme was transformed into the Innovative-Behaviour theme during the Development Period, and the Learning-Culture theme during the Maturation Period.

During the Maturation Period, 11 themes emerged in total, and they all had relationships with themes from the Development Period as indicated by the solid lines used in Figure 10b. Closer scrutiny of the relationship of themes from the Maturation Period with those that emerged during the Development Period shows that the Teacher-Leadership theme was closely associated with the Student-Achievement theme while the Instructional-Leadership with Self-Efficacy, Student-Achievement, the Transformational-Leadership with Principals, and Instructional-Leadership. The Digital-Competencies theme, on the other hand, was associated with Transformational-School-Leadership. These results indicate that existing research mostly investigated the relationships between these variables. The fact that Work-Family-Conflict was associated with the SEM theme implied that studies addressing this issue were mostly designed to test mediating-moderating effects.

4. Discussion

Combining bibliometric and science mapping analysis, we exhibited the intellectual and conceptual architecture of the TSL knowledge base by revealing the strategic themes that emerged and evolved throughout its scientific development. In this section, we will first elaborate on the motor themes that emerged from the period-based science mapping analysis since these themes are significant in the development of the TSL research field during each period and highlight the dominant research trajectories. We will also discuss the under-explored or emerging aspects of TSL research as revealed by the current analysis. Finally, we will reflect upon the empirical implications of these results, particularly for its future exploration.

As can be expected, two prevalent themes during the Incubation Period were “leadership” and “transformational leadership”. Considering that most articles published during this period were rather conceptual in nature, these themes clearly evidence a particular focus on the conceptualization of TSL. Closer scrutiny into the subthemes of the transformational leadership theme (e.g., change agent, employee creativity, collective teacher efficacy, and collaborative culture) supports this assertion since they align with the salient characteristics and potential contribution of TL to school leadership. Taken as a whole, these results indicate that research during the Incubation Period attempted to provide a firm conceptual and theoretical footing for its solid empirical investigation as suggested by Leithwood and Jantzi [9], and investigated TSL in relation to teachers’ internal states, teacher behaviors, school outcomes, and conditions [33].

Another prominent theme during the Incubation Period was school improvement, which is not surprising since TSL was widely adopted and tested as a leadership model that can reinforce school improvement [23]. The subthemes that emerged for the school improvement theme, such as rural schools, teacher leadership, teaching effectiveness, and school culture indicate interest in TSL as a tool for the improvement of school outcomes by way of developing the quality of teaching and school context, with a particular focus on rural schools.

Among these themes, the teacher leadership theme deserves closer attention because it not only appeared in relation to the school improvement theme but was also an emerging theme during both the Development and Maturation Periods. Teacher leadership and TSL are related in several ways. For one thing, TSL is described as a shared/distributed form of leadership that evokes bottom-up participation and thereby enables multiple forms of leadership. As such, leadership in this model does not belong solely to the principal, but the principal is expected to guide and coordinate collective efforts within the school community [1]. Therefore, TSL is significant in building a school culture where teachers can rise as leaders [32,100,107] who ‘lead within and beyond the classroom, identify with and contribute to a community of teacher learners and leaders, and influence others towards improved educational practice’ [108] (p. 6).

In addition, sustainable improvement in learning and teaching mostly depends on teachers as they are the gatekeepers in translating the principles of school improvement initiatives into the actual classroom [109,110]. TSL supports this process by empowering teachers, supporting their professional development, increasing collaboration, and creating a sense of ownership for the change process [111]. In addition, scholars also asserted that teacher leadership is quite transformational in nature as teacher leaders engage in behaviors similar to those of transformational leaders such as establishing rapport and trust through skillful communication (idealized influence), challenging the status quo, initiating and encouraging change initiatives (intellectual stimulation), nurturing relationships and promoting professional growth (individual consideration) [112,113]. As a result, some researchers focused on transformational teacher leadership [112] while others investigated the relationship between teacher leadership and TSL [114,115]. However, as Li and Liu [100] also notified in a recent study, the interactive role of TSL and teacher leadership in improving teaching and learning was weakly explored despite these close links between the two models and their strong potential to levy school improvement capacity when practiced in combination.

Another theme that emerged during the Incubation Period and lost researchers’ interest later was the ‘mentoring’ theme. As Scandura and Williams [116] suggest, TSL and mentoring are interrelated and complementary since transformational leaders promote the professional development of their subordinates, and thus serve as mentors [117,118]. The practice of mentoring and TSL possess common elements such that the charisma dimension provides a high level of respect necessary for quality mentoring while the individualized consideration promotes positive interactions and personalized attention to the unique needs of the subordinates. Similarly, the inspirational motivation dimension of TSL assists in promoting the subordinates’ performance and commitment [68,116]. Considering the

merit of quality mentoring in schools to enable sustainable development, innovation, and perpetual learning through developing school-wide leadership capacity [119,120], and the contribution of TSL to initiating a change towards a learning culture [82], the interactive effects of these two constructs deserve further investigation so as to develop deeper insights into their joint effects.

Findings with regard to the Development Period revealed a tremendous variety of themes having been addressed in the published TSL research. One reason for this increased variety could be the dynamic structure of educational leadership research that has often been influenced and guided by developments in other research fields, such as management or social sciences [3]. Similarly, the conceptual development of TSL has not only contributed to its theory, but also to the identification, development, and contribution of effective TSL practices from a variety of perspectives aimed at promoting positive school outcomes [8].

During the Development Period, research was mostly premised on the practice of TSL, particularly by school principals. This focus on principals might not be unique to TSL research since leadership is often assumed to be synonymous with principalship [21,63]. In addition, much evidence is provided by empirical research on the central role of principals in elevating school success through improving collective capacity and school-wide collaboration by means of transformational leadership [1,66,121]. Another reason for the prevalence of principal themes could be the inclusion of TSL within principal training programs and textbooks [3,107,122] because research into the effects of TSL on school outcomes has often mentioned significant implications for training principals in this regard [5,8].

Another motor theme that deserves attention is that of instructional leadership (IL), which was prominent during the Development and Maturation periods. In fact, the two models of leadership are considered to be distinct, in that IL is a top-down leadership model which stresses the principals' responsibilities for coordination and the controlling of instruction while TSL demonstrates a bottom-up approach to developing school leadership capacity that aims at facilitating progression in school outcomes and improvement [69]. However, Marks and Printy [66] asserted that IL and TSL are complementary despite their distinct characteristics, and the integration of IL and TSL offers an effective school leadership model that eventually promotes 'active collaboration around instructional matters to enhance the quality of teaching and student performance' (p. 370).

In the same year, Hallinger [1] stressed that IL and TSL have much in common with regard to supporting teachers' capacity to perform better instruction and leveraging student learning. These studies may have increased scholars' research interest in the blended study of these two leadership models. However, this initial interest in such research, which was mostly comparative and aimed at understanding which model contributed more to student learning [100], evolved to be explored under a broader concept of leadership, namely 'leadership for learning' [123,124]. Combining IL, TSL, and distributed leadership, the leadership for learning framework addresses wider sources of leadership [125] that 'combines the coordination and monitoring of instruction with behaviors that promote cooperation, commitment, and capacity' [126] (p. 368). This leadership for learning perspective may have also escalated the combined investigation of IL and TSL during the Maturation Period.

The prominence of principal and IL themes could also be regarded from the teacher self-efficacy perspective, which emerged as another motor theme during the Development Period because both leadership models are considered to promote self-efficacy [127,128]. Transformational school leaders enable teachers to reach their full potential by setting clear expectations, providing individualized support, and fostering an environment of trust and openness. Thus, they enhance teachers' confidence in undertaking initiatives, engaging in professional learning, and experimenting with new methods [129,130]. As such, TSL helps develop and consolidate teacher self-efficacy, which contributes greatly to positive student outcomes [100]. This could explain researchers' focus on the joint exploration of TSL and self-efficacy during this period. In fact, much recent research highlights the significant effect of TSL on collective teacher efficacy, which is also a strong contributor to the quality

of teaching and learning at school [131,132]. Therefore, further investigations into their interplay could contribute to this aspect of the TSL literature.

The basic and transversal themes that emerged during the Development Period also deserves closer scrutiny since these themes are described as being highly significant for the development of the field and having a close relationship with TSL in this regard. However, their being in the transversal category implies that these themes were not developed sufficiently during the period despite their strong potential to become motor themes in the following period(s). The basic and transversal themes yielded by the analysis were organizational learning, innovative behavior, student achievement, job satisfaction, and SEM (structural equation modeling).

Leadership in general, and TSL in particular, has been of interest to researchers for their potential to increase student achievement [4,133]. However, since early research yielded controversial results regarding the relationship between principals' behaviors and student achievement, researchers seem to be inclined towards investigating its indirect effects over other variables such as teachers' behaviors or student background [6]. Similarly, leadership research including moderating/mediating variables yielded significant effects of the school principal on student outcomes [30,125]. All these developments help explain the interest in research designs including SEM, as well as the focus on school principals and student achievement.

In fact, studies addressing the relationship between TSL and student achievement presented mixed results. While some evidenced the positive direct influence of TSL on student achievement and outcomes [19,134], others have underlined that TSL could also have indirect effects through changing teachers' internal states (e.g., job satisfaction, commitment), teacher behaviors (e.g., use of knowledge, disciplinary practices) and school climate [23,24,135]. The likelihood of the indirect influence of TSL on student achievement could be the reason why teacher job satisfaction, innovative behavior, and organizational learning attracted research interest during this period. Indeed, studies conducted during the Development Period evidenced that TSL has a significant influence on teachers' job satisfaction [23,25,85,136] and innovative behavior [137–140], particularly through creating a positive and supportive school climate [137,140]. As underlined by Leithwood and Sun [23], some dimensions of TSL such as building healthy relationships at school, developing teachers through intellectual stimulation and individual support, and setting a motivating shared vision are particularly significant in enhancing teachers satisfaction and commitment to goals. These dimensions are also cited as significant factors in establishing an innovative-friendly culture because they help create and maintain a safe, reliable, and supportive school climate, which is essential to boost the innovative behaviors of teachers [139–141].

During the Maturation Period (2021–2022), transformational leadership has become a basic and transversal theme, which implies that researchers were less inclined to develop the TSL framework but used the existing framework to address related variables. Among these variables, work-family conflict and digital competencies were prevalent. As for work-family conflict, scholars could be intrigued about the viability of TSL in dealing with the negative consequences of work-family conflict since TSL promotes teacher commitment and capacity through individualized consideration [9]. From the perspective of COR (conservation of resources) theory, teachers who receive more resources (e.g., help, understanding, support) from their principal and other school staff are more likely to experience lower levels of work-family conflict, and display higher commitment to work [142]. The collaborative culture created by TSL could also provide this support.

As for the digital competencies theme, one of the significant challenges facing education today is the unprecedented need for digital transformation and the development of digital competencies of not only students but all school staff [143]. In this new era, school principals are expected to become digital leaders who can successfully align school structures and objectives in a way to support digital transformation [144,145]. TSL, with its pivotal role in enabling deeper cultural transformation to support school-wide learning and

knowledge-sharing, is also linked to the practice of successful digital leadership [146,147]. Transformational leaders are currently expected to both anticipate the changes in the digital world and become the initiators of such change to deliver innovation and success in the long run [145]. To successfully navigate the challenges of digital transformation, leaders need to possess a blend of digital competencies such as using digital media to manage information, build and share knowledge, establish collaborations, tackle complex issues, and swiftly adapt to changing circumstances [146,147]. The increased focus on digital competencies during the last period of TSL research could have resulted from this changing scope of school leadership in recent years.

5. Conclusions

Our study, which delineated the thematic evolution and the conceptual architecture of the TSL knowledge base, offers significant implications for future investigations by reflecting its developed or underdeveloped aspects and helps guide research towards the under-investigated or emerging themes of TSL. Although TSL has become one of the most studied leadership models [3], certain aspects of it still warrant further investigation, such as its antecedents [8,9], the actual leadership acts that promote school improvement [148] and its relationship with a range of variables such as teacher commitment and resilience, turnover intention, extra-work behaviors, and the holistic development of students in addition to academic achievement.

None of these variables emerged among the prevalent themes in the present analysis. In addition, variables significantly related to both TSL and school capacity building such as mentoring and teacher leadership were revealed to be insufficiently addressed in the TSL literature, and their joint investigation could provide deeper insights. Furthermore, as Berkovich [7] and Oplatka [123] pronounced earlier, TSL research lacks a theoretical connection to the prevailing theories in educational literature such as institutional, critical, agency, or systems theories. Although these theories could establish an expanded theoretical ground for the investigation and understanding of TSL, our analysis did not reveal any such theories.

As with any study, our study is not without certain limitations. For one thing, we may have missed some of the research published on TSL despite the wide coverage of journals and articles listed on Scopus, and the inclusion of a larger scope of research thanks to co-word analysis. Moreover, our study did not attempt to provide a review of prior research findings in conventional terms, but solely aimed to illustrate the intellectual development and evolution of the TSL field from 1989 to 2022 in accordance with the analysis of meta-data associated with these studies.

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