

BIBLIOMETRIC ANALYSIS OF LEADER-MEMBER EXCHANGE THEORY RELATED LITERATURE BASED ON THE SCOPUS DATABASE

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ABSTRACT

The relationship between leaders and followers is the most common in an organisation. The degree of interaction between leaders and employees, widely known as leader-member exchange (LMX), significantly impacts employees' attitudes and behaviours. Thus, through a systematic review of the literature on LMX, this study summarised the research hotspots, inconsistencies in current research, and trends for future studies. In addition to providing a reference for the development of theories, this study also helps enterprise managers better understand the positive role of LMX quality in the organisation. This study used bibliometrics to review 1,883 articles from the field of LMX based on the Scopus database. Excel and VOSviewer were used for linear regression, statistical analysis, and cluster analysis of the documents that met the requirements. Firstly, the temporal trends and sources of LMX were summarised, and it was found that publications grow exponentially. Secondly, out of 3,617 authors, 127 are core authors. Thirdly, the United States, China, Australia, the United Kingdom, and South Korea are the countries with the most study on the LMX theory. Fourthly, LMX has a wide range of applications. Finally, the clustering analysis of keywords shows five clusters.



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INTRODUCTION

Since the 1980s and 1990s, the nature of the employee-employer relationship has shifted considerably (Robinson, 1996). The relationship between leaders and followers is the most common finding in the research on leadership and organisational behaviour (Uhl-Bien *et al.*, 2022). Due to limited time and energy, Graen & Dansereau (1972) argued that it is unrealistic for leaders to communicate with diverse subordinates in the same manner, which will inevitably result in the distinction between close and distant relationships. Based on this point of view, Dansereau *et al.* (1975) started the study of the leader-member exchange (LMX) theory. Graen & Dansereau (1972) suggested that the research on leadership behaviour should focus on the relationship between leaders and followers instead of being limited to the simple exploration of leadership behaviour. In LMX theory, the leader-follower relationship is the central unit of analysis rather than the characteristics, styles, or behaviours of leaders or followers, as in other leadership theories (Martin *et al.*, 2018). In this light, leadership represents a two-way relationship between leaders and followers to achieve common goals (e.g., Graen & Uhl-Bien, 1995; Liden *et al.*, 1997).

Moreover, Byun *et al.* (2017) suggested that LMX quality is a crucial factor in predicting desired individual, team, and organisational outcomes. LMX theory emphasizes reciprocity in relationships and focuses on building trust between leaders and subordinates (McLarty *et al.*, 2021). Due to differential treatment, this idea asserts that leaders will only create high-quality relationships with a small number of followers (Martin *et al.*, 2018). This high-quality relationship is manifested by employees' high sense of responsibility, decision-making influence, and resource access (Dulebohn *et al.*, 2012). Therefore, it is argued that the quality of the relationship between leaders and followers in the exchange enhances the perceived security and increases the interest of employees in completing the job requirements (Van Den Broeck *et al.*, 2014). By developing high-quality LMX, leaders can cultivate a higher level of subordinates' performance and job satisfaction, deliver positive psychological capital, and enhance interpersonal trust culture (Byun *et al.*, 2017). In addition, the idea argues that the level of

connection evolves over a specific period of time, even if leaders may differentiate between relationships of different qualities. Through mutual understanding and experience, LMX will likewise improve in quality (Nahrgang *et al.*, 2009). Positive relationships between leaders and followers improve the likelihood that followers will tend to serve the organisation and their colleagues, and it decreases the likelihood that followers would engage in undesirable behaviour (Kaluza *et al.*, 2021; Pan *et al.*, 2021).

There have been numerous studies on LMX since 1972 (Martin *et al.*, 2018; Chang *et al.*, 2020). LMX theory has been studied for 50 years, thus it is not a new field, and it is still improving (Andersen *et al.*, 2020; Martin *et al.*, 2019). However, there is no unanimity regarding the development of LMX theory (Premru *et al.*, 2022). Some scholars believe (Dulebohn *et al.*, 2017) that trust, and respect are the basis for leaders and subordinates, so social exchange theory should be the basis for measuring the quality of the relationship. Some scholars believe that trust and respect are the basis of relationships between leaders and subordinates (Dulebohn *et al.*, 2017); therefore, social exchange theory should be used to assess the quality of the connection. Instead, other academics believe that role formation is the foundation of LMX (Sparrowe & Emery, 2015). According to Pfrombeck *et al.* (2020), LMX is a critical component influencing employee outcomes in an organisation. Thus, researchers continue to focus on LMX theory. Yet, a study of existing research finds that few studies summarise the literature on LMX theory comprehensively. Hence, the Scopus database was utilised to conduct a literature search on LMX theory. On this premise, the study utilised bibliometrics to analyse the time trend, core author groups, and hot subjects of LMX theory, as well as to examine the antecedents, consequences, and moderating effects of LMX, measurement dimensions, and future research directions.

METHODOLOGY

Search Strategy

This study conducted a systematic literature search on a single electronic database, Scopus. The keyword ‘leader-member EXCHANGE’

is used to find article titles and abstracts across 2,211 documents. The date of the last search was July 6, 2022.

Limit-to and Exclusion Criteria

This study limited and excluded 2,211 acquired documents. The document type was initially restricted to ARTICLE. Second, only the FINAL publishing stage is allowed. Although this study focuses on the evolution of LMX as a whole, additional variables such as time, language, and country are not restricted. The method of limit-to and exclusion criteria is depicted in Figure 1.

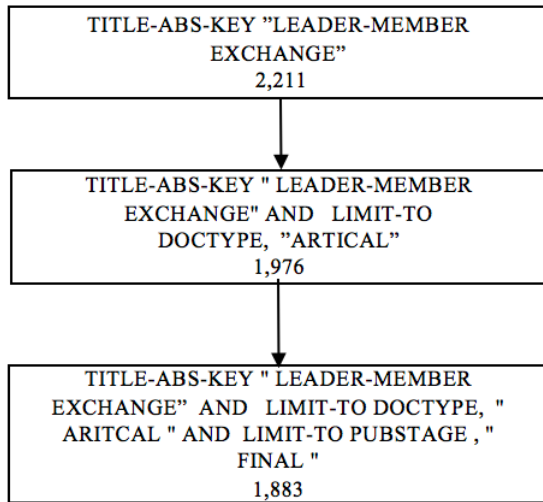


Figure 1: Flow Diagram for Systematic Literature Review Process

Analysis Method

This study exported the qualified literature information, including publication, language, journal, title, author, affiliation, keywords, literature type, abstract, and citation, in CSV format and conducted a bibliometric analysis on the data. The bibliometric technique was proposed by Chen *et al.* (2014) to compile statistics of research publications on a certain subject

using mathematical methods. This study employs Excel and VOSviewer to do linear regression, statistical, and cluster analyses on the documents that match the criteria.

FINDING

Bibliometric Analysis of Published Trend on LMX

By an overview of LMX-related literature, it can be seen that LMX theory has garnered considerable attention. The quantity of documents continued to expand each year. Since 1996, more than ten articles have been published annually. Each year since 2014, more than 100 research on LMX have been published annually. A linear regression analysis of cumulative data revealed an exponential growth tendency in published articles about LMX. The fitted equation is $y = 3.9637e^{0.1604X}$, $R^2=0.97064 > 0.8$, which indicates that the equation fits well and is consistent with the law of exponential development (see Figure 2). In addition, it implies that the LMX theory is still in its developmental stages.

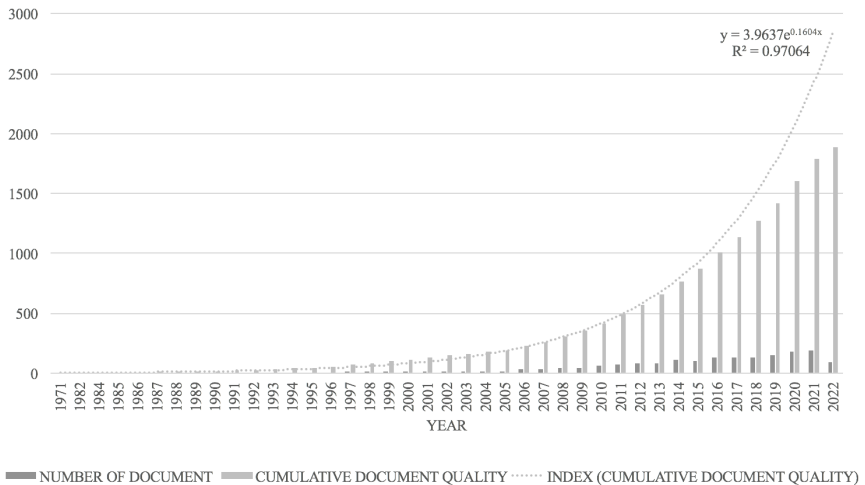


Figure 2: The Published Trend of LMX

Bibliometric Analysis of Source on LMX

There have been 1,883 papers published in 160 journals since 1971. The linear regression analysis of 160 journals revealed that each journal’s LMX-related literature was a power function (see Figure 3). In other words, the Matthew effect was apparent (Merton, 1968). The exponential curve tends to be flat when the number of documents is less than 10, as depicted in Figure 3. The primary sources were therefore journals containing more than ten articles on LMX. 32 of the 160 journals can be regarded primary sources and published a total of 338 articles (46.9%). The titles, quantity of documents, ratio of publications, and cumulative ratio of these 32 periodicals are listed in Table 1. The Leadership Quarterly has the most published articles on organisational cynicism among 25 journals, with 88 (4.7%).

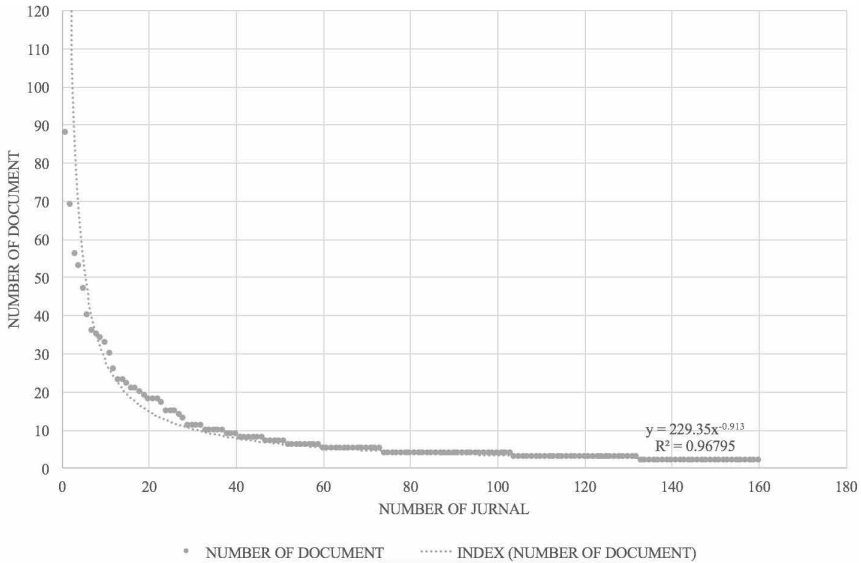


Figure 3: The Frequency Distribution of Articles Published by Sources on LMX

Table 1: Major Source of LMX

Rank	Source title	Number of documents	Ratio	Cumulative ratio
1	Leadership Quarterly	88	4.7%	4.7%
2	Journal of Applied Psychology	69	3.7%	8.3%
3	Leadership and Organization Development Journal	56	3.0%	11.3%
4	Journal of Organizational Behavior	53	2.8%	14.1%
5	Frontiers in Psychology	47	2.5%	16.6%
6	Social Behavior and Personality	40	18.7%	2.1%
7	Journal of Leadership and Organizational Studies	36	1.9%	20.7%
8	International Journal of Human Resource Management	35	1.9%	22.5%
9	Journal of Managerial Psychology	34	1.8%	24.3%
10	Journal of Occupational and Organizational Psychology	33	1.8%	26.1%
11	European Journal of Work and Organizational Psychology	30	1.6%	27.7%
12	Personnel Review	26	1.4%	29.0%
13	Journal of Management	23	1.2%	30.3%
14	Personnel Psychology	23	1.2%	31.5%
15	Journal of Business Ethics	22	1.2%	32.7%
16	Group and Organization Management	21	1.1%	33.8%
17	Journal of Business Research	21	1.1%	34.9%
18	Sustainability Switzerland	20	1.1%	36.0%
19	Academy of Management Journal	19	1.0%	37.0%
20	Human Relations	18	1.0%	37.9%
21	Journal of Business and Psychology	18	1.0%	38.9%
22	Organizational Behavior and Human Decision Processes	18	1.0%	39.8%
23	International Journal of Environmental Research and Public Health	17	0.9%	40.7%
24	Asia Pacific Journal of Management	15	0.8%	41.5%

25	International Journal of Hospitality Management	15	0.8%	42.3%
26	Journal of Applied Social Psychology	15	0.8%	43.1%
27	International Journal of Contemporary Hospitality Management	14	0.7%	43.9%
28	Journal of Management and Organization	13	0.7%	44.6%
29	Human Resource Management	11	0.6%	45.1%
30	Journal of Social Psychology	11	0.6%	45.7%
31	Journal of Vocational Behavior	11	0.6%	46.3%
32	Psychological Reports	11	0.6%	46.9%

Bibliometric Analysis of The Co-authorship on LMX

A total of 3,671 authors participated in LMX-related studies and published articles. Core authors are scholars who publish multiple publications in an area and make significant contributions to discipline study (Zhong, 2012). Price (1976) proposed Price’s Law and argued that the core author should be the group that wrote half of the articles in the field, and the number should be the square of the total number of authors. In other words, the least productive of outstanding authors published 0.749 times the square root of the number of articles published by the most productive author ($m=0.749\sqrt{n_{max}}$), in the formula, n_{max} is the number of articles published by the most scholars, and m is the minimum number of articles published by core authors). Therefore, we consider core authors as those who have published more than four articles in the field of LMX. Out of 3,617 authors, 127 are core authors. Among them, Liden from the University of Illinois at Chicago, has published 30 papers. Liden & Maslyn (1998) explained LMX from the perspective of social exchange theory and measured it from four dimensions. Figure 4 showed the co-authorship map of authors, which refers to the authors that cooperate in the study of LMX.

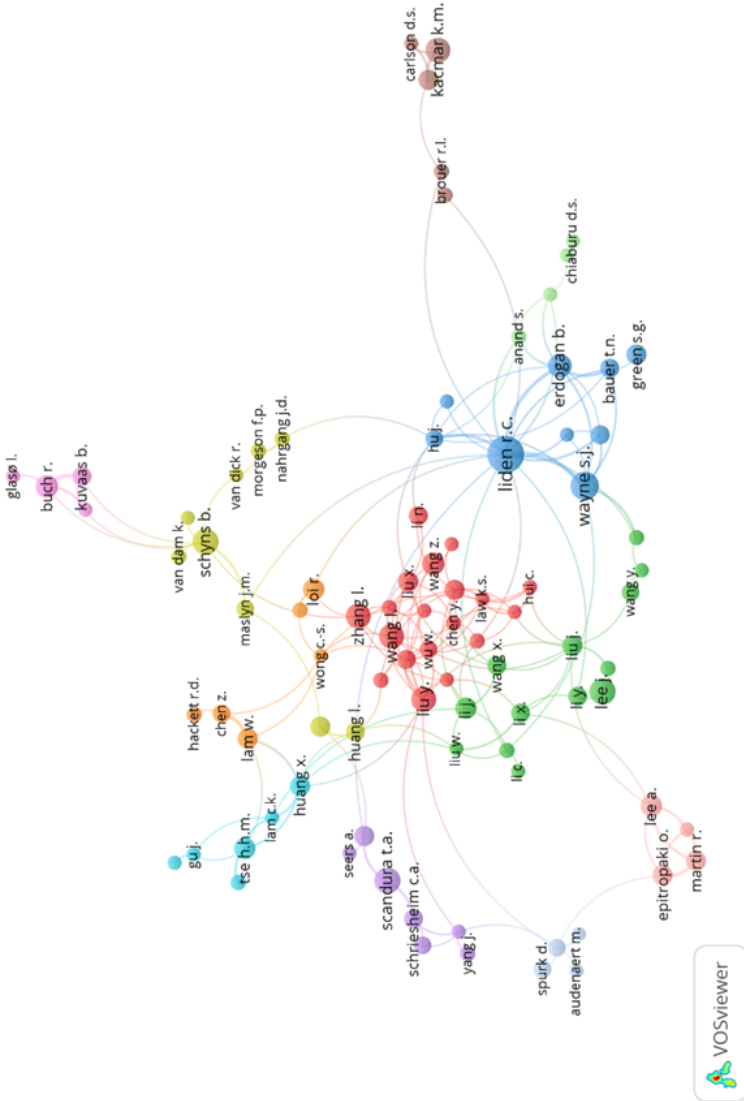


Figure 4: Co-authorship Map of A: Authors, B: Organisational, C: Countries

Note: The size of the circles represents the frequency of appearance as the keywords. The distance between the two circles indicates their correlation. Different colours indicate different clusters. The thickness of the line indicates the strength of the link

A literature search revealed that 3,874 institutions had published papers, ten of which had published articles in more than six journals. Michigan State University has nine articles that have been cited 1,472 times. Figure 5 showed the co-authorship map of organisations. In addition, Figure 6 showed cooperation in each country, with seven clusters. The United States, China, Australia, and the United Kingdom are among the clusters with the maximal number of documents.



Figure 5: Co-authorship Map of Organisational

Note: The size of the circles represents the frequency of appearance as the keywords. The distance between the two circles indicates their correlation. Different colours indicate different clusters. The thickness of the line indicates the strength of the link.

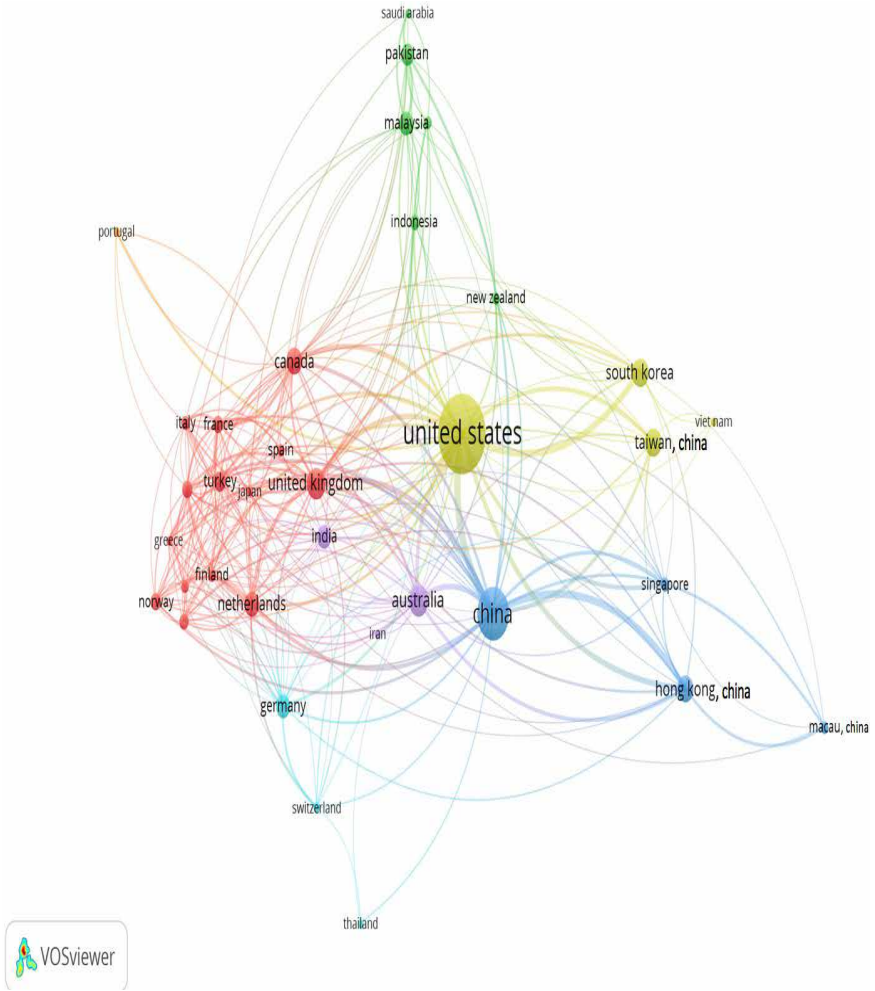


Figure 6: Co-authorship Map of Countries

Note: The size of the circles represents the frequency of appearance as the keywords. The distance between the two circles indicates their correlation. Different colours indicate different clusters. The thickness of the line indicates the strength of the link.

Bibliometric Analysis of Citations

Table 2 displays the countries and organisations with the most prolific authors. According to these, it is discovered that Linden R.C. has the most

publications, having written 30 articles and receiving 10,475 citations while making a substantial contribution to the growth of LMX theory. In addition, the United States, China, Australia, South Korea, and the United Kingdom have contributed significantly to the development of LMX theory. The majority of organisations that have investigated the LMX field are from the United States (see Table 2). Notably, academics from the Renmin University of China also contributed significantly to the LMX hypothesis. The Renmin University of China has eight articles, second only to Michigan State University. In addition, Table 2 displays the most frequently mentioned writers.

Table 3 shows the top ten cited articles in the field of LMX. Graen and Uhl-Bien (1995) used a levels perspective to identify the developmental stages of the leader-member exchange theory and summarised the LMX literature at each phase. The most cited article is by Graen and Uhl-Bien (1995). In addition, review articles are typically cited more frequently in the field of LMX.

Table 2: Top 5 Most active Authors, Countries, and Organisations and Top 5 Most Cited Authors in Field of LMX

Subject	Number of Documents	Citations	Average
Authors			
Linden R.C.	30	10,475	349.2
Wayne S.J.	18	7,098	394.3
Brunetto Y.	18	339	18.8
Scandura T.A.	16	2,332	145.8
Schyns B.	16	807	50.4
Linden R.C.	30	10,475	349.2
Wayne S.J.	18	7,098	394.3
Graen G.B.	9	6,091	676.8
Uhl-bien M.	9	4,147	460.8
Shore L.M.	6	3,131	521.8
Countries			
United States	740	55,482	75.0
China	324	7,247	22.4
Australia	120	4,352	36.3

United Kingdom	111	4,236	38.2
South Korea	100	1,394	13.9
Organisations			
Michigan State University	9	1,472	163.6
Renmin University of China	8	69	8.6
Arizona State University	8	1,026	128.3
University of Notre Dame	8	532	66.5
University of Alabama	7	868	124.0
University of Illinois at Chicago	7	1,165	166.4

Table 3: Top 10 Most Cited Article in Field of LMX

Rank	Title	Author (Years)	Citations
1	Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective	Graen & Uhl-Bien (1995)	3,582
2	Perceived organizational support and leader-member exchange: A social exchange perspective	Wayne <i>et al.</i> (1997)	1,980
3	Meta-analytic review of leader-member exchange theory: Correlates and construct issues	Gerstner & Day (1997)	1,637
4	Social exchange in organisations: Perceived organisational support, leader-member exchange, and employee reciprocity	Settoon <i>et al.</i> (1996)	1,150
5	Multidimensionality of leader-member exchange: An empirical assessment through scale development	Liden & Maslyn (1998)	1,015
6	An examination of leadership and employee creativity: The relevance of traits and relationships	Tierney <i>et al.</i> (1999)	969
7	A meta-analysis of antecedents and consequences of leader-member exchange: Integrating the past with an eye toward the future	Dulebohn <i>et al.</i> (2012)	854

8	Employees' goal orientations, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction	Janssen & Van Yperen (2004)	810
9	An examination of the mediating role of psychological empowerment on the relations between the job, interpersonal relationships, and work outcomes	Liden <i>et al.</i> (2000)	781
10	Servant leadership: Development of a multidimensional measure and multi-level assessment.	Liden <i>et al.</i> (2008)	744

Bibliometric Analysis of Subject Area

Figure 7 shows the subject areas covered by LMX. It can be found that LMX theory was applied in a wide range of fields. The main subject areas involved business, management and accounting, psychology, and the social sciences.

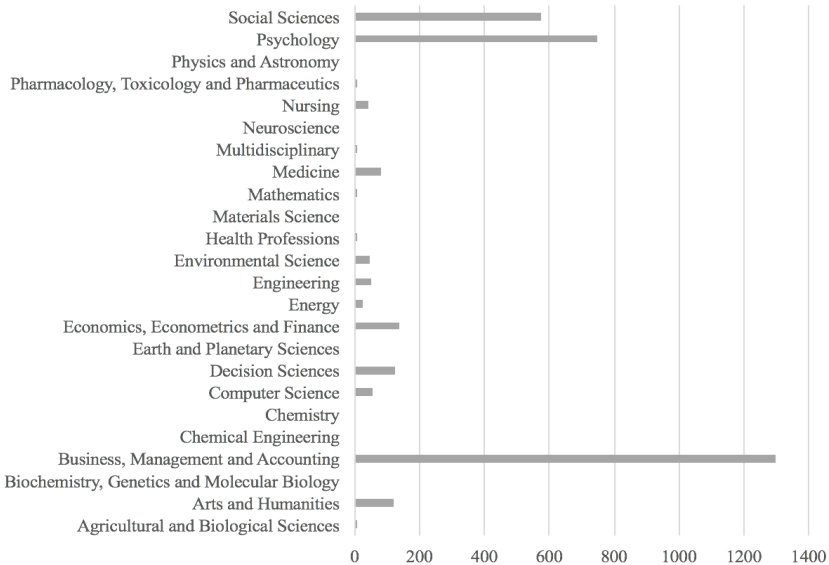


Figure 7: Subject Area of LMX

Bibliometric Analysis of Popular Theme

This study established a minimum number of ten occurrences of a keyword, and 167 of the 4133 keywords met the requirement. Cluster analysis reveals that LMX-related studies can be categorised into five areas (as shown in Figure 8). The red cluster represented organisational behaviour variables and theories associated with LMX and leadership (e.g., job satisfaction, transformational leadership, social exchange theory, etc.). The green cluster revealed research methods and objects (e.g., male, female, adult, questionnaire, survey, etc.). The Blue cluster meant variables related to interpersonal relationship (e.g., human, human reactions, relationships, etc.). Yellow cluster refers to communication and attitude within the workplace or organisation. The purple cluster showed motivation and the resulting social behaviour. Figure 9 show the network map of the trend topics according to the keywords used Since 1971. Indicator shows the current publications from purple to yellow. More studies focused on creativity, innovation, psychology, and engagement have been published recently.

Second, LMX emphasizes the connection between leaders and followers, which enables LMX to provide a relevant explanation of the relationship between leadership precursors and outcomes. With these advantages, LMX research has grown in recent decades (see Figure 2). Based on role-playing theory, Graen & Dansereau (1972) established the theoretical framework of LMX. Since then, LMX theory has attracted the interest of scholars (see Figure 2) and has become the cutting edge of leadership theory research. Due to the differential treatment of leaders, Graen & Dansereau (1972) proposed that in-group members and out-group members were differentiated, with in-group members being the priority and trusted objects of leaders. Members of the in-group may enjoy additional benefits, such as positions with greater flexibility and autonomy, advancement, and a better reward. Graen & Uhl-Bien (1995) described in detail the evolution of LMX from the 'in-group/out-group' concept to a more specific and applicable model. There were disputes regarding the LMX theory's breadth of application. Graen & Dansereau (1972) represent the view that LMX should be restricted to the workplace. However, Liden & Maslyn (1998) explained LMX from the standpoint of social exchange and stated that it should encompass both labour and social exchange. Contemporary researchers examine employment relations in organisations mostly through the lens of social exchange theory (e.g., Amoah *et al.*, 2021; Pfrombeck *et al.*, 2020; Song *et al.*, 2022). Hence, LMX theory encompasses a vast array of studies (see Figure 7).

The measurement dimension of LMX has always been controversial. Graen & Uhl-Bien (1995) believed that LMX quality only reflected the quality of the working relationship between leaders and subordinates in the workplace. On the contrary, since the relationship between leader and followers is hard to limit in a work situation, Dienesch and Liden (1986) proposed the three-dimensional model of LMX, including affect, contribution, and loyalty. Soon afterwards, Liden & Maslyn (1998) retrieved a fourth dimension (professional respect) from the three-dimensional model shortly thereafter. Following Dansereau *et al.* (1975) introduced the 2-item scale, scholars with a one-dimensional perspective produced a succession of scales (e.g., Graen & Schiemann, 1978; Graen *et al.*, 1982; Wakabayashi *et al.*, 1990). The 7-item scale created by Seers and Graen (1984) and modified by Graen & Uhlbien (1995) (see Table 3) has been widely adopted by researchers (e.g., Pfrombeck *et al.*, 2020; Restubog *et al.*, 2010; Zia *et al.*, 2022). The 7-item scale created by Seers & Graen (1984)

and modified by Graen & Uhlbien (1995) (see Table 3) has been widely adopted by researchers (e.g., Restubog *et al.*, 2010; Pfrombeck *et al.*, 2020; Zia *et al.*, 2022). Using meta-analysis, Gerstner & Day (1997) proposed that the 7-item LMX scale showed excellent reliability. Researchers with a multidimensional perspective utilise the 12-item scale created by Liden & Maslyn (1998) (see Table 3). (e.g., Fousiani & Wisse, 2022). Since LMX has gained an increasing amount of research interest, the area has also been criticised for the mismatch between theory and LMX measuring techniques (Andersen *et al.*, 2020). Nonetheless, such criticism presents an opportunity for future growth.

Most empirical studies on LMX focus on antecedents and consequences. Liden *et al.* (1997) summarised the antecedents and consequences of LMX by reviewing previous literature. Dulebohn *et al.* (2012) developed a theoretical framework for the antecedents and consequences of LMX. According to this theoretical framework, Dulebohn *et al.* (2012) divided the antecedent of LMX into three aspects: follower characteristics (e.g., competence, agreeableness, conscientiousness, extraversion, neuroticism, openness, etc.), leader characteristics (e.g., supervisor's expectations of followers, contingent reward behaviour, transformational leadership, etc.), and interpersonal relationships (perceived similarity, affect, ingratiation, etc.). In addition, combine the bibliometric analysis of the keywords (see Figure 8) and a review of previous literature. This study divided the consequences of LMX into three categories: organisational level (e.g., overall organisational commitment, organisational justice, team conflict, etc.), employee attitude (e.g., employee satisfaction, turnover intention, etc.), and employee behaviour and outcome (e.g., organisational citizenship behaviour, innovation, job performance, etc.). In addition, LMX has been a moderator to explain internal mechanisms in organisations (e.g., psychological contract breach (PCB) - outcome). However, there have been two conflicting views in the previous literature (Doden *et al.* 2018). Some scholars believe that when employees have a negative perception of the organisation (e.g., PCB), high LMX quality will intensify the passive reaction of employees (e.g., Bal *et al.*, 2010; Restubog *et al.*, 2010; Suazo, 2011). On the other hand, other scholars believe that high LMX quality can provide support and resources for employees and help them better deal with negative perceptions of the organisation (e.g., Dulac *et al.*, 2008; Griep *et al.*, 2016). As current studies on LMX theory adopt cross-sectional studies

(see Figure 8), there is still a lack of exploration of the internal causal relationship of LMX. As mentioned before, LMX is a theory about the binary relationship between leaders and followers (Graen & Uhl-Bien, 1995). Therefore, this study suggests that social network analysis should be used for LMX development since social network analysis is a powerful method for exploring duality (Carter *et al.*, 2015). As scholars like Sheer (Sheer, 2015) have criticised, research on LMX should focus on the actual relationship between leaders and followers, rather than being limited to features, behaviours, and outcomes. The use of social networking may be a viable approach (Premru *et al.*, 2022).

Based on bibliometric analysis of popular themes (see Figure 8) and literature reviews, this study summarises two primary areas of LMX theory research. That is the practise of LMX theory in the employment relationship and the research on the derivative concepts of LMX theory (such as relative LMX, LMX differentiation, LMX social comparison, etc.). ‘National prosperity is created, not inherited’ (Porter, 1990). These few simple words aptly convey the necessity of creativity for enterprise competitiveness (Tierney *et al.*, 1999). In this era of global competition, innovation is necessary for enterprises to survive (Winarno *et al.*, 2022). In particular, it is essential to determine the role of creativity in leadership (Tierney *et al.*, 1999). In recent years, the psychology of employees (e.g., psychological capital, psychological well-being, etc.) has gradually become the focus of attention in organisations. Liao *et al.* (2016) discussed the role of LMX on psychological capital. Loon *et al.* (2019) suggested that employee psychological well-being plays a considerable role in human resource management practise. Therefore, future research can continue to enrich the theory of LMX and use LMX as a crucial variable in the study of the employment relationship in organisations, expanding the scope of the theory’s application. For instance, in recent years, innovation, employee creation, psychology, etc. (see Figure 8) have become hot topics related to LMX theory. In addition, with the enrichment and deepening of organisational management research, more scholars have put forward new derivative concepts combining different theories or situations, considering the differences of LMX in different environments. For instance, Martin *et al.* (2018) found that LMX differentiation is currently a primary focus of LMX research, and that the number of studies devoted to this topic is growing rapidly. Future research might examine the concept of LMX derivatives

from three angles: properties, measurement and analysis techniques, and applications.

LIMITATION

In this study, a comprehensive search of the Scopus database for LMX-related articles was conducted in order to assess the data objectively and thoroughly. Yet, the study had certain unavoidable limitations. Even though there are a number of new LMX studies published every day, only a select few of them can be found in the Scopus database. Thus, some outstanding articles may be omitted. In the future, the researcher may utilise enormous databases such as SCI, SSCI, or another large database. In addition, some non-English speaking nations have also made significant contributions to the development of LMX theory (see Table 2). Due to language limitations, however, investigations of LMX theory conducted in contexts other than English may not be included in the study. Thus, this constraint of the English language could be addressed with additional research addressing complete findings.

CONCLUSION

Considering the growing number of studies on LMX, it is vital to do a systematic review of the past research. On the basis of bibliometric analysis, this study examines the pertinent literature on LMX. The measurements and dimensions of LMX have not led to a uniform conclusion. However, the impact of LMX as a moderating component remains debatable. Finally, it is recommended that future study 1) further investigate the measurement dimension of LMX; 2) continue to broaden the application of LMX theory to other fields; and 3) create the derivative notion of LMX from its attributes, measurement and analytic methods, and applications.

DECLARATION OF CONFLICTING INTERESTS

The authors declare that they have no conflicting interests.

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