

# BIBLIOMETRIC ANALYSIS OF RESEARCH TRENDS ON LEAN IN VIETNAM

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## Abstract

*This paper develops a bibliometric, empirical study about Lean in Vietnam and globally to identify the state of the art and the agenda for future research in Vietnam related to Lean approach. The results show that there is still room for improvement regarding Lean leadership, Lean innovation, and Lean in the supply chain.*

**Keywords:** Bibliometric; Business management; Lean management; Vietnam.

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# PHÂN TÍCH ĐỊNH LƯỢNG ẢN PHẨM KHOA HỌC XU HƯỚNG NGHIÊN CỨU TRONG NGHIÊN CỨU LEAN TẠI VIỆT NAM

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## Tóm tắt

*Bài viết phát triển nghiên cứu thực nghiệm định lượng ẩn phẩm khoa học về quản trị tinh gọn (Lean) ở Việt Nam và trên thế giới nhằm xác định tình trạng hiện tại và hướng nghiên cứu trong tương lai trong bối cảnh Việt Nam về Lean. Kết quả cho thấy vẫn còn khoảng trống nghiên cứu liên quan đến lãnh đạo tinh gọn, đổi mới tinh gọn và tinh gọn trong chuỗi cung ứng.*

**Từ khóa:** Định lượng ẩn phẩm khoa học; Quản trị kinh doanh; Quản trị tinh gọn; Việt Nam.

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## 1. INTRODUCTION

After over 30 years of renovation since 1986, Vietnam has made great achievements. From a poor country, heavily devastated by the war, with a closed and subsidized centralized planning scheme, Vietnam has moved out of underdevelopment, becoming a middle-income developing country, with a dynamic market economy, and a strong and deep integration into the global economic system. With the advantages of a politically stable government, abundant young human resources, and cheap labor costs, Vietnam is a place many multinational companies of the world to look for outsourcing production. Many organizations are investing in the construction of manufacturing plants, and well-known multinational service-oriented business corporations have been investing in Vietnam. Numerous new technologies and advanced scientific and technical achievements have been put into practice in Vietnam. Running a profitable business must either increase prices or reduce prices. Increasing prices risks losing customers while reducing prices can increase a market share compared to rivals. Based on this principle, to reduce manufacturing costs, many Vietnamese companies adopt Lean management strategies and consequently build Lean business processes to cut costs; nevertheless, some companies fail to achieve the desired results in their work with Lean.

We might expect the same results to be the case in other countries. However, we should not trust all studies because research varies from country to country; it is necessary to authenticate traditional research through various experiments and observations. This paper will present a literature review on Lean management implementation in Vietnam in an attempt to better understand what has been researched, what are the main trends, and what are the opportunities for future research.

## 2. LITERATURE REVIEW

A common definition of Lean has been lacking (Francis, Fisher, & Thomas, 2015). The definition of Lean is deficient and the interpretation of the Lean paradigm in both academic and industry literature requires a clarification of its origins and applications (Piercy & Rich, 2009). The Lean concept originated from thinking about waste reduction. The “main objective for Lean is to eliminate waste” (Lewis, cited in Bhasin, 2015, p. 12). Many definitions of Lean have existed since its inception, with the hard and fast version being Womack and Jones’s “doing more and more with less and less,” which as Bicheno and Holweg (2016) explain also relates to the concept of productivity (outputs/-inputs). Nevertheless, Lean does not simply mean waste reduction. That is because the Toyota system seems to “add waste rather than eliminate it” (Liker, 2003). Lean is not always thought of as minimizing waste but as maximizing value and about getting the right things to the right place at the right time and in the right quantity (Browning, 2000). The important point is understanding that Lean is value-adding (Ton & Jones, 2020). The purpose of Ohno’s nonvalue added journey through the Toyota shop floor was to recognize which activities add value to raw materials and which ones do not. He observed the process and information flow and mapped the value stream of raw materials moving to a finished product that the customer was willing to pay for (Liker, 2003). In Lean, all value is defined from the heart of the customer: Does something add value for the

customer or not. To be genuine Lean all elements within a robust supply chain are linked to ensure the flow of value.

The majority of studies were carried out on the manufacture of motor vehicles worldwide, which can be explained by the close relationship that exists between that industrial sector and the origins of Lean management (LM) in the Toyota Production System (Liker, 2003; Womack, Jones, & Roos, 1990, p. 12). Since the 1990s, production designs based on what is known as Lean manufacturing became a “must” for western automobile manufacturers to enhance competitiveness through efficient processes, waste minimization, and improvements in flexibility (Henoa, Sarache, & Gómez, 2019; Sahoo, 2020).

Publications on the topic of Lean by various researchers are continuously increasing (Jasti & Kodali, 2014). As shown in that review, a problem for years has been that conceptual and theoretical papers dominated by more than double articles taking an empirical approach. As for observational studies, the majority of articles discussing Lean have addressed issues in the manufacturing setting (Danese, Manfè, & Romano, 2017; Jasti & Kodali, 2014). This focus indicates that the attempt to understand the success of LM principles in organizations has led to the growth of research about Lean implementation in production industries. As regards the research contexts investigated in the recent Lean literature, Danese et al. (2017) suggest conducting Lean research on the following macro clusters: (1) conceptualizing and demystifying Lean, (2) exploring perspective on Lean implementation, (3) exploring the relationship between Lean and other governing bodies, and (4) discovering the effects of Lean management. The vast majority of reported studies belong to the second content cluster, where various research studies describe Lean implementation in a single firm. Psomas and Antony (2019) point out that many researchers are carrying out research in the country where they hold authorization whereas LM concerns the country in which the company operates. It is readily apparent from the above that research should be concerned with empirical studies rather than the theoretical framework of Lean.

Problems with the Lean implementation process in other sectors may slightly differ from production environments (Jadhav, Mantha, & Rane, 2014; Sahoo, 2020). Besides, the issues may vary from country to country, and management challenges for organizations working in countries could be different as it is hard to transport and implant one culture into another (Gelmez, Özceylan, Mete, & Durmuşoğlu, 2020; Jadhav et al., 2014). When researchers look at the bigger picture, however, it appears far darker. Despite the experience of learning and applying Lean, most companies that apply Lean fail: only 10% of which are successful (Zhang, Narkhede, & Chaple, 2017). In the context of the Vietnamese experience, that of a developing country where LM has been introduced, a limited number of Lean studies in Vietnam have been conducted, around less than 1%. As the main aim of this contribution, the author would like to examine the knowledge structure and development of research fields to highlight the themes covered in the past and to point out gaps in existing research, and thus give guidance for future research on a potential scenario in Vietnam.

The bibliometric method is a way to build science mapping. Bibliometric analysis is a statistical method to analyze current trends in the literature on a particular issue and

to determine the structure and evolution of the field of research via bibliographic features of literature (Cobo, Lopez-Herrera, Herrera-Viedma, & Herrera, 2011; Muhuri, Shukla, & Abraham, 2019; Suebsombut, Sekhari, Sureepong, Ueasangkomsate, & Bouras, 2017). Bibliometric methods provide a broad outline and an overall structure of the research area due to their strong coverage of predominantly journal articles. Because of these advantages, it is valuable to make a systematic and intuitive analysis of the journal articles based on bibliometric approaches and visual analytic tools. Drawing from the above explanations and following the applications of the concepts in the literature, we present our research design in the next section.

### 3. RESEARCH METHODOLOGY

To achieve the aim of the present study, the article uses bibliometric analysis. The method is considered a visual quantitative analysis tool to explore the relationships between scientific articles. A mapping analysis was performed with the VOSviewer and ScienceScape software applications to analyze and visualize the relationships among the authors, countries, journals, co-citations, and terms.

- Stage 1: Collecting data

The main task of this stage includes developing a protocol for observations or measurements. The methodology of this paper is based on an analysis of secondary data sources. A lot of material needed to be gathered. However, accurate and fake information, trusted and unreliable statistics, and useful and unusable instructions are mixed in much of the data. Therefore, in this stage, we set out the following search standards (Table 1):

**Table 1. Selection criteria set the boundaries for the systematic review**

Inclusion criteria	Exclusion criteria
All data from Scopus and Web of Science from 1 <sup>st</sup> January 2020 to 25 <sup>th</sup> July 2020	Any publication after 25 <sup>th</sup> July 2020 or before 1 <sup>st</sup> January 2010
Peer-reviewed articles	Book chapters or articles from a conference proceeding
English articles	Articles written in other languages

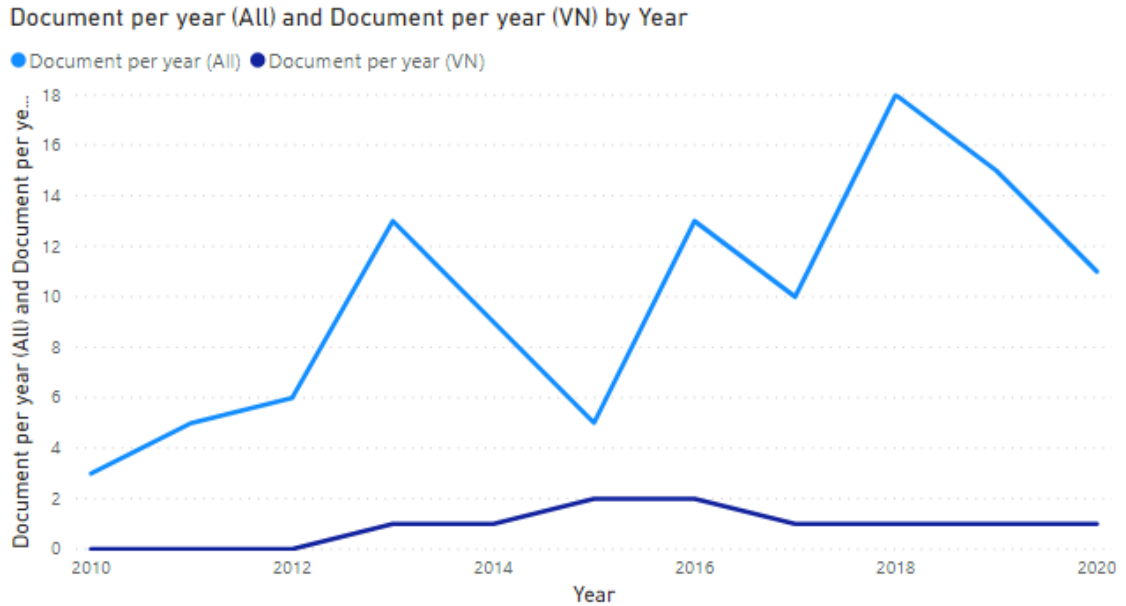
Notes: Search term: TITLE-ABS-KEY (Lean and Vietnam).

- Stage 2: Observations and analysis of documents

From Figure 1, the exponential growth of research has increased interest in the LM topic. We found a significant number of articles in the Scopus database (n=32) that have published on the topic of Lean in Vietnam; however, only 9 out of 32 (28 percent) discuss LM, most use the word “Lean” in the field of health sciences. Globally, 108 empirical research articles were found after selecting Lean management in the Scopus database and Web of Science. The Web of Science data yielded five results, but after filtering out duplicate and inconsistent results, we got only one article. As observed, there was no spike for a specific journal. LM is discussed in many articles published in high-

quality scientific journals such as the International Journal of Education and Practice, and Economics and Sociology (Table 2).

**Figure 1. Lean documents published in Vietnam and the world**



Source: From the Scopus database and Web of Science.

**Table 2. List of journals that published with Lean articles**

Source	Journals	No. of articles
Scopus	International Journal of Education and Practice	1
	Management and Production Engineering Review	1
	Economics and Sociology	1
	International Journal for Quality Research	1
	Procedia CIRP	1
	KSCE Journal of Civil Engineering	2
	Sustainability	1
	Engineering, Construction and Architectural Management	1
Web of Science	Journal of Marine Science and Technology-Taiwan	1
TOTAL =		10

Table 3 indicates the frequency distribution of articles for two research methodologies. Out of ten articles, nine were empirical and one was conceptual in methodology. Most directly involved research on Lean production and Lean education. Very few Vietnamese articles are in the database as researchers have not started to concentrate on these fields in the context of Vietnam. Surprisingly, it is also evident that studies of Lean construction projects have predominant signs of concern.

**Table 3. Frequency of research topics in Vietnam by research methodology**

Research topic	Research methodology		Distribution (%)
	Conceptual	Empirical	%
Lean production		5	50
Lean higher education	1		10
Lean project		4	40

Notes: We replicate Stage 1 with the keyword “Vietnam” removed to get a global overview.

#### 4. RESULTS AND DISCUSSION

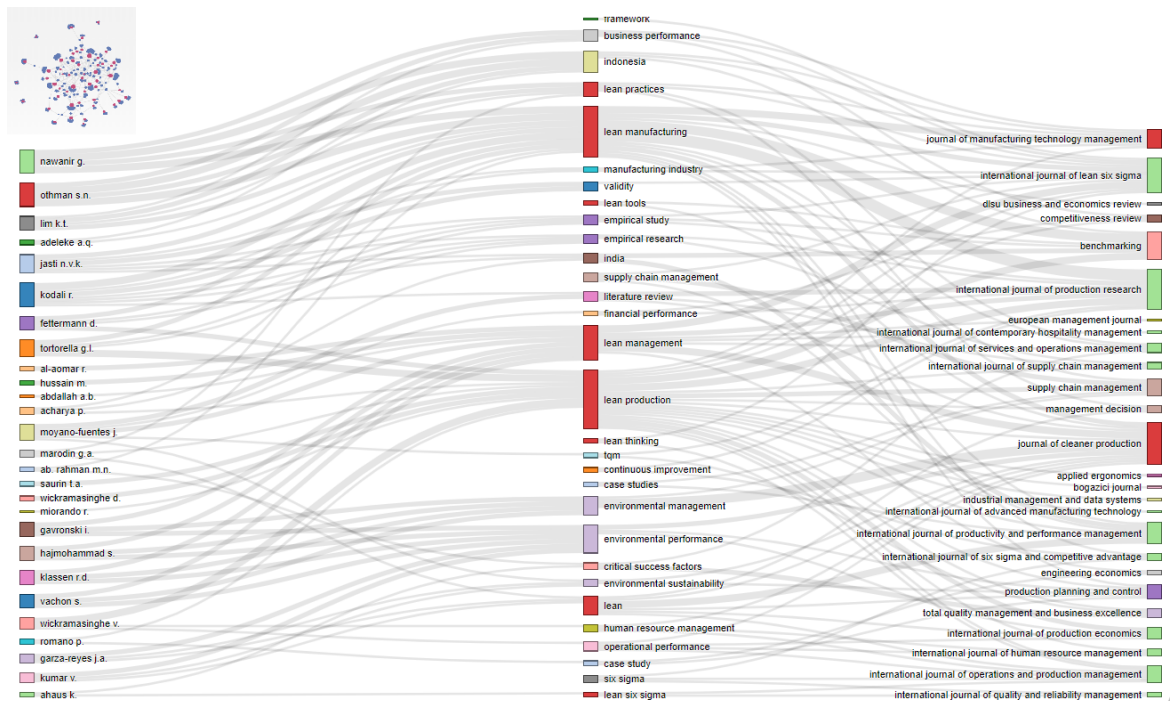
For this bibliometric analysis of Lean in the international context, the search encompassed 108 scientific documents during the study period. Using ScienceScape software, we obtained an overview of empirical studies of Lean globally (Figure 3). Although the results of the keyword analysis show that the research studies have occurred in Indonesia, India, and China, the results of the data analysis from the Scopus database generally show that the research is much studied (in descending order) in the UK, India, the USA, and Brazil. Lean management research is mainly focused on the production field; about 37.7% of the studies were published in business and management. Overall, the research covers a wide range of categories, such as production, supply chain management, human resources, and a few studies on Lean tourism, Lean accounting, Lean Six Sigma, customer value, Leanness metric, Lean innovation, Lean leadership, and sustainability in Lean (Figure 2).

Figure 3, a graphic from the VOSViewer analysis, shows overseas studies that have discussed Lean production and agile manufacturing. Of these, environmental issues are discussed more in Lean supply chain studies. Critical success factors for implementing Lean are studied in the three areas of Lean Six Sigma, supply chains, and manufacturing. Based on the size of the circle and the distance of the keywords, the colors give us the following interesting findings. Initially, not much research was conducted on Lean within the educational sector. What exists is related to continuous improvement and Six Sigma to improve academic and administrative operations across the institution. The method is also known as Structural Equation Modeling, which is a common multivariate analysis technique because of its ability to impute relationships between unobserved constructs; however, it is not available in the field of environmental management. Furthermore, waste reduction has always been studied in association with Lean, a lesser-known aspect of waste reduction that is associated with contributing to sustainable environmental development. Lastly, innovation is understood in Lean product development through the design of experiments, surveys, and case study methods.

For Lean studies in Vietnam, business or management studies account for 40% of the research publications, followed by engineering which accounts for approximately 30%, and the rest are published by other disciplines. These articles are published by authors working at institutions such as Hanoi National University, Hanoi University of Technology, HCMC University of Technology, etc. Some authors are working or

studying abroad in places such as National Taiwan University or Ruentex Group in Taipei (P. R. C.). In comparison with the topics that have been studied and discussed in Table 4, part (a), we realize that there are still many gaps that need to be filled, as shown in Table 4 (b).

- Lean paradigms may boost a supply chain to the next level of performance; however, the effect of Lean on a supply chain in the context of Vietnam has not been investigated.
- Consideration should be taken of the empirical evidence that a combination of Lean and agile (leagile) has made businesses competitive and more profitable.
- Various Lean tools are used based on the needs of industry; therefore, we need to explore and prioritize Lean techniques and explore the effective supply chain with Lean thinking techniques.
- Lean leadership is of critical importance for the successful implementation and the need to discover leadership behaviors during Lean implementation in different sectors.
- Research insights into Lean innovation management are necessary to investigate a Lean innovation model for transforming an organization into one that can drive innovation and improve quality with less cost.

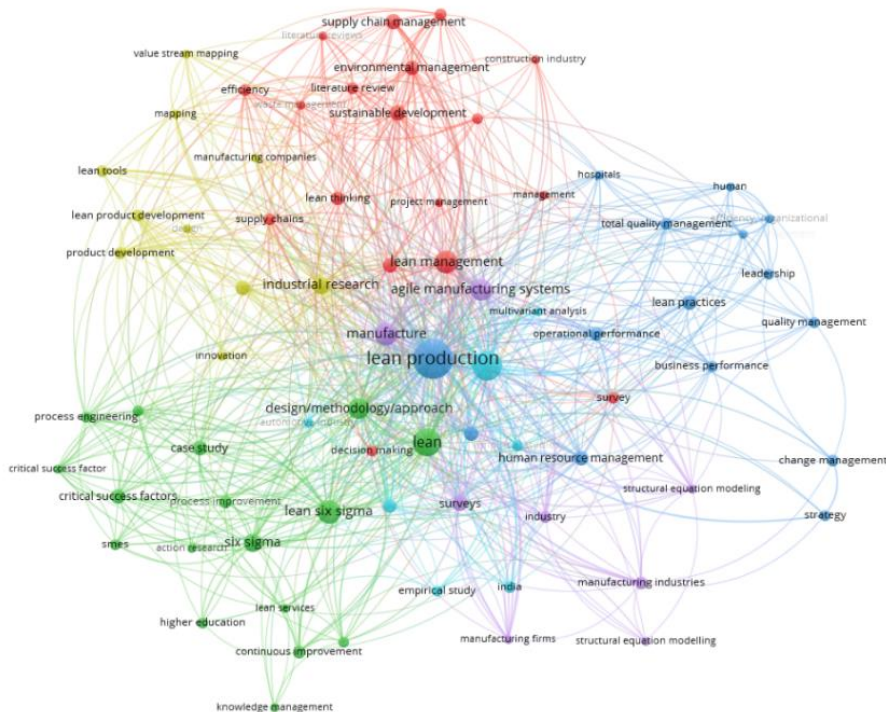


**Figure 2. Sankey diagram visualization of the main authors, keywords, journals, and their relationships**



**Table 4. Bridging the research gap in the field of Lean**

What has been done (a)	Research gap (b)
<ul style="list-style-type: none"> <li>- Lean project:</li> <li>+ Waste factors on project performance cost in Vietnam.</li> <li>+ Proposing Lean model.</li> <li>+ Development of waste occurrence level indicator.</li> <li>+ Evaluation of applying the production planning procedures and tools.</li> <li>- Lean production:</li> <li>+ Lean implementation (applying Lean tools)</li> <li>+ Factors for successful Lean.</li> <li>+ Lean management model for sustainable development.</li> <li>+ Decision-making model for justification of Lean manufacturing.</li> <li>+ Combination of TRIZ and Lean manufacturing to enhance performance.</li> <li>- Lean for education</li> <li>+ Model for teaching collaboration between universities and enterprises.</li> </ul>	<ul style="list-style-type: none"> <li>-Supply chains:</li> <li>+ Assessment of Lean supply chain on productivity and environment of Vietnam manufacturing/logistics.</li> <li>+ Lean techniques prioritization for <i>different</i> industrial sectors in Vietnam.</li> <li>+ Critical Success Factors for the effective implementation of Lean Six Sigma.</li> <li>+ Leagile assessment.</li> <li>- Leadership behaviors during Lean implementation in different sectors (manufacturing and service).</li> <li>- Lean innovation model.</li> </ul>



**Figure 3. Keyword map of publication**

## 5. CONCLUSION AND FUTURE WORK

This research has provided a bibliometric analysis of the scholarly literature on Lean. The contribution of this work is the formation of a knowledge repository to support Lean. The outcome of the present research represents a useful means of performing future diagnostics of Lean research capacity for Vietnamese conditions. Data obtained from this study represent global research trends, and the current study can also help scientists locate a research gap (a lack of empirical studies involving Vietnam) by offering comprehensive analyses and structured information on this topic. The limitation of this study is the lack of evaluation of domestic scientific articles as well as those written in languages other than English. Further studies could replicate the same methodology on a much larger dataset, and any such further study should be considered.

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