Text Mining: Absolute Advantage Research at Scopus

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Abstract

This study aims to collect scopus indexed articles with the keyword absolute advantage in 2020, 2021, and 2022 (until July 15, 2022). In addition, we analyzed the text mining of several abstracts from these articles using the R software. we used 75 articles from top 3 journals that have most publications based on the keyword including the Journal of Cleaner Production, the Journal of Chemical Engineering, and the Journal of Applied Soft Computing. Based on data mining analysis, the word-cloud of each abstract automatically appears based on the frequency of each word that appears in the abstract.

Keywords*: Scopus Indexed, R Software, Top 3 Journals, Most Publications, Word-Cloud.*

1. Introduction

Text mining is a statistical science for extracting words from reading sources. Text mining research has been widely carried out in various research topics, including agriculture [1,2], medicine [3,4], technology [5,6], etc. In the agricultural sector, Jung et al. in 2020 conducted network and main path analysis of 1856 studies related to text mining. They show that research papers on text mining were published in 45 disciplines in the 1980s and 1990s, 105 disciplines in the 2000s, and 171 disciplines in the 2010s. The results show that the use of text mining as a research topic and method has increased rapidly [2]. Furthermore, Zuliani et al. in 2021 using text mining and modeling analysis of mountain livestock (MLF)-related topics and trends over the past four decades from 2679 documents. As a result, the amount of scientific output has doubled every 10 years since 1980 [1].

In the medicine sector, Cho et al. in 2020 used data mining to investigate the relationship between herbal medicine and skin-related keywords (SRK) in classical texts. The research selected 26 SRKs used in the Donguibogam text; it refers to 626 medicinal plants. The result is a complete list of candidate medicinal plants for skin care through data mining of classical medical texts. This increases our understanding of the

plant and will help discover new plant candidates [4]. Selain itu, Schedlbauer et al. (2021) extracted 544 job advertisements from STEPSTONE (the German job portal). The process developed in R with the "rvest" library, utilizing web crawling, web extraction and text mining. After removing duplicates and filtering for jobs requiring a bachelor's degree, 147 job advertisements remained, from which we extracted qualification requirements. The research results show that only 45% of terms are related to professional skills, while 55% are related to soft skills [3].

Also, in the technology sector, Ahn et al. in 2021 proposed a methodology that integrates sociotechnical systems (STS) and big data analysis media using text mining for new, real-time technology assessment (TA). The results show that the structure of media discourse, in which eight countries began to form socio-technical regimes around technology with their respective strengths, was carried out objectively [6]. Lim et al. in 2021 conducted a comprehensive smart cities literature review based on text mining of 3,315 papers on smart cities published in journals indexed in the Science Citation Index Expanded and Social Sciences Citation Index databases. This includes "all papers" classified as research articles published from 1999 to April 2020. Results from the study represent current research on smart cities, including smart city literature statistics from 1999 to 2019, 23 topics research related to smart cities, and geographic variations in smart city research.

However, based on previous research, there is still no research that collects Scopus indexed articles based on keywords in science direct. Therefore the study aims to collect Scopus indexed articles with the keyword "absolute advantage". After these keywords were input, 3 journals were selected with the highest frequency regarding the verb "absolute advantage". In addition, we analyze the text mining of several abstracts from these articles. Of course, some things that are not needed, such as numbers, conjunctions, etc., are filtered out in this research. Apart from that, the results of the extraction of these words are displayed in word-cloud form to make it more interesting when compared to the frequency table.

2. Results

This research refers to the scopus indexed articles from 2020 to July 15, 2022. The type of article is research article. However, we used 3 journals that the most publications based on the absolute advantage keyword. We found 75 articles from the Journal of Cleaner Production (JCP), the Journal of Chemical Engineering (JCE), and the Journal of Applied Soft Computing (JASC). So, the total research in the JCP and the JCE in 2020 is 11 articles (Table 1 and Table 7). While in the JASC in the same year it was 6 (Table 13). In 2021, there will be 13 articles published in the JCE (Table 3), 6 articles published in the JCE (Table 9), and 11 articles published in the JASC (Table 15). Then in 2022, we found 8 articles in the JCP (Table 5), 5 articles in the JCE (Table 11), and 4 articles in the JASC (Table 17).

Table 1. Absolute advantage research in JCP in 2020

| ID	Keywords	Ref.
J1-2020-01	Alkali activated, CO2 emission, environment-friendly, sub-zero temperature, and winter construction	[7]
J1-2020-02	China, CO2 transfer, final consumption, industrial contribution, industrial transfer path, and United States	[8]
J1-2020-03	Ecological connectivity, green space ecological network, landscape pattern, minimum cost distance, morphological spatial pattern analysis, and urban fringe area	[9]
J1-2020-04	Data processing, improved ant colony optimization, parameter optimization, photovoltaic power prediction, and support vector machine	[10]
J1-2020-05	Emission factor, energy consumption, Lorenz curve, PM2.5 speciation, and spatiotemporal variation	[11]
J1-2020-06	Microbial community, mustard tuber wastewater, self-buffered electrolyte, simultaneous power generation and nitrogen removal, and single-chamber microbial fuel cell	[12]
J1-2020-07	Degumming, eco-friendly, high-efficiency, Pectobacterium carotovorum HG-49, and Ramie fibers	[13]
J1-2020-08	Business mode, energy internet, integrated energy, internet+	[14]
J1-2020-09	Biorefinery, multi-criteria decision-making, sustainability assessment, and uncertainty	[15]
J1-2020-10	Annual percentage targets, new energy vehicle, social welfare, and the dual-credit policy	[16]
J1-2020-11	Cost-benefit model, economic analysis, lithium-ion batteries, power load peak shaving, secondary use, and sensitivity analysis	[17]

(a)   (b)
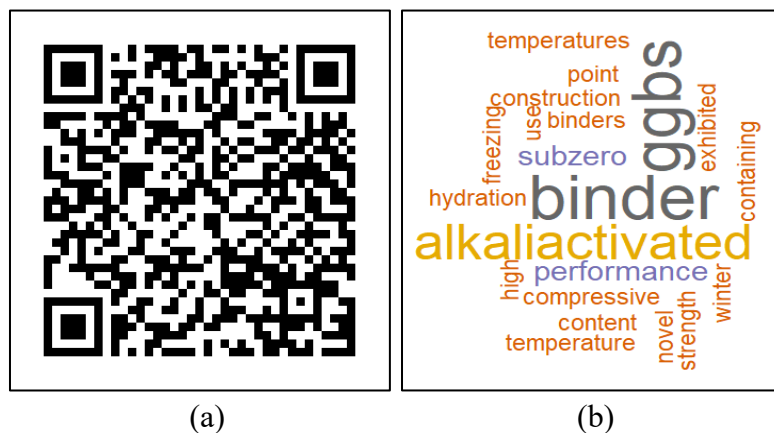
Figure 1. Data mining analysis on article abstract J1-2020-01
(a) R code and (b) word-cloud

We selected several articles for data mining analysis from the articles above. We select 1 article each in every 1 year of publication of the journal. Thus, in the JCP (ISSN: 0959-6526), we selected articles written by [7], [18], and [19]. Next, in the JCE (ISSN: 1385-8947), we selected articles written by [20], [21], and [22]. Finally, in the JASC (ISSN: 1568-4946), we selected articles written by [23], [24], and [25]. In total, we selected 9 articles for text mining analysis. Also, we used R software to perform data mining analysis of the abstracts of the articles.

Table 2. Absolute advantage research in JCP in 2021

ID	Keywords	Ref.
J1-2021-01	Heavy metal, high-nitrogen activated carbon, mechanism, and nitrogen function	[18]
J1-2021-02	Biochar, composting, heavy metal resistance fungi, and high-throughput sequencing	[26]
J1-2021-03	Eco-design, game theory, government subsidy, and manufacturing–recycling system	[27]
J1-2021-04	Environmental pressure, evaluation system, quality of built environment, Shandong Peninsula Region, and urban sustainability	[28]
J1-2021-05	Data decomposition, hybrid forecasting algorithm, multiple strategies, and ozone	[29]
J1-2021-06	China, clean energy, development potentials, Porter's diamond model, and shale gas	[30]
J1-2021-07	Animal products, economic gap, optimization simulation, virtual water flow, water footprint, and water stress	[31]
J1-2021-08	China, Empirical orthogonal function, analysis, K-means clustering, real and pseudo human settlements, spatial-temporal distribution, and two-stage model	[32]
J1-2021-09	Multi-type batteries, multi-type PV arrays, optimal design, PV-battery system, and smoothing scenario	[33]
J1-2021-10	BP neural Network, norfloxacin, photo-electro catalysis, Ti/SnO2–Sb, and urea precipitation	[34]
J1-2021-11	BEKK-GARCH model, carbon financial market, VAR model, and volatility spillover effect	[35]
J1-2021-12	Combination weighting method, plan selection, probabilistic linguistic term set, rail transit photovoltaic power station, and VIKOR model	[36]
J1-2021-13	Fuzzy analytic hierarchy process, fuzzy best-worst method, life cycle assessment, sludge treatment, sludge-to-energy technology, and sustainability assessment	[37]

Figure 2. Data mining analysis on article abstract J1-2021-01
(a) R code and (b) word-cloud

We found the 10 most frequently occurring words in each of the articles carried out by data mining analysis. Based on the abstract of article J1-2020-01, the words that appear most often are binder and ggbs. These words appear 8 times. Then followed by the alkaliactivated with a frequency of 6. The word in the abstract is alkali-activated, but the symbol "–" is deleted so that it becomes alkaliactivated. After that, there are the performance and subzero that appear 3 times. Finally, there are the binders, compressive, construction, containing, and content that appear 2 times. In full, the data mining analysis on the abstract of the J1-2020-01 article is available in Figure 1.

Table 3. Absolute advantage research in JCP in 2022

ID	Keywords	Ref.
J1-2022-01	Adsorption, MCPs, mechanism, mercury ions, and selectivity	[19]
J1-2022-02	Critical metal recovery, extraction, ion species contribution, metal ion species, and whole process pollution control	[38]
J1-2022-03	Improvement strategies, international competitiveness, overseas construction projects, spatiotemporal evolution, and sustainable development	[39]
J1-2022-04	Electricity structure, environmental impact, hydrogen peroxide, hydrogen source, industrial layout, and life cycle assessment	[40]
J1-2022-05	Chromate reductase, Cr(VI) reduction, immobilized enzyme, magnetic biochar, and smelting wastewater	[41]
J1-2022-06	Altruistic preference, eco-design, government subsidy, and recycling	[42]
J1-2022-07	City sustainability, evaluation, grey relational analysis, interaction between indicators, and multiple indicators	[43]
J1-2022-08	Cleaner production, graphical approaches, process integration, and sustainability	[44]

Figure 3. Data mining analysis on article abstract J1-2022-01
(a) R code and (b) word-cloud

Table 4. Absolute advantage research in JCE in 2020

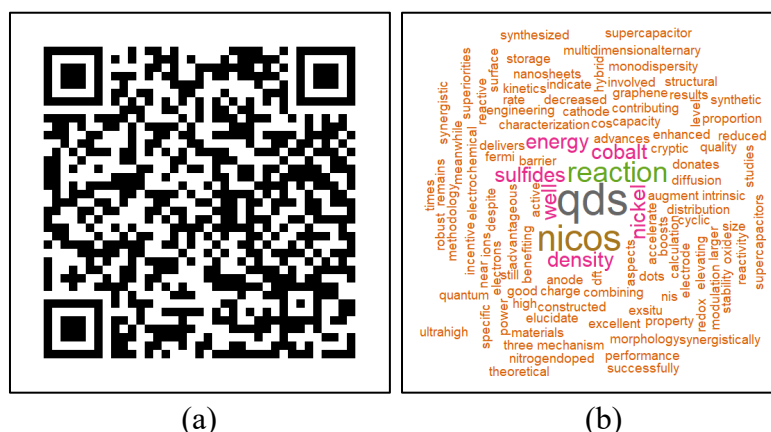| ID	Keywords	Ref.
J2-2020-01	Bimetallic nickel cobalt sulfides, high energy density, high redox reactivity, hybrid supercapacitors, and quantum dots	[20]
J2-2020-02	Flow cytometry, glycogen-accumulating organisms, metabolic shift, phosphate-accumulating organisms, and thiothrix caldifontis	[45]
J2-2020-03	All-solid-state supercapacitors, carbon cloth, cobalt sulfides, hierarchical structure, and high-power density	[46]
J2-2020-04	Amino acid doping, anionic dye selectivity, non-thermal separation/regeneration, and pH-switchable UiO-66	[47]
J2-2020-05	Battery-supercapacitor hybrids, conductivity, hydrothermal, nanowire, and nickel phosphide	[48]
J2-2020-06	Aquatic toxicity, dibutyl phthalate degradation, hydroxyl radical, rate constants, sulfate radical, and theoretical computational methods	[49]
J2-2020-07	Directional charge transfer, G-C3N4, H2 fuel, H2O splitting, and in-plane coupling electric field	[50]
J2-2020-08	Hemostasis, laparoscopic, minimally invasive surgery, portable device, and solution blow spinning	[51]
J2-2020-09	Adsorption, flow regime, nanopores, shale gas, slippage, and transport	[52]
J2-2020-10	Aluminum-selenium battery, coating, conversion reaction, electrochemical performance, and porous nanosphere TiO2@Se	[53]
J2-2020-11	Aluminum battery, density functional theory, electrochemical performance, MXene, and Ti3C2	[54]

Figure 4. Data mining analysis on article abstract J1-2022-01
(a) R code and (b) word-cloud

Based on the abstract of article J1-2021-01, the most frequently occurring words are hnac and nitrogen. These words appear 6 times. This is followed by the adsorption with a frequency of 5. After that, the leather appears 4 times. This is followed by the heavy and metals which appear 3 times. Finally, there are the adsorb, high, mechanisms, and proved which appear 2 times. In full, the data mining analysis on the abstract of the article J1-2021-01 is available in Figure 2.

Table 5. Absolute advantage research in JCE in 2021

ID	Keywords	Ref.
J2-2021-01	Adsorption kinetics, defect engineering, high-efficiency lithium extraction, interface modification, and metatitanic acid adsorbent	[21]
J2-2021-02	Enhanced stability, perovskite quantum dots, single-phase phosphor, tunable luminescence, and white-light emission	[55]
J2-2021-03	CoNi-bimetal MOFs, heterostructure, microwave absorption, and MXene fibers	[56]
J2-2021-04	CO2 storage, global warming, hydrate distribution, proton NMR, SDS, and SiO2 nanoparticles	[57]
J2-2021-05	5,5′-Azotetrazole-1,1′-diol, ammonium perchlorate, catalyst, and energy materials	[58]
J2-2021-06	CoBDC, electrochemical activation, hydr(oxy)oxides, oxygen evolution reaction, and ultra-fast synthesis	[59]

For the abstract of article J1-2022-01, the words that appear most often are mercury and znidcamt. These words appear 7 times. This is followed by the ions with a frequency of 4. After that, the pollution and reaction appear 3 times. Finally, there are the adsorbent, adsorption, analysis, experiments, and models that appear 2 times. In full, the data mining analysis on the abstract of the article J1-2022-01 is available in Figure 3.

The word that appears most often in the abstract of the J2-2020-01 article is qds. These words appear 5 times. This is followed by the nicos with a frequency of 4. After that, the reaction appears 3 times. Finally, there are the cobalt, density, energy, nickel, sulfides, and well which appear 2 times. In full, the data mining analysis on the abstract of the J2-2020-01 article is available in Figure 4.

(a)	(b)

Figure 5. Data mining analysis on article abstract J2-2021-01
(a) R code and (b) word-cloud

Based on the abstract of article J2-2021-01, the word that appears most often is adsorption which appears 4 times. Then followed by the adsorbent and hto with a frequency of 3. Finally, there are the bulk, capacity, defect, doping, extraction, ion, and lithium which appear 2 times. In full, the data mining analysis on the abstract of the article J2-2021-01 is available in Figure 5.

Table 6. Absolute advantage research in JCE in 2022

ID	Keywords	Ref.
J2-2022-01	Biochar composites, collaborative optimization, persulfate activation, ZnO nanoparticles, and plant enrichment-pyrolysis	[22]
J2-2022-02	Drinking water, energy efficiency, fluoride, hydrophobic membrane, and single-pass water recovery	[60]
J2-2022-03	Crosslinking, free carbon, lithium-ion battery, self-polymerization, and SiOC anode	[61]
J2-2022-04	Anisotropic bamboo, biomimetic actuators, complex deformations, light-responsive hydrogels, and remote control	[62]
J2-2022-05	Flexible sensor, hierarchical structures, silk fibroin, and smart wristband	[63]

Figure 6. Data mining analysis on article abstract J2-2022-01
(a) R code and (b) word-cloud

Table 7. Absolute advantage research in JASC in 2020

ID	Keywords	Ref.
J3-2020-01	Backbone, hard clustering, irregular clustering results, and cluster validity index	[23]
J3-2020-02	Attitude maneuver, improved hierarchical structure, liquid-filled flexible spacecraft, multi-objective optimization, and r-dominance relation	[64]
J3-2020-03	Computationally expensive, constrained, discrete, global optimization, and kriging	[65]
J3-2020-04	Interval prediction, loss function, reservoir computing, and wind power	[66]
J3-2020-05	Fibonacci, global–local alternation, multi-modal optimization, noisy environment, and probability distribution	[67]
J3-2020-06	Grey Verhulst model, new structure, prediction of China's Tight gas production, result analysis, and suggestions	[68]

Figure 7. Data mining analysis on article abstract J3-2020-01
(a) R code and (b) word-cloud

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For the abstract of article J2-2022-01, the word that appears most often is zno. These appear 10 times. This is followed by the biochar with a frequency of 6. After that, the pfrs appears 5 times. Furthermore, the composites and nps appear 4 times. Then followed by the metal, method, and radicals which appeared 3 times. Finally, there are the ability and activation that appear 2 times. In full, the data mining analysis on the abstract of the article J2-2022-01 is available in Figure 6.

The word that appears most often in the abstract of the J3-2020-01 article is clustering. These words appear 7 times. Then followed by the index and results with a frequency of 4. Finally, there are the best, cluster, cvis, data, different, partition, and partitions which appear 3 times. In full, the data mining analysis on the abstract of the J3-2020-01 article is available in Figure 7.

Table 8. Absolute advantage research in JASC in 2021

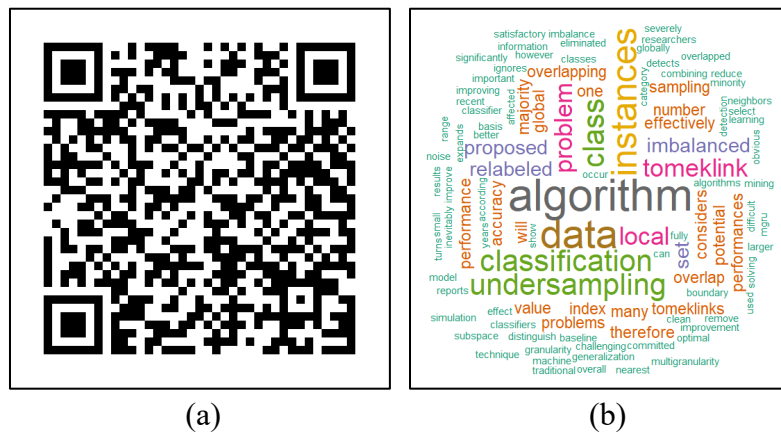| ID	Keywords	Ref.
J3-2021-01	Deep hashing, dense patch mapping, image denoising, image processing, and image retrieval	[24]
J3-2021-02	Broad learning extreme learning machine, coupled model, improved equilibrium optimizer, teleoperation control system, and tremor elimination	[69]
J3-2021-03	Convolution neural network, eye state detection, transfer learning, and weight binarization	[70]
J3-2021-04	Bearing degradation, deep neural network, fruit fly optimization algorithm, multi-population, and support vector regression	[71]
J3-2021-05	Expensive many-objective optimization, Kriging model, Radial space division, and surrogate-assisted evolutionary algorithm	[72]
J3-2021-06	Edge computing, graph neural network, heterogeneous graph, and service recommendation	[73]
J3-2021-07	Arc model, chaos mechanism, DC arc, parameter identification, and quantum cuckoo search	[74]
J3-2021-08	Dynamic monitor, multiple surrogate models, multi-point sampling, non-dominated sorting, and pareto-based sampling strategy	[75]
J3-2021-09	Intelligent edge computing, social learning discrete particle swarm optimization, soft computing, steiner minimum tree, wirelength, and X-routing	[76]
J3-2021-10	Bearing fault diagnosis, least squares support vector machine, multi-class imbalanced classification, and SCOTE oversampling	[77]
J3-2021-11	Deep learning approach, electrical load interval forecasting, kernel density estimation, and K-nearest neighbors	[78]

Based on the abstract of article J3-2021-01, the word that appears most often is image which appears 11 times. Then followed by the method and patches with a frequency of 6. After that, the similar appears 4 times. Furthermore, the words clean, denoising, and external appear 3 times. Finally, there are the based, datasets, and exploits that appear 2 times. In full, the data mining analysis on the abstract of the article J3-2021-01 is available in Figure 8.

(a)   (b)

Figure 8. Data mining analysis on article abstract J3-2021-01
(a) R code and (b) word-cloud

Table 9. Absolute advantage research in JASC in 2022

ID	Keywords	Ref.
J3-2022-01	Class overlap, classification, imbalanced data, Mahalanobis distance, Tomek-link, and under-sampling	[25]
J3-2022-02	Classification, deep learning, inception-v4, kernel, and selective	[79]
J3-2022-03	Coherent fuzzy numbers, dynamic risk-tolerance/expected-return level, heterogeneity, and multi-period portfolio selection	[80]
J3-2022-04	Combinatorial optimization, exploration, exploitation, learning in games, minimum weighted vertex cover, and Nash equilibrium	[81]

Furthermore, for the abstract of article J3-2022-01, the word that appears most often is algorithm. These words appear 8 times. This is followed by the word data and sampling with a frequency of 7. After that, the instances appears 6 times. Furthermore, class and classification appear 5 times. Then followed by the local, problem, tomeklink which appeared 4 times. Finally, there is the imbalanced which appears 3 times. In full, the data mining analysis on the abstract of the article J3-2022-01 is available in Figure 9.

Figure 9. Data mining analysis on article abstract J3-2022-01
(a) R code and (b) word-cloud

3. Conclusion

In total, research related to absolute advantage from 2020 to July 15, 2022 is 75 articles. The articles come from 3 journals that publish the most keywords, including the Journal of Cleaner Production, the Journal of Chemical Engineering, and the Journal of Applied Soft Computing. In more detail, the total absolute advantage research in the Journal of Cleaner Production and the Journal of Chemical Engineering in 2020 is 11 articles each. While in the Journal of Applied Soft Computing in the same year it was 6. In 2021, there were 13 articles published in the Journal of Chemical Engineering, 6 articles published in the Journal of Chemical Engineering, and 11 articles published in the Journal of Applied Soft Computing. Then in 2022, we found 8 articles in the Journal of Cleaner Production, 5 articles in the Journal of Chemical Engineering, and 4 articles in the Journal of Applied Soft Computing.

There are 9 articles that were analyzed using data mining using R software. The articles were selected from each of these journals every 1 year of publication. Thus, in the Journal of Cleaner Production, we selected articles written by (G. Zhang et al., 2020), (Yuan et al., 2021), and (B. Zeng et al., 2022). Next, in the Journal of Chemical Engineering, we selected articles written by (W. Chen, Zhang, et al., 2020), (Pu et al., 2021), and (Xu et al., 2022). Finally, in the Journal of Applied Soft Computing, we selected articles written by (S. Liang et al., 2020), (Huang et al., 2021), and (Dai et al., 2022). Also, all the R software code applied to the 9 articles can be downloaded by readers. The word-cloud of each abstract is automatically displayed based on the frequency of each word that appears in the abstract.

For further research, we recommend updating the latest data regarding absolute advantage research. In addition, if possible, not only abstract data mining analysis is carried out but also full papers from these articles.

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