

Industrial relations: Bibliometric analysis approach

Ida Farida*

Management Department, Malang State University, Indonesia

ABSTRACT

Industrial relations are an important part of business organization, providing broad social benefits. However, ethics in industrial relationships can become a problem. In Scandinavia and Switzerland, various types of business organizations, chambers of industry and commerce, chambers of commerce, and employers' associations are joined. Further research is needed due to the wide scope of the topic and lack of systematic literature review. This study aims to identify broadly the keywords of industrial relations and findings that are relevant to current conditions. This research is meant to contribute to future research. This research method uses a bibliometric analysis approach using the VOSviewer application and a search for research articles using the Publish or Perish (PoP) application from 2013-2023 with a total of 200 articles and explains in detail the 10 most cited articles. The research results are submitted in the form of co-authorship, co-occurrence, citations, and keywords related to industrial relations, namely university-industry collaboration, digitalization, industry 4.0, innovation, and others.

KEYWORDS

Industrial Relation; Business Organization; Bibliometric Analysis

Received: 9 March 2023

Accepted: 19 March 2023

Published: 21 May 2023

Introduction

In a business organization, an employer plays an important role in solving the problem in a sustainable manner (Ehnert et al., 2016). Basically, good management is an intermediary between the leadership of the organization and each manager. As a good manager, you must be required to know the policy plans, activities, work programs and business plans of an organization or company based on circumstances, expectations, desires as the target (Asyraini, 2022). The involvement between employers and workers in industrial relations provides broad social benefits (Zwickl et al., 2016). Therefore, work organization is a field that is studied academically (Richards, 2022). However, this becomes a problem if problems regarding humanity occur, for example, one of the things is ethics in an industrial relationship (Budd, 2018).

In contrast to the past 20 years, industrial relations have received greater attention due to the complexity of the relationship between workers, employers and the government regarding economic, political, social and cultural issues (Marnisah, 2019). No country can progress without a system of industrial relations. This is interrelated in the field of employment (Nasution et al., 2015). As in Scandinavia and Switzerland, various types of business organizations or associations, chambers of industry and commerce, chambers of commerce, and employers' associations are joined, this shows the existence of various involvements between business actors (Schroeder, 2013). Human resources are an important asset for the organization, because their roles and functions cannot be replaced by other resources and of course they must always be oriented towards the vision and mission of the organization. To achieve its vision and mission, human resources in an organization must have characteristics such as motivation, attitude, self-concept, knowledge and expertise (Bestri, 2022).

The current competitive conditions are increasingly competitive. This requires companies or organizations to be able to improve employee performance in achieving increased productivity in quality and quantity, so that they can compete with other companies and even be able to be above other companies. Human resources or employees play an important role in achieving goals for a company or organization (Nurhasanah, 2022). Organizational culture is also the most important support in improving employee performance, where it can be assessed if an employee when working whether they feel comfortable or not doing their job if the organizational culture created is very bad. Organizational culture has an influence on employee performance where employee performance increases if the organizational culture is well created. A high level of discipline reflects the amount of responsibility employees have for the tasks assigned (Sapitri, 2022). Even though theoretically and practically, many academics have conducted research on the topic of industrial relations, due to the wide scope of the topic and the lack of systematic literature review and bibliography that has been conducted requires further research on the topic. Reflecting on various types of research on industrial relations, this article aims to contribute by identifying industrial relations topics bibliographically using bibliometric analysis in the last 10 years from 2013-2023. It will describe as a whole the network of co-authorship, co-occurrence, and citations on industry relations and the latest developments along with their relevance to related topics.

Literature review

Definition of industrial relations

Industrial relations are defined as activities that promote harmony between workers, employers and the government so that peace in work activities (Industrial Peace) and business goes well (Marnisah, 2019). Factors that affect industrial relations are the situation within the company, in this case workers and employers, then the company's external parties, namely the government as the party that makes regulations and policies (Thaib & Nofrial, 2019). Meanwhile according to (Zulkarnaen, 2018) industrial relations are aspects that directly and indirectly concern the economy, politics, social and culture involving actors in production, namely workers and employers and the party that bridges regulations and permits, namely the government. Harmonious industrial relations can advance business enterprises and the wheels of the economy. indicators that make this happen include (a) the certainty of a company complying with laws and regulations, (b) the existence of adequate and safe facilities and infrastructure, (c) the existence of a mechanism for production organization (Thaib & Nofrial, 2019).

Industrial society is a pluralistic and developing society which contains groups of people, communities and institutions or institutions that are interconnected but have different views and attitudes. Environmental influences from each party usually shape their attitudes and actions. Industrial society has necessities of life which often become its reference in the form of wages and working time (Idris, 2018). In institutions there is the term industrial organization which is the main element in industrial society for the progress of the industrial wheel (Naqvi et al., 2016).

Methods

In this research framework, a three (3) step method is used, starting from determining the subject keywords, selecting the article database, then bibliometric analysis. The steps used in more detail will be explained as follows:

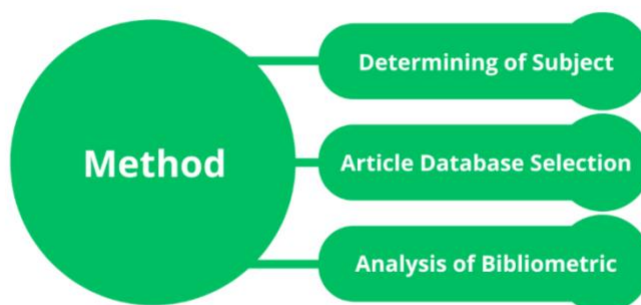


Figure 1. Research Method Model

Determining keyword subjects

A study requires a focus on research subjects by focusing on research questions and those related to them so that research objectives can be properly directed (Kotamena et al., 2020). So the researcher chose the keyword "industrial relations" which allows it to be connected with other keywords in the research that has been done. In addition to this, it intends to limit keywords to industrial relations but does not close itself to related keywords and the latest findings.

Select article data base

The database taken by the researchers was selected from the Google Scholar website with the help of the Publish or Perish (PoP) software application with a total of 200 research articles with international reputations. Typing in PoP uses the keyword "industrial relations" with the amount of research journal time from 2013-2023 which means the past 10 years. Then the downloaded results of the 200 research articles were stored in RIS format for further processing in bibliometric analysis using VOSviewer software.

Bibliometric analysis

In these 2 decades, researchers have tried to develop a variety of applications for bibliographic analysis and visualization of science (Cobo et al., 2011). Bibliometric analysis is used to explain this research in the form of practical co-authorship, co-occurrence, and citations to describe network forms that will be presented using the VOSviewer application (Sharifi, 2020). The VOSviewer complete mapping the rest can also visualize bibliographic coupling, and co-citation (Van Eck & Waltman, 2020). Then in this citation will be presented the top 10 research articles that are widely cited so that there is a continuation and development of past research (Purwanto et al., 2021).

Results

Co-Authorship

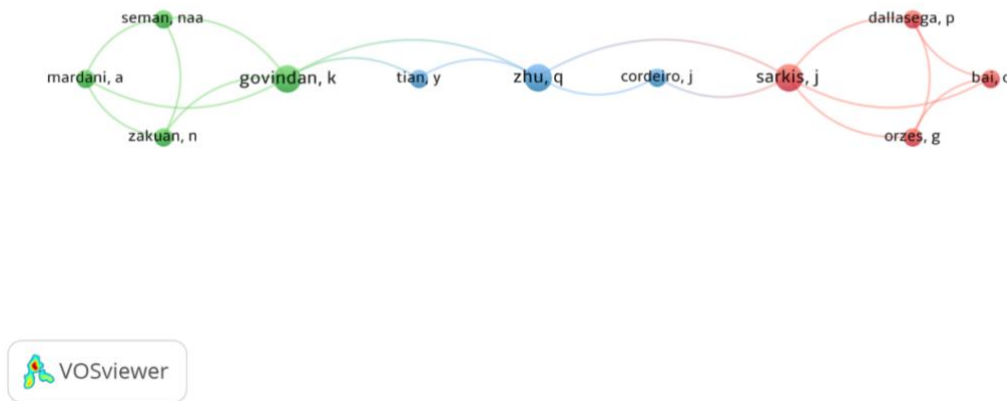


Figure 2. Network Visualization of Co-Authorship Metadata (Pairs)

Figure 2 visualizes the identified co-authorship in the form of a paired visualization network. As has been raised, there are 3 different colors indicating the existence of 3 clusters with a total of 11 items of author's names that are connected to one another. Judging from the size of the circle of each pair of authors, it shows that the number of research articles written by the names of the authors regarding industrial relations is relatively the same and not much different because the size of the circle is not too large or vice versa.

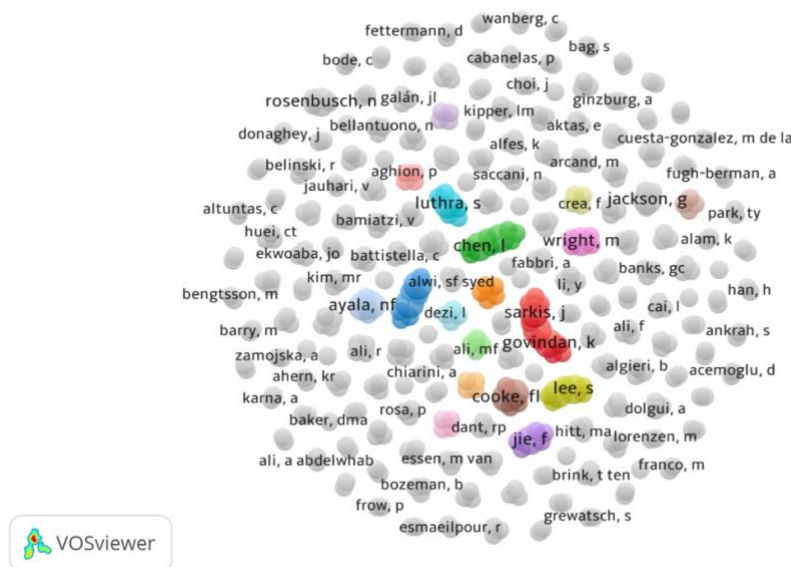


Figure 3. Network Visualization of Co-Authorship Metadata (Overall)

Figure 3 shows that many networks are disconnected from one another, even though there are lots of circles that form their own bonds. This shows that the names of the authors who researched on industrial relations that have been analyzed form their own networks and are not related to the names of other authors as before. This shows that the co-authorship here is a network visualization that includes both those who are networked and those who are not on the topic under study, namely industrial relations. This overall co-authorship explains that there are 184 clusters, 492 items, and 462 networks in it, where the most clusters have 11 items covering the names of the authors.

Co-Occurrence

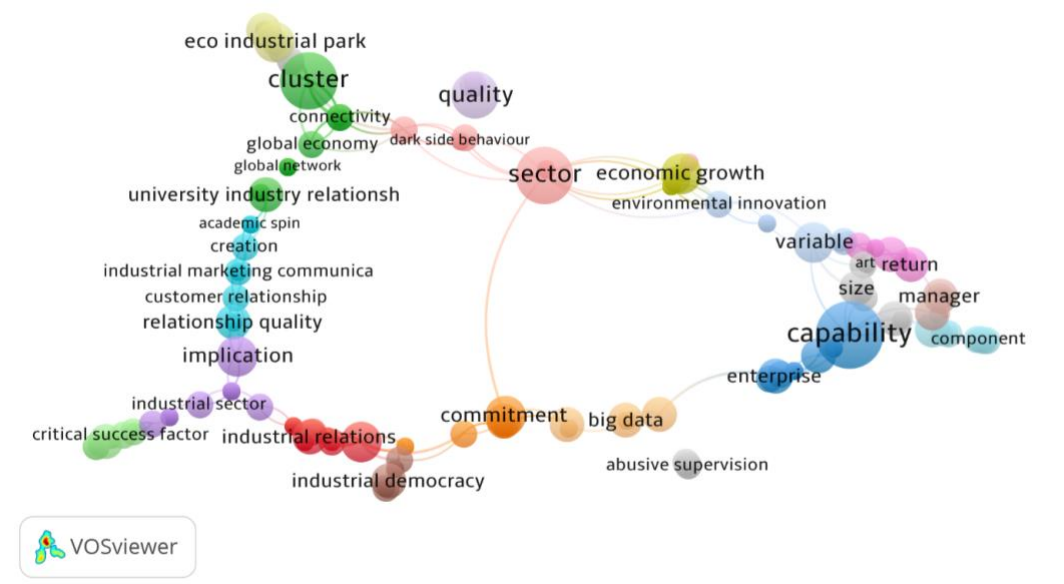


Figure 4. Network Visualization of Co-Occurrence Metadata (Keywords)

What appears in Figure 4 above visualizes a network of keywords related to industrial relations and their relationship with other topics that have developed a lot in this research. This co-occurrence has 24 scattered clusters with 384 total items which means a very wide range of research on industrial relations and topics related to it. This shows that the theme of industrial relations has developed so that the appearance of these keywords is not visible in the image compared to other keywords.

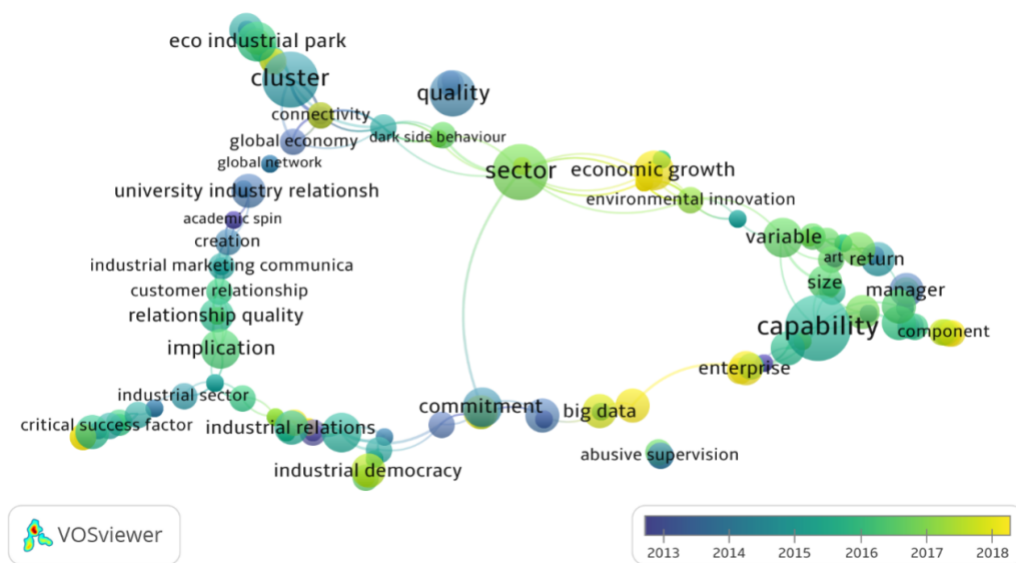


Figure 5. Overlay Visualization of Co-occurrence Metadata (Keywords)

No.	Publication Year	Author	title	Journals	Cites	Publishers
		Guilherme Brittes Benitez, Néstor Fabián Ayala, and Alejandro Germán Frank	4.0 technologies for industrial performance			Production Economics
4	2014	César Camison and Ana Villar-López	Organizational innovation as an enabler of technological innovation capabilities and firm performance	Science Direct (Elsevier)	1543	Journal of Business Research
5	2020	Ercan Oztemel and Samet Gursev	Literature review of Industry 4.0 and related technologies	Springer Link	1439	Journal of Intelligent Manufacturing
6	2018	Dmitry Ivanov, Alexandre Dolgui and Boris Sokolov	The impact of digital technology and Industry 4.0 on the ripple effect and supply chain risk analysis	Taylor and Francis Online	1179	International Journal of Production Research
7	2015	Samuel Ankrah and Omar AL-Tabbaa	Universities-industry collaboration: A systematic review	Science Direct (Elsevier)	1052	Scandinavian Journal of Management
8	2014	Christian Dustmann, Bernd Fitzenberger, Uta Schönberg, and Alexandra Spitz-Oener	From Sick Man of Europe to Economic Superstar: Germany's Resurgent Economy	American Economic Association	1030	Journal Of Economic Perspectives
9	2018	RP Jayani Rajapathirana and Yan Hui	Relationship between innovation capability, innovation type, and firm performance	Science Direct (Elsevier)	972	Journal of Innovation & Knowledge
10	2015	James H Love and Stephen Roper	SME innovation, exporting and growth: A review of existing evidence	Sage Journals	945	The International Small Business Journal

As ordered in table 1 if the top 10 research articles are selected from the most cited. Ranking 1 most follows research by Daron Acemoglu from the Massachusetts Institute of Technology and Pascual Restrepo from Boston University. These authors have published their articles since June 6, 2020 and have been cited a lot, namely 2953 times. The title of the research is "Robots and Jobs: Evidence from US Labor Markets" which discusses the effects of the use of industrial robots in the US labor market, where their results find that the areas exposed to the use of robots after 1990 are no different from before.

Rank 2 is occupied by research articles that have been widely cited with a total of 2271 where the respective authors are Michael Lieder and Amir Rashid who both come from KTH Royal Institute of Technology, Brinellvägen, Sweden. Their writing has been published since March 1, 2016 by the Journal of Cleaner Production. The title of this study is "Towards circular economy implementation: a comprehensive review in the context of the manufacturing industry". This research discusses the circular economy (CE) framework, which in one aspect is an economic benefit that requires collaboration with stakeholders for industrial relations to make it happen on a large scale.

Then in 3rd place are research articles done by Lucas Santos Dalenogare, Guilherme Brittes Benitez, and Alejandro Germán Frank from the Universidade Federal do Rio Grande do Sul, Brazil and Néstor Fabián Ayala from the Grenoble Institute of Technology (INPG), France. The author of this article has been cited 1575 times which was published in October 2018. Where the title of this research is "The expected contribution of Industry 4.0 technologies for industrial performance" whose results show that Industry 4.0 is helping industrial performance compared to conventional technology in an industrial context that runs in Brazil. Then the research articles ranked 4 to 10 were successively carried out by (Camisón & Villar-López, 2014), (Oztemel & Gursev, 2020), (Ivanov et al., 2019), (Ankrah & Omar, 2015), (Dustmann et al., 2014), (Rajapathirana & Hui, 2018), (Love & Roper, 2015).

Discussion

The study of industrial relations is indeed very broad, so it is open to research efforts on related topics and other contextual dimensions. As with industrial relations, today the use of robots in the business sector is something that is practiced and continues to be developed, for example how the effects of industrial robots on the US labor

market are increasing with negative side effects, not only the conveniences that are obtained. However, it is calculated that if one robot compared to a thousand workers can reduce the ratio of the proportion and wages to 0.42 percent as well as employment to the population of 0.2 percent (Acemoglu & Restrepo, 2020). In Germany there are labor market institutions that are managed specifically so that the country after the economic recession has led the country to become the economic superstar it is today (Dustmann et al., 2014).

Then due to the effects of industrialization, the circular economy (CE) concept was formed to solve the problem of waste piles, scarce resources, and controlling the economy for benefits by jointly using it in strategic implementation with an integrated bottom-up and top-down approach so that ideas regarding CE can be relevant and there is motivation for further research (Lieder & Rashid, 2016). The application of industry 4.0 demands new technology. Not only the ability of the workforce, but the use of conventional technology can hamper industrial performance whose expectations are not as expected. This can be seen how Brazil as a developing country needs to utilize industrial technology 4.0 for higher industrial performance efforts both horizontally and vertically (Dalenogare et al., 2018). As the control of robots and digital systems that are widely used have defeated machines and completely replaced the technological infrastructure used for the production process. This dominance triggers the manufacturing community to increasingly use digital, smart cities and information communication networks (Oztemel & Gursev, 2020). Supply chain (SC) risk analysis is carried out what efforts can industry 4.0 and digitization contribute to it so that in the future there will be developments for the transition to cyber-physical SC (Ivanov et al., 2019).

On the other hand, industrial relations between various parties require organizational innovation as well as technology, such as the Spanish industry, that if organizational innovation is carried out, the ability to innovate in technology can create high company performance (Camisón & Villar-López, 2014). This innovation also has an impact on progress for the management and performance of insurance companies in Sri Lanka besides virtual life and full of risks regarding insurance (Rajapathirana & Hui, 2018). Adoption of business models is necessary in dealing with problems that hinder growth in the industry (Shaws, 2020). The findings also show the need to focus on internal and external supporters of the ecosystem in making efforts to innovate, export and grow SMEs in the industrial sector (Love & Roper, 2015). In industrial relations, it has also been discussed regarding the theory of UIC or university-industry collaboration which is useful in increasing innovation by means of exchanging knowledge that has been identified by researchers consisting of 5 aspects namely motivation, Formation Phase, Organizational Forms, Operational Phase Acvies, and Outcome (Ankrah & Omar, 2015).

Conclusion

The definition of industrial relations presents several parties directly involved in the production process (workers and employers) and indirect parties as regulators (government) who work together to create harmony in business activities. A bibliometric analysis of 200 research articles over the last 10 years using PoP and VOSviewer downloaded from Google Scholar shows that the topic is so broad and wide that the keyword industrial relations is connected with other keywords and even research on these keywords is rarely carried out compared to the word another connected key. As shown in the bibliometric identification of co-authorship, co-occurrence, and citation that industrial relations, industrial relations academy, industrial relations journals, literature, and surveys are keywords that have been researched. The rest of the keywords relate to other related dimensions such as university-industry collaboration, digitalization, industry 4.0, innovation, and other dimensions. Most of the research on research keywords was carried out in the 2016 timeframe as in the visualization of the expanse that was previously stated.

This research has several drawbacks because it only uses data sources from Google Scholar. Therefore, future researchers can combine it with other journal sites such as paid Web of Science or others. In addition, of the 200 journals that have been analyzed bibliometrically, a thorough detailed explanation cannot be carried out, so they only rely on the top 10 articles that are most cited. Future researchers are advised to add to the analysis of articles for literature reviews so that new findings can be known by researchers as information for further research and practitioners as research knowledge or practice in business activities in the future.

Acknowledgements

We would like to thank all the parties involved in this research.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

- Acemoglu, D., & Restrepo, P. (2020). Robots and jobs: Evidence from US labor markets. *Journal of Political Economy*. <https://doi.org/10.1086/705716>
- Ankrah, S., & Omar, ALT (2015). Universities-industry collaboration: A systematic review. *Scandinavian Journal of Management*. <https://www.sciencedirect.com/science/article/pii/S0956522115000238>
- Asyraini, S. A. S. (2022). Pengukuran Efektivitas Operasionalisasi Manajemen Pada Pt. Karya Lestari Medan. *Juripol (Jurnal Institusi Politeknik Ganesha Medan)*, 5(1), 164-172.
- Bestri, R., Aniska, R., Ikon, M., Nellitawati, N., & Marsidin, S. (2022). Manajemen Personalia Organisasi Mengelola Manusia Sebagai Aset Organisasi Pendidikan. *Jurnal Pendidikan Tambusai*, 6(2), 12862-12868.
- Budd, JW (2018). *Employment with a human face*. In *Employment with a Human Face*. Cornell University Press.

- Camison, C., & Villar-López, A. (2014). Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business Research*. <https://www.sciencedirect.com/science/article/pii/S0148296312001828>
- Cobo, MJ, López-Herrera, AG, Herrera-Viedma, E., & Herrera, F. (2011). An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. *Journal of Informetrics*, 5(1), 146-166. <https://doi.org/https://doi.org/10.1016/j.joi.2010.10.002>
- Dalenogare, LS, Benitez, GB, Ayala, NF, & ... (2018). The expected contribution of Industry 4.0 technologies for industrial performance. *International Journal of ...* <https://www.sciencedirect.com/science/article/pii/S0925527318303372>
- Dustmann, C., Fitzenberger, B., Schönberg, U., & ... (2014). From sick man of Europe to economic superstar: Germany's resurgent economy. *Journal of Economics...* <https://www.aeaweb.org/articles?id=10.1257/jep.28.1.167>
- Ehnert, I., Parsa, S., Roper, I., Wagner, M., & Muller-Camen, M. (2016). Reporting on sustainability and HRM: A comparative study of sustainability reporting practices by the world's largest companies. *The International Journal of Human Resource Management*, 27(1), 88-108.
- Idris, F. (2018). *Industrial Relations Dynamics*. Deepublish.
- Ivanov, D., Dolgui, A., & Sokolov, B. (2019). The impact of digital technology and Industry 4.0 on the ripple effect and supply chain risk analysis. ... *Journal of Production Research*. <https://doi.org/10.1080/00207543.2018.1488086>
- Kotamena, F., Senjaya, P., & Prasetya, AB (2020). A Literature Review: Is Transformational Leadership Elitist and Antidemocratic? *International Journal of Social, Policy And Law*, 1(1), 36-43.
- Lieder, M., & Rashid, A. (2016). Towards circular economy implementation: a comprehensive review in the context of the manufacturing industry. *Journal of cleaner production*. <https://www.sciencedirect.com/science/article/pii/S0959652615018661>
- Love, JH, & Roper, S. (2015). SME innovation, exporting and growth: A review of existing evidence. *International Small Business Journal*. <https://doi.org/10.1177/0266242614550190>
- Marnishah, L. (2019). *Industrial Relations and Compensation (Theory and Practice)*. Deepublish.
- Naqvi, AA, Naqvi, SBS, Shahid, S., & Yazdani, N. (2016). Barriers To Rehabilitation Treatment Among Poliomyelitis Infected Patients In Karachi, Pakistan: A Mix-Methods Study. *Khyber Medical University Journal*, 8(1).
- Nasution, A., Imran, I., & Abdullah, M. (2015). Improvement of concrete durability by nanomaterials. *Procedia Engineering*, 125, 608-612.
- Nurhasanah, N., Jufrizen, J., & Tupti, Z. (2022). Pengaruh Etika Kerja, Budaya Organisasi Dan Beban Kerja Terhadap Kinerja Karyawan Dengan Kepuasan Kerja Sebagai Variabel Intervening. *Jesya (Jurnal Ekonomi Dan Ekonomi Syariah)*, 5(1), 245-261.
- Oztemel, E., & Gursev, S. (2020). Literature review of Industry 4.0 and related technologies. *Journal of Intelligent Manufacturing*. <https://doi.org/10.1007/s10845-018-1433-8>
- Purwanto, A., Purba, JT, Bernardo, I., & Sijuang, R. (2021). Effect of transformational leadership, job satisfaction, and organizational commitments on organizational citizenship behavior. *Inovbiz: Business Innovation Journal*, 9(1), 61-69.
- Rajapathirana, RPJ, & Hui, Y. (2018). Relationship between innovation capability, innovation type, and firm performance. In *Journal of Innovation & Knowledge*. Elsevier. <https://www.sciencedirect.com/science/article/pii/S2444569X17300409>
- Richards, J. (2022). Putting employees at the center of sustainable HRM: a review, map and research agenda. *Employee Relations: The International Journal*, 44(3), 533-554.
- Sapitri, D., & Pancasasti, R. (2022). Efek Moderasi Budaya Organisasi Untuk Peningkatan Kinerja Karyawan. *Technomedia Journal*, 6(2 Februari), 252-262.
- Schroeder, W. (2013). *Handbuch Gewerkschaften in Deutschland*. Springer-Verlag.
- Sharifi, A. (2020). Urban Resilience Assessment: Mapping Knowledge Structures and Trends. In *Sustainability (Vol. 12, Issue 15)*. <https://doi.org/10.3390/su12155918>
- Shaw, G. (2020). Potential implications of COVID-19 for the insurance sector. *Deloitte Insights*, 18.
- Thaib, M., & Nofrial, R. (2019). *Settlement of industrial relations disputes*. Deepublish.
- Van Eck, N., & Waltman, L. (2020). *VOSviewer Manual for VOSviewer Version 1.6. 14*. Leiden University Press: EZ Leiden, Netherlands.
- Zulkarnaen, AH (2018). Vulnerable problems in industrial relations and the concept of the Indonesian welfare state. *Justitia Pulpit Law Journal*, 2(2), 806-825.
- Zwickl, K., Disslbacher, F., & Stagl, S. (2016). Work-sharing for a sustainable economy. *Ecological Economics*, 121, 246-253.