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Review

# Scientometric Review and Thematic Areas for the Research Trends on Marine Hoses

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**Abstract:** For over three (3) decades, there has been an increase in research on energy sources from the production of oil using flexible marine risers, such as marine hoses. Marine hoses are conduits for special use as rubberized structures with hybrid polymer composites for offshore platforms in the oil and gas industry. This scientometric study uses qualitative, quantitative, and computational approaches. Data were retrieved using a research methodology that was created for this study using the SCOPUS and Web of Science (WoS) databases. This study provides a bibliometric literature review on marine hoses with an emphasis on the advancements made in the field from recent developments, geographical activity by countries, authorship histories, partnerships, funding sources, affiliations, co-occurrences, and potential research areas. The study found that the USA had the most publications, but there were fewer co-occurrences with connections outside the cluster. Due to the difficulty of adaptation, acceptability, qualification, and deployment of marine hoses in the offshore marine industry, this topic contains more conference papers than journal papers. Therefore, more funding sources and collaborations on marine hoses are required to advance the research. This study makes a contribution to scholarship on advances made in petroleum exploration and production for (un)loading hoses.

**Keywords:** marine hose; pipeline; marine bonded composite hose (MBCH); marine structures; research trend; research pattern; scientometric; bibliometric; scientific review; hoses; review

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## 1. Introduction

Currently, there is still a high global dependence on fossil fuels which require lighter sustainable materials for energy production [1,2]. Thus, the recent need to develop sustainable materials has led to the utilization of polymers as hybrid materials across different fields [3–6]. The interest in hybrid polymers such as elastomers has grown significantly over the past three (3) decades, along with scientific study. Hitherto, different literature exists offering a wealth of information for biomedical research facilities, oil corporations, engineering firms, and manufacturing companies such as hose manufacturers [7–12]. Additionally, the rising energy demand for fossil fuels has prompted an expansion in the oil and gas sector. This has led to subsequent operations seen in various exploration, drilling, and production activities [13–16]. Despite the diverse studies conducted on both conduits and subsea pipelines, the stress analysis of these subsea piping products is important to explore the characteristics of each hose/pipe product [17–27]. These studies consider the influence of global issues, technological changes, and climatic changes on the deployment of marine structures. Some of these studies used different weather conditions for different sea states to assess the performance of marine hoses [28–38]. Aside from environmental conditions, the recent COVID-19 pandemic caused some changes in the trends of production, energy generation, distribution, supplies, and consumption [39–49]. However, the offshore marine industry has adapted different measures to ensure that there is the sustainable production of oil and gas products, particularly with (un)loading marine hoses [50–60]. These activities have stimulated the development of novel processes, technologies, and materials, as well as new adaptations in a number of industries, as recorded on hose development, hose modeling, hose failures, etc., from various publications. These are ascertained from different databases through the survey on "marine hose", as shown in Figure 1. It shows that Academia had 6935 publications, followed by ScienceDirect, which had 6901 publications and then followed by Wiley Online, which had 3129 publications. It was followed by OnePetro which had 2364 publications, then Google Scholar, which had 2120 publications; Taylor & Francis, which had 2010 publications; ResearchGate, which had 1000 publications; ASME digital collections, which had 595 publications; Sage Journals, which had 590 publications; ASCE library, which had 346 publications; Scopus, which had 296 publications; and then Web of Science (WoS) had the least with 223 publications.

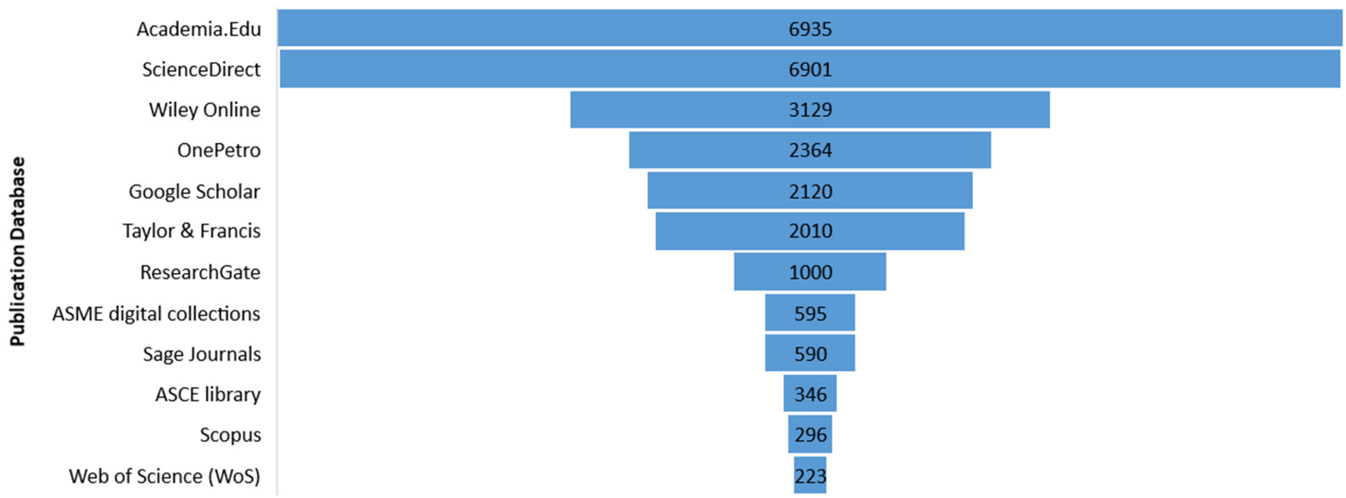


**Figure 1.** Result of literature search from different publication databases on "marine hose".

Although the development of marine hoses is affected by the different factors, the rising cost of manufacturing different materials is an important factor, thus hose manufacturers seek to develop less expensive materials. Thus, there is an increase in material development research, such as elastomers for marine hose production [61–66]. In the marine industry, the application of rubber materials called elastomers, have been used over time for different offshore marine structures, such as offshore fender barriers, industrial hoses, flexible hose-lines, etc. Additionally, in the manufacturing industry, the increase in polymer production is one of the main production sources for marine hoses. Elastomers, for instance, have strong adsorption capacity, durability, and flexibility properties. Another important benefit of polymers is their high economic advantage. Additionally, both polymers and composites are potential materials that could be used to improve the performance of marine hoses. The hose materials are used to enhance the mechanical characteristics, longevity, fatigue resistance, and usability for marine applications [67–77]. Based on innovative designs, oil offloading lines (OOL) have found recent applications in deep water at offloading terminals [38–41,77]. Gonzalez et al. [78,79] investigated the axial and bending behavior of marine hoses using numerical models. Another important factor is the influence of wave loads under environmental conditions on marine hoses at SPM terminals. Amaechi et al. [80,81] investigated the strength performance and wave–current interaction (WCI) of marine hoses attached to catenary anchored leg-mooring (CALM) buoys under hydrodynamic loads for environmental conditions in the Gulf of Mexico (GoM) [82,83]. O'Donoghe and Halliwell [84,85] conducted mathematical modeling on the axial forces and vertical bending of floating marine hoses with experimental models. Brown and Elliott [84,85] conducted dynamic analysis of floating hose-string using mathematical modeling to understand the hose response using two-dimensional (2D) and three-dimensional (3D) dynamic analysis for single point mooring (SPM) systems. Hasanvand and Edalat [86,87] conducted sensitivity analysis of marine hoses at CALM oil terminals under environmental conditions in the Persian Gulf region. Tonatto et al. [88,89] conducted computational modeling of marine hoses using parametric analysis with progressive damage models. However, some studies presented theoretical models on marine hoses by considering parameters such as internal pressure loads [90–94]. The literature search found some models conducted on the CALM terminals with marine hoses and floating buoys to understand the motion response using coupled models, computational fluid dynamics (CFD) models, hydrodynamic models, and experimental models [95–99]. However, important aspects of SPMs are their integrity management, life extension and reliability [100–110], mooring response, fluid-transfer mechanisms, and the response of the marine hoses at SPM terminals [100–110]. Another challenging area of marine engineering is failure modes of marine hoses and the installation of conduits such as pipelines, submarine hoses, umbilicals, and subsea marine risers [111–121]. Hence, there is a need to study the research patterns and advances made in this area as part of a systematic or scientific review.

In this paper, the scientometric review and thematic areas on the research patterns of marine hoses were conducted. Some introduction to this research is presented in Section 1, while the research methodology is presented in Section 2, with some discussion on the framework used to conduct the study by utilizing the data retrieved from SCOPUS and Web of Science (WoS) databases. The results and discussion are presented in Section 3, while Section 4 provides the thematic areas for the study with recommendations for future studies. Future research areas on marine hose are presented in Section 5. The concluding remarks are presented in Section 6.

## 2. Methodology

In this section, the methodology used for the data analysis and the research design for this study is presented.

### *2.1. Data Retrieval and Research Design*

A scientometric review and meta-science analysis of marine hoses were carried out in this study. "Marine hose" was used as the search term for the literature search. There was a thorough bibliometric literature evaluation, scientometric review, and meta-science analysis on different fields considered for this study [122–133]. The meta-science analysis on marine hoses was used to carry out the initial analysis from the bibliographical review. This was accomplished by gaining access to current academic works from two academic databases, which include high-impact journal papers and conference papers in the field. Additionally, a literature search and a few classifications were offered before being examined. An examination of the science, engineering, and general research from publications, including reviews, journal articles, and conference papers, was then conducted on marine hoses using scientometric analysis and text mining. Additionally, there was a major emphasis on the advances made on marine hoses for the offshore marine industry, as portrayed in earlier reviews on marine hoses [6–8,17–19].

To determine the impact of various international initiatives for research on marine hoses, the meta-analysis was created using data obtained from the SCOPUS and Web of Science (WoS) databases. These data were compared with data obtained recently, up to mid-2022, from the same database. With conceptual frameworks, theoretical formulations, and bibliometric analysis, bibliographic studies have developed a new method of analyzing theoretical literature in a range of fields, including engineering design, management science, and ocean engineering. As a result, a thorough meta-science examination of the bibliometric literature has been carried out in this section. This was accomplished by consulting recent academic papers from both databases, which included high-impact journal papers and conference papers in the field. It was restricted to meta-science analysis because of the scope, which was also utilized to validate discoveries on the cutting edge of marine hose technology. The bibliometric methodology encapsulates the application of quantitative techniques (bibliometric analysis, e.g., citation analysis) on bibliometric data (e.g., units of publication and citation). To effectively implement such methods, specific bibliometric software such as Gephi, Leximancer, and VOSviewer can be used. In the present study, VOSviewer was used. Further description of the scientometric analysis on the marine hose is presented in Section 3. Based on the information gathered during the scientific literature review that was undertaken, the framework and direction took important meta-science factors into consideration, such as the impact on the offshore marine industry. The methodology is presented in Figure 2.

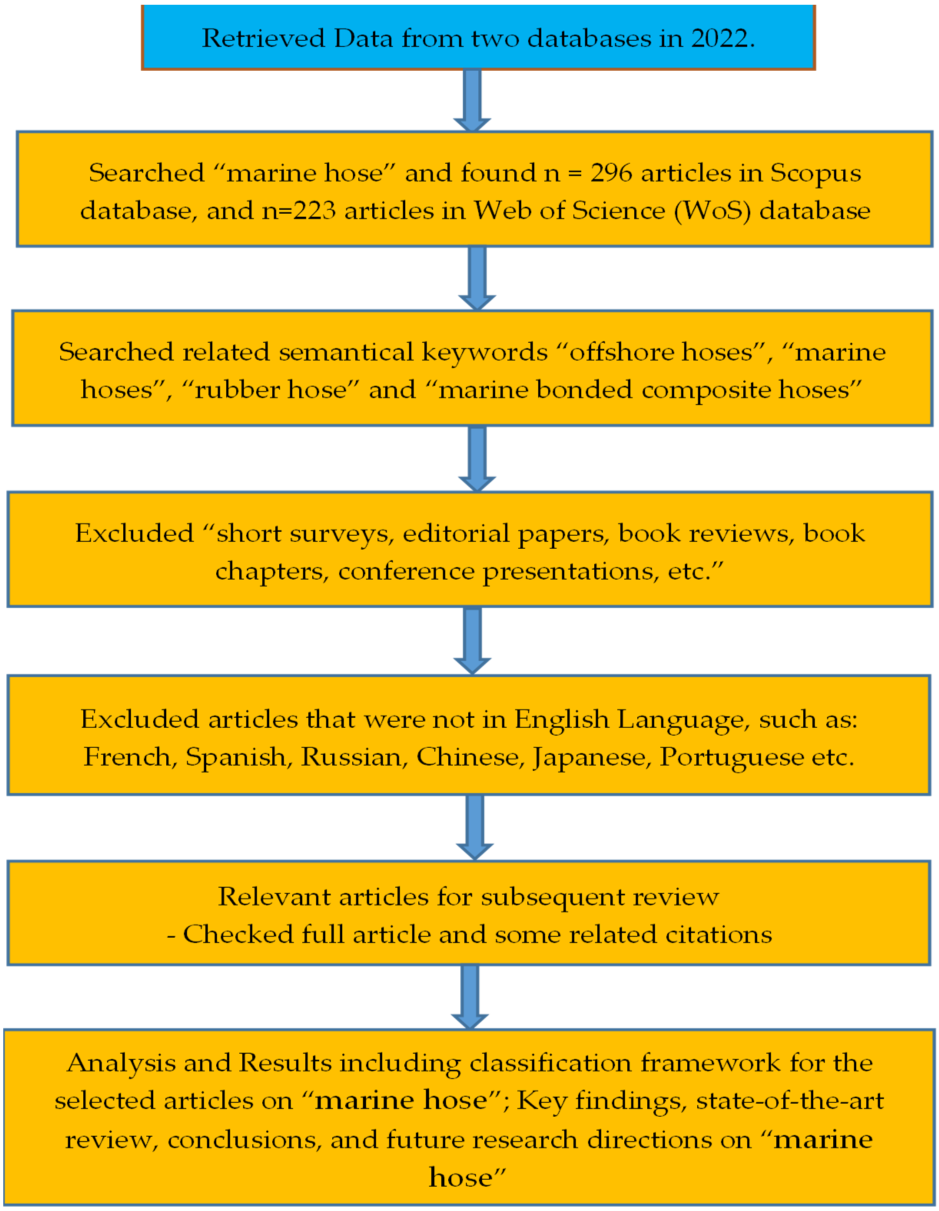


**Figure 2.** Research methodology on the scientometric review for marine hoses.

As indicated in Figure 2, the approach taken into account in the meta-analysis involved using an accessible academic database to extract data on the subject matter and exclude the resources that were not required. It responds to the question, "What are the trends in the research on marine hoses?" What collaborations have been established for marine hoses?

What can be learned from advances in marine hoses? What are the implications for the elaboration of guidelines and standards on marine hoses?

It is noteworthy to justify the need for this literature review in this subject area, considering that previous reviews on marine hoses exist, such as those authored by Amaechi et al. [17–19]. Thus, the requirement for the present study needs to be justified herein. Generally, there are conceptual differences between the presented study and the previous publication [17–19], as they all applied different methods and concepts, as follows:

i. The present study is based on bibliometric data analysis to understand the trend in research from publications, while the former reviews were based on developments in marine research, looking more at practical works, mostly from the industry and hose manufacturers.
ii. Additionally, the present study looks at metrics from citations, publication subjects, publication types, authorships, etc., while the former reviews looked at metrics from patents and state-of-the-art works from individual research outputs made on marine hoses as well as industrial marine hose products.
iii. Lastly, the present study involves a systematic literature review called scientometrics which uses bibliometric data, while the former employed a traditional literature review which uses individual authored research, industry presentations, conference papers, and company reports to identify progress made in the industry and academia.
iv. Both reviews present different findings on marine hose development and publication trends, despite the limited expertise required from this technical subject.

### 2.2. Scientometric Review: Tools and Framework

Recent growth in scientific research has provided us with access to a wealth of information on the offshore marine industry. Data retrieval and text mining tools such as CiteSpace are commonly used [125–131]. In order to improve technological methodology, research techniques, or the hit-to-lead identification process, publication databases may be helpful in minimizing hit multiplicity, as seen in recent scientometric reviews [132–140]. The avalanche of papers published each year could obscure most of this knowledge. An example is when scholars find it challenging to comprehend material that has been published more than once, as can be observed by looking for certain terms in the Scopus and Web of Science (WoS) databases, which return over 80,000 results for the year 2022. Each of those articles would undoubtedly be difficult for one person to read alone. However, more robust analytical techniques for text mining and scientometric analysis are now facilitating research by assisting in the finding of new data for the general advancement of research. Thus, scientometric analyses such as this current research presented herein are important. Scientometric reviews are conducted by different researchers on diverse areas using different tools [141–149].

The publications considered for this meta-analysis were only those that included genuine research, cutting-edge inventions, and theoretical analysis. The investigation articles that were chosen had to satisfy the following requirements: (a) clearly stated methodology, (b) thoroughly described results, and (c) a remark and a reference to its limitations. The conceptual articles needed to satisfy a number of criteria, including (a) a systematic baseline selection technique, (b) a time frame that was accurately described, and (c) an analytical procedure that included a critical review. The requirements for marine hose standards now used by the marine industry, such as those set forth by the API, OCIMF, PANC, DNVGL, ABS, or ISO, were also examined. As a result, the requirements for maritime hose qualification were examined. Finally, a tabular bibliography of a few of the chosen papers was created, including the research projects, author information, and the year of publication.

The method taken into account for choosing the academic papers in Section 2 is also a crucial component of the meta-science analysis carried out in this systematic literature review. Finding research threads, trends, and advancements in marine hoses is one of this review's main goals. As stated in Figure 3, the first database, Scopus, was taken into consideration for this review in order to accomplish this objective. After various adjustments and exclusions to make sure the data utilized fits within the planned study on maritime hoses, 296 papers in total were taken into account in the meta-analysis. Descriptors in the English language were taken from the Scopus database. Additionally, since the non-English papers were all disqualified, only publication articles in the English language were taken into consideration. However, "marine hoses" was the major keyword that the research was focused on in order to determine the trend in development in other forms of flexible marine risers in comparison to marine hoses. The keywords chosen were author keywords from academic publications from the data retrieved from Scopus.

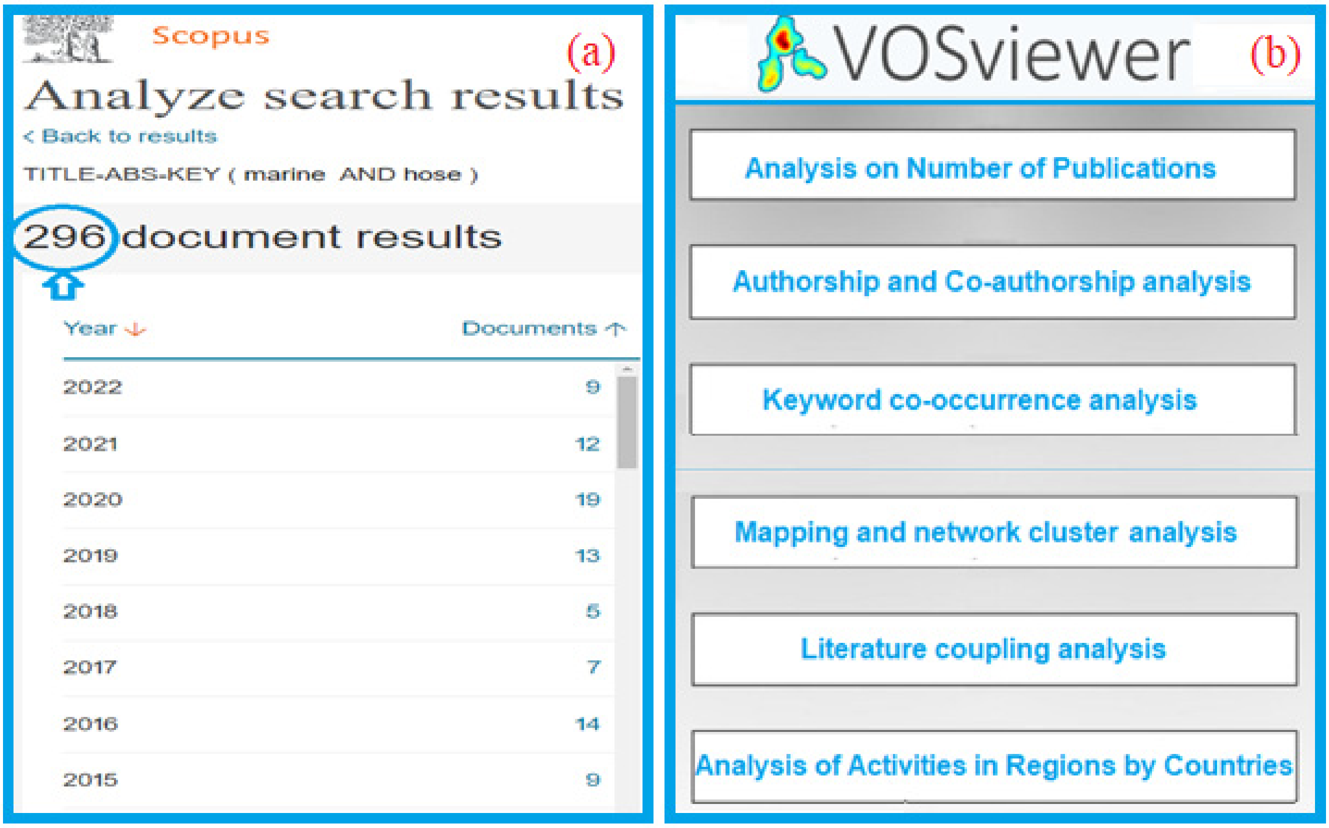


**Figure 3.** Image showing (**a**) the interface of the Scopus database used for the data analysis on "marine hose" and (**b**) the VOSviewer interface with some areas that can be analyzed.

With reference to this study, data from the databases were used to conduct the scientometric review. Using desired variables, networks, and exported variables, it was further postprocessed. In order to create the visualization map and graphical interpretations, tools could be used for further processing, such as CiteSpace [125–131] and VOSviewer [150–159]. Section 4 presents the findings of the scientometric analysis. The extrapolated data were used in the study to create the co-occurrence network and co-citation network as they appeared in publications. The main parameters used to dictate the research pattern include authorship, author keywords, index keywords, publication subject, publication type, and publication country location.

It is important to provide a brief overview of the taxonomy that has been used to analyze scientific publications, such as journal articles and conference papers. In order to achieve this, the criteria taken into account for the taxonomy are based on the comprehension of the most recent advancements in developing marine hoses. This will also provide researchers in both academia and industry with a thorough history of the technology, highlight its advantages, and detail its economic effects. With that goal in mind, a thorough analysis of marine hoses in relation to the suggested future research topics will be made available.

Thus, the taxonomy framework under consideration includes a systematic and in-depth review of the literature that emphasizes and highlights novelties, the emergence of research directions, research sources, publication gaps, a key component of marine hose designs, chronological advancements, and important elements. Therefore, the following criteria apply to the taxonomy framework and cover the publication sources displaying publishers and articles, research designs, research methods, marine hose technology, drivers, benefits, issues (or barriers), and applications. The taxonomy framework criteria listed herein provided the basis for the theme areas further discussed in Section 5, including the following: (1) classification and impact of marine hose development; (2) certifications and technology adaptation for marine hoses; (3) frameworks and research designs; (4) assessments and research methods; (5) drivers; (6) benefits or importance; (7) issues or barriers; (8) application of marine hoses.

## 3. Results and Discussion

In the research, a scientometric study was conducted on the research area to ascertain the contribution made to knowledge by "marine hose", as detailed in recent literature [7,8,17–21]. There were 296 publications from the Scopus database and 223 publications from the Web of Science (WoS) database. The result of the publication search is presented in Figure 4, while the type of publications by classification and subject area are shown in Figure 5. As seen in Figure 4, it was observed that the highest generated publications were 19 publications in 2020, followed by 14 publications in 2014 and 2016, then 13 documents in 2019, and 12 documents in 2021. However, there are limited publications found on the installation of marine hoses [160–170] compared to other marine systems [171–180].

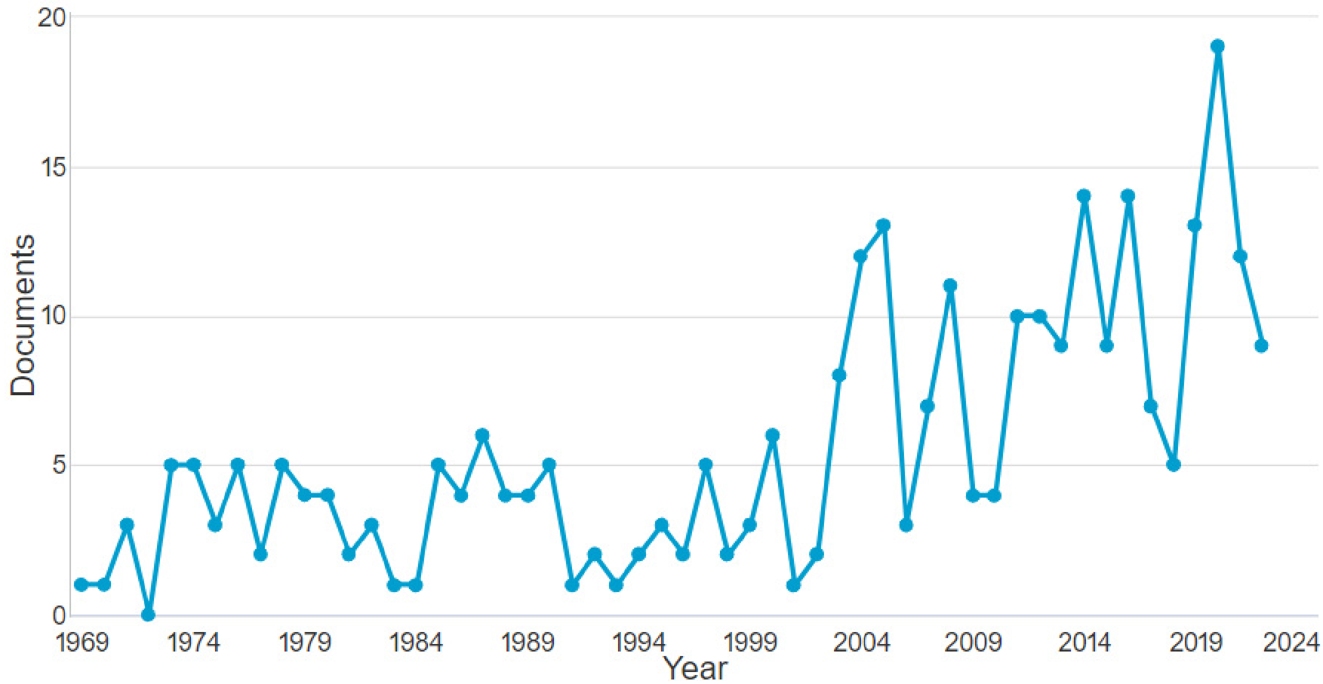


**Figure 4.** The number of publications on "marine hose" research (data retrieved from Scopus database, 24 July 2022).

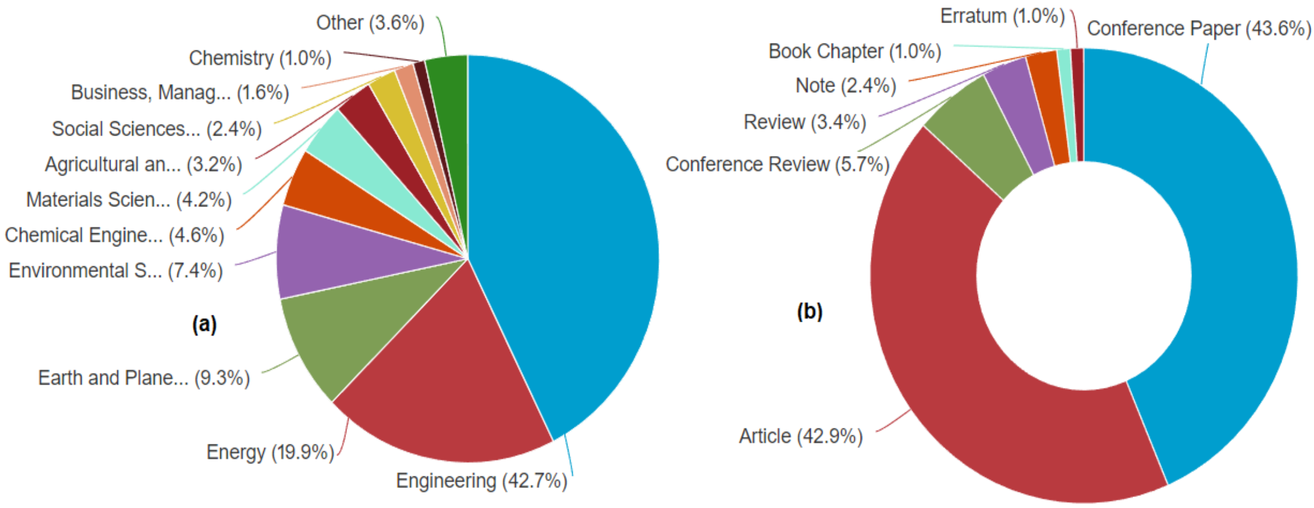


**Figure 5.** The research on "marine hose" showing (**a**) subject area and (**b**) document type (data retrieved from Scopus database, 24 July 2022).

As observed in Figure 5a, the highest publications by subject area were in engineering, with 212 publications (42.7%), energy, with 99 publications (19.9%), earth and planetary sciences, with 46 publications (9.3%), environmental science with 23 publications (7.4%), chemical engineering with 23 publications (4.6%), materials science with 21 publications (4.2%), and agricultural and biological sciences with 16 publications (3.2%), among other subject areas. This shows that there are more technical publications on this subject area which is expected due to the expertise required in manufacturing marine hoses and the limited number of marine hose manufacturers [181–187]. In addition, the materials used for the manufacture of marine hoses have unique properties that confine them to certain tests, such as those recommended by industry standards (see specifications particularly in GMPHOM OCIMF 2009 and API 17K, among others) [188–197].

Based on the classification of these publications, the systematic search was also looked at to ascertain the areas of interest by authors. As seen in Figure 5b, there were 129 conference papers (43.6%), 127 journal articles (42.9%), 17 conference reviews (5.7%), 10 review papers (3.4%), 7 notes (2.4%), 3 book chapters (1.0%), and 3 errata (1.0%). This suggests that the volume of publication outputs, which predominately include research articles, reflects the scrutiny given to the research on marine hoses.

Additionally, the author's keywords obtained from Scopus were used to develop the word cloud using Voyant tools. To achieve this, two limits were set on the Voyant tools to produce the word cloud and postprocessed using its Corpus uploader, Cirrus viewer, TermsBerry, and Trend exporter. There were 1712 words and 916 unique word forms obtained from the index keywords. This shows more contributions to the research area, with an average words per sentence of 856.0, a vocabulary density of 0.535, and a readability index of 22.283. The results of this study were postprocessed with the keywords to develop two sets of word clouds. While the cloud in Figure 6a is lighter with fewer words, the cloud in Figure 6b is very dense and busy. The word clouds showed that some keywords had a higher density than other keywords, which also implies that they are more considered by authors in this field. The most-dense keywords are represented with larger font sizes and unique font colors. These keywords are visualized in order using the Voyant word cloud generator, which shows the highest to the lowest as boldest to the least bold. The detailed results of these keywords obtained are seen in Figure 6.

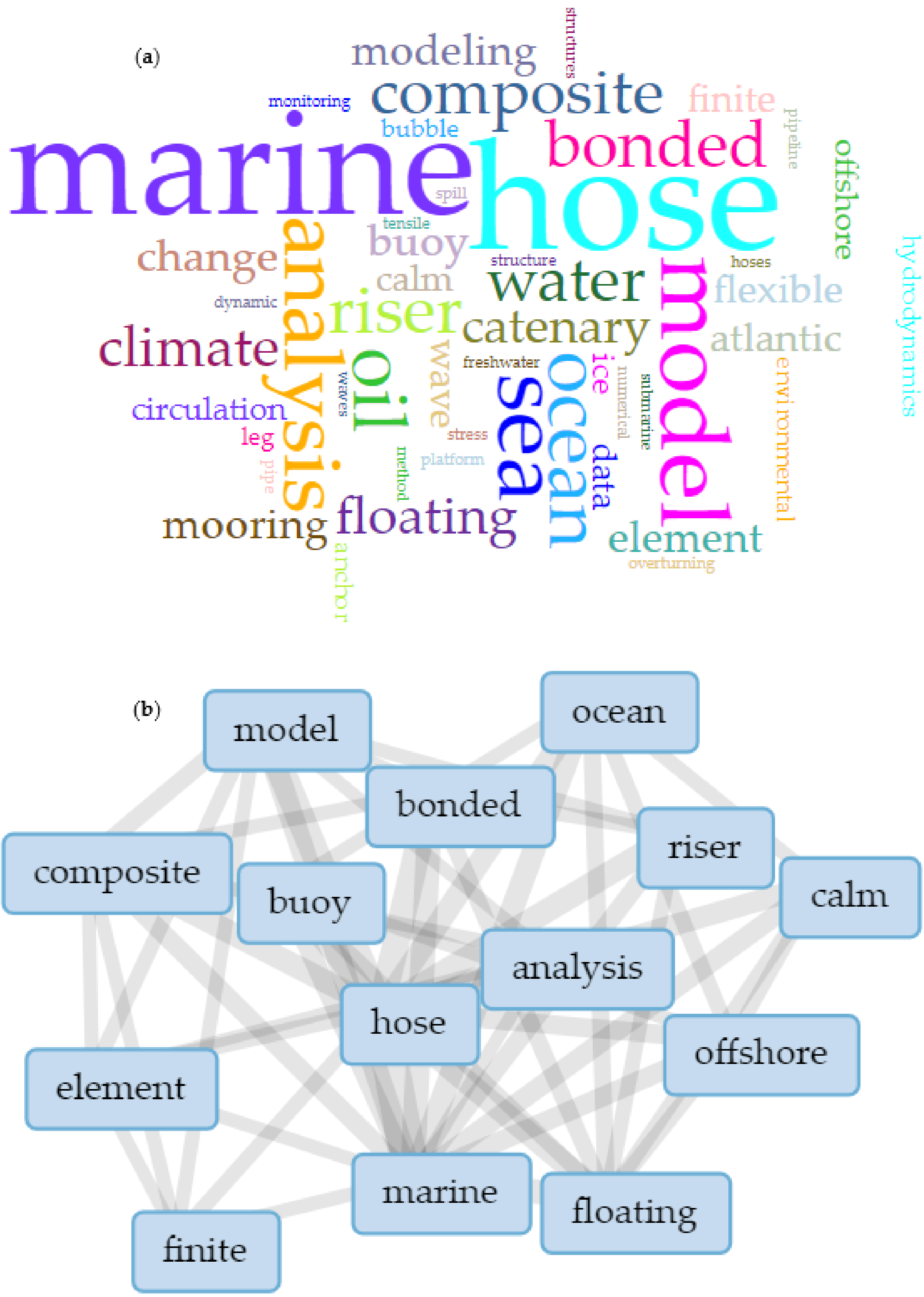


**Figure 6.** The word cloud for author keywords on "marine hose" research generated using Voyant word cloud generator, showing (**a**) the word cloud form and (**b**) the keyword links (data retrieved from Scopus database, 24 July 2022).

From the search data from the Scopus database compared with the Scopus data, it was observed that there are different keywords used by the authors in this subject area; however, the most frequently used keyword was hose (68 times). The other keyword frequencies are: marine risers (47 times), offshore oil well production (42 times), marine pollution (22 times), oil spills (17 times), mooring (17 times), arctic engineering (17 times), offshore technology (15 times), offshore structures (13 times), ships (12 times), marine environment (12 times), marine engineering (12 times), seawater (11 times), finite element method (11 times), offshore oil wells (10 times), hydrodynamics (10 times), buoys (10 times), pipelines (9 times), ocean engineering (9 times), reinforcement (8 times), pumps (8 times), mooring cables (8 times), design (8 times), single point mooring (7 times), shipbuilding (7 times), oil tankers (7 times), offshore drilling (7 times), liquefied natural gas (7 times), cryogenics (7 times), crude oil (7 times), article (7 times), technical presentations (6 times), submersibles (6 times), stress analysis (6 times), rubber products (6 times), rubber (6 times), petroleum industry (6 times), offshore pipelines (6 times), offshore oil fields (6 times), marine applications (6 times), loading (6 times), LNG (6 times), infill drilling (6 times), gas industry (6 times), floating liquefied natural gas (6 times), failure analysis (6 times), environmental protection (6 times), crude petroleum (6 times), buoyancy (6 times), tubing (5 times), tanker ships (5 times), submarine pipelines (5 times), stainless steel (5 times), software testing (5 times), seismology (5 times), safety engineering (5 times), ports and harbors (5 times), marine technology (5 times), marine hose (5 times), marine engines (5 times), flexible hose (5 times), environmental impact (5 times), water waves (4 times), unloading (4 times), United States (4 times), tubular steel structures (4 times), technology (4 times), technical seminars (4 times), tandem offloading (4 times), surveys (4 times), submarine hose (4 times), steel pipe (4 times), ship (4 times), semisubmersibles (4 times), safety factor (4 times), safety (4 times), riser systems (4 times), riser (4 times), remotely operated vehicles (4 times), remote control (4 times), reinforced plastics (4 times), piles (4 times), petroleum transportation (4 times), overhead lines (4 times), oil terminals (4 times), offloading operations (4 times), ocean waves (4 times), ocean currents (4 times), floating hose (4 times), flexible risers (4 times), catenary anchor leg mooring buoys (4 times), etc. Using these keywords on Voyant tools, the most frequent words in the corpus were: marine (35), hose (35), model (18), sea (17), and oil (16), as seen in Figures 7 and 8. This investigation showed that the most commonly used words were marine and hose, which appeared 35 times each with a relative frequency of 0.0093458.

The publication citations were also analyzed in this study. One crucial criterion that we considered was the ratio of publications to citations in this domain. The strength of a study area, the scientific importance, and the influence of the articles in the field were evaluated using citations. The h-index is one of the metrics used in this evaluation. The Times Cited count is used to rank a list of publications in descending order to determine the h-index value. An index of "h" denotes the existence of "h" papers, each of which has received at least "h" citations. Additionally, the h-index is determined by the depth of years of your chosen timeframe and the WoS database product subscription. The estimate did not take into account the source items that are not covered by the WoS database product subscription. In a ratio of 296:223 representing Scopus-to-WoS citations, there were fewer publications from WoS while there were more from SCOPUS. An h-index of 36 and an average of 19.43 citations per publication were noted. There were 3724 citing articles in the overall number of documents on the topic, whereas 3663 publications lacked self-citations. The total number of citations for these articles was 4334 times cited, compared to 4115 times for the publications without self-citations. The citation information is demonstrated across the publication record, as displayed in Figure 9. The study shows the most significant changes in the slope of the cumulative publications. It shows significant growth seen as a plateau pattern in recent years, demonstrating the relevance of recent marine hose research. Furthermore, the figures for 2021–2022 show a decline because it is mid–2022 when it is anticipated to rise. While the slope of the cumulative publications barely altered from 2009 to 2013, the number of documents showed an increased growth rate.

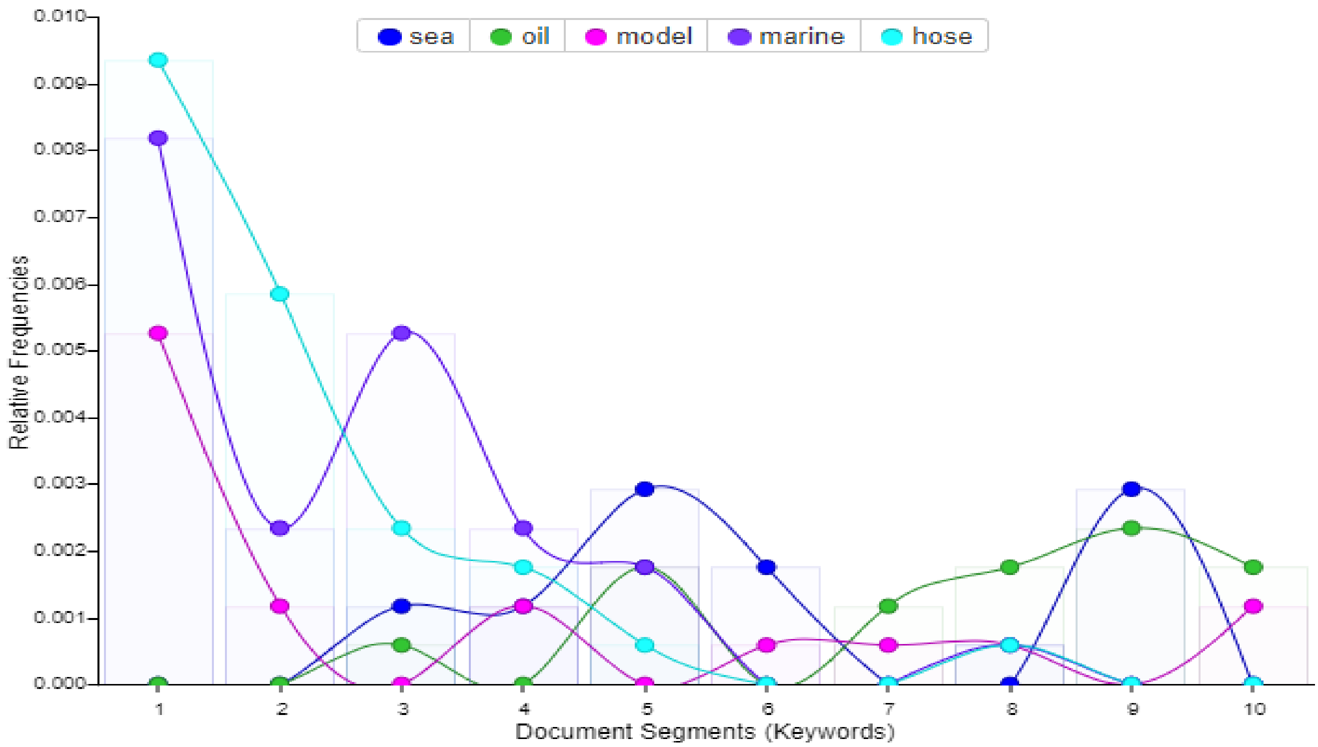


**Figure 7.** Result of relative frequency and trend from the most frequent author keywords on "marine hose" generated using Voyant tools.

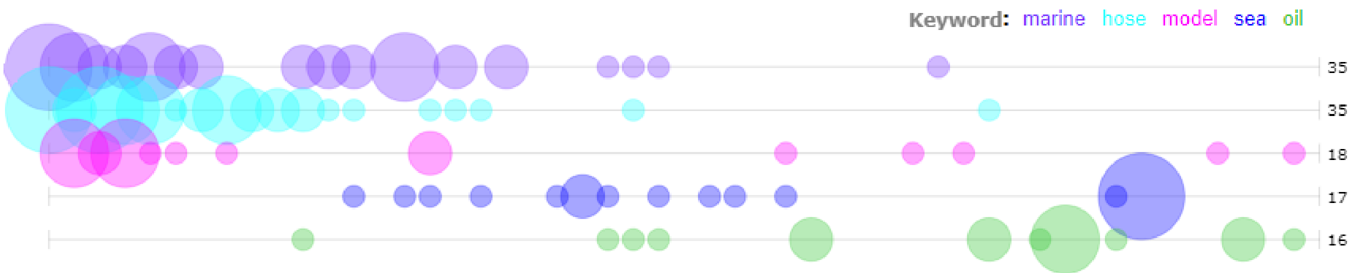


**Figure 8.** Bubblelines from the most frequent author keywords on "marine hose" generated using Voyant tools.

Understanding the influence of institutions or organizations, referred to as affiliations, on the research requires looking at the findings of bibliometric analyses of publications connected to the subject. To evaluate the research effect from the institution or organization, which is provided as a breakdown of publication volume from different departments, it is vital to discuss the support from different affiliations towards marine hose research. Marine hoses have also been used in offloading applications, shipbuilding, fluid mechanics, mechanical engineering, ocean engineering, offshore applications, and marine engineering. As a result, the results from Scopus and WoS databases were papers that cut across different fields. The scientific literature on marine hoses is now being contributed to by numerous research institutions, polytechnics, universities, and businesses. Figures 10 and 11 show the result of affiliations by academic institutions and affiliations by industry companies, respectively. Currently, it shows that Lancaster University has 11 publications, Tsinghua University has 10 publications, and the University of Sao Paulo has 6 publications. These institutions were followed by five publications produced by the Technical University of Denmark and the University of Tokyo, and four publications produced by the Dalian University of Technology and Harbin Engineering University. The progress of this research area is promoted by the increased funding for marine hoses and related systems.

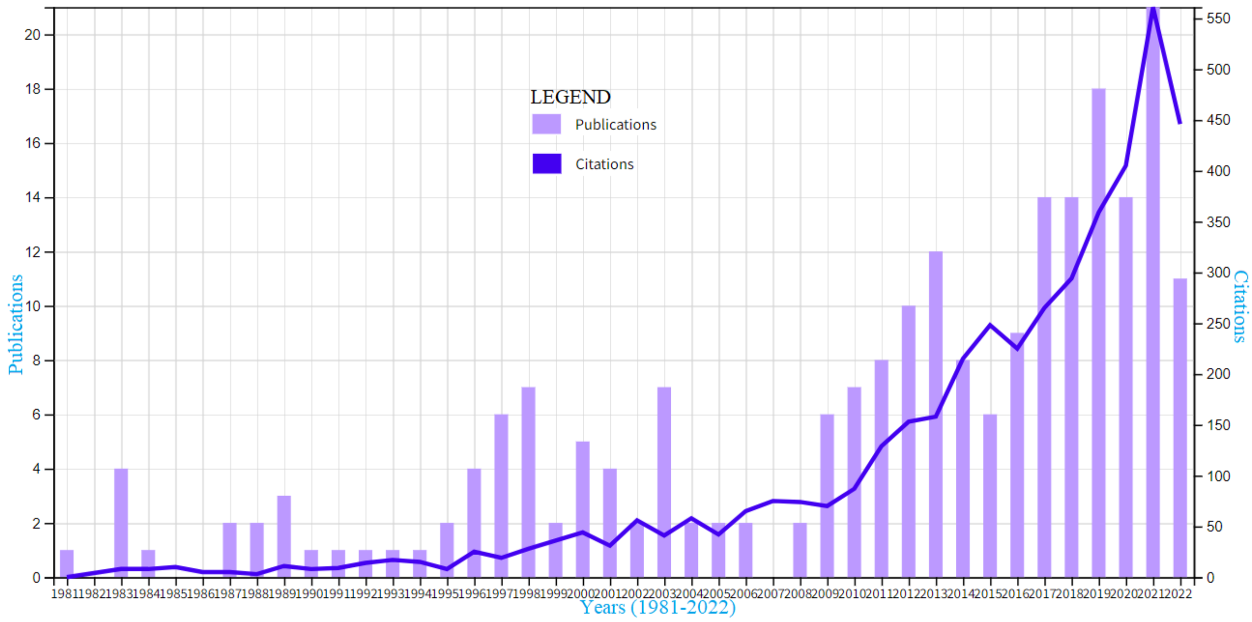


**Figure 9.** The number of citations and number of publications from 1981 to 2022 for the research on "marine hose" research (data retrieved from WoS database, 24 July 2022).

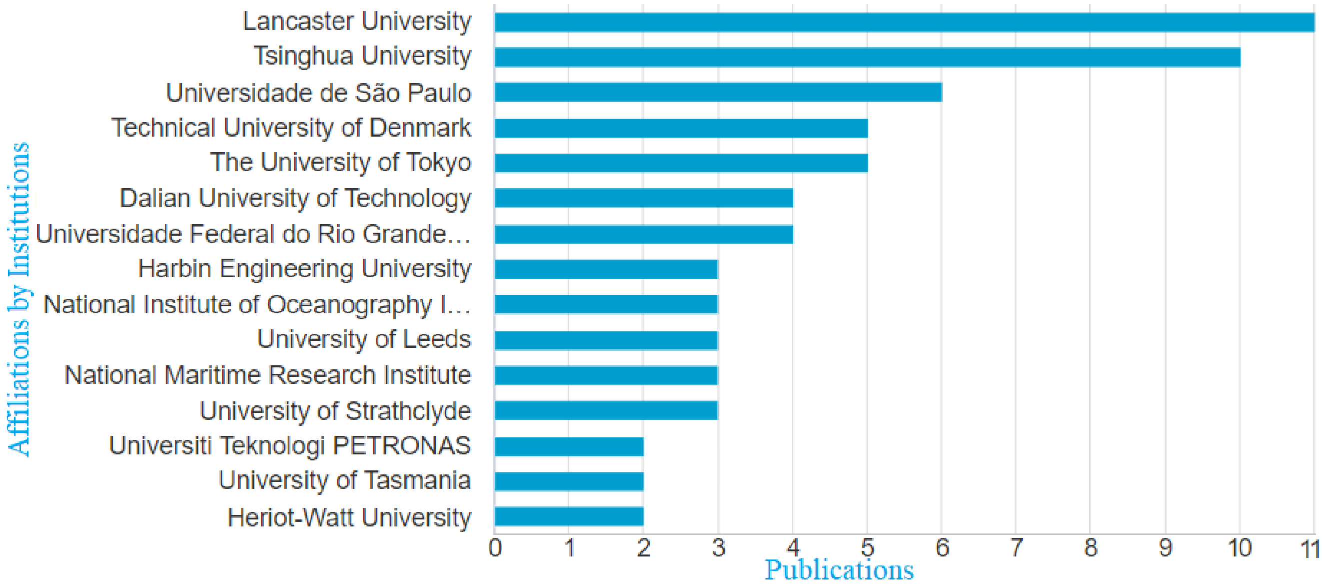


**Figure 10.** The affiliations by academic institutions for the research on "marine hose" (data retrieved from Scopus database, 24 July 2022).

Another important aspect of the study is the funding for research on marine hoses by different funding sponsors. The author's funders, as well as the project funders in the research area, were further filtered to ascertain their influence on the quality of publications published annually in this field to visualize the influence of funders on the affiliations. This also makes it easier to understand how the institution's funders have affected the calibre of that field's research. For instance, in the UK, one of the identified funders, the Engineering and Physical Sciences Research Council (EPSRC), which is a part of the United Kingdom Research Council (UKRI), was identified as one of the major funders of research related to marine hoses. However, according to the data in Figure 12, it was identified that EPSRC was second with 8 publications, while the first is the National Natural Science Foundation of China (NSFC) with 14 publications. It was followed by Conselho Nacional de Desenvolvimento Científico e Tecnológico with three publications, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior with 2 publications, and the National Science Foundation also funded two publications. The second (EPSRC) funded approximately half the amount of the highest (NSFC). Additionally, it was found that those who funded the least research had funded at least one marine hose research, as seen across 27 funding agencies or funding sponsors. The details of funding with grant numbers for the top funding agencies on marine hose research are presented in Table 1. It shows that grant number: 51922064 is the highest funding recorded on marine hoses.

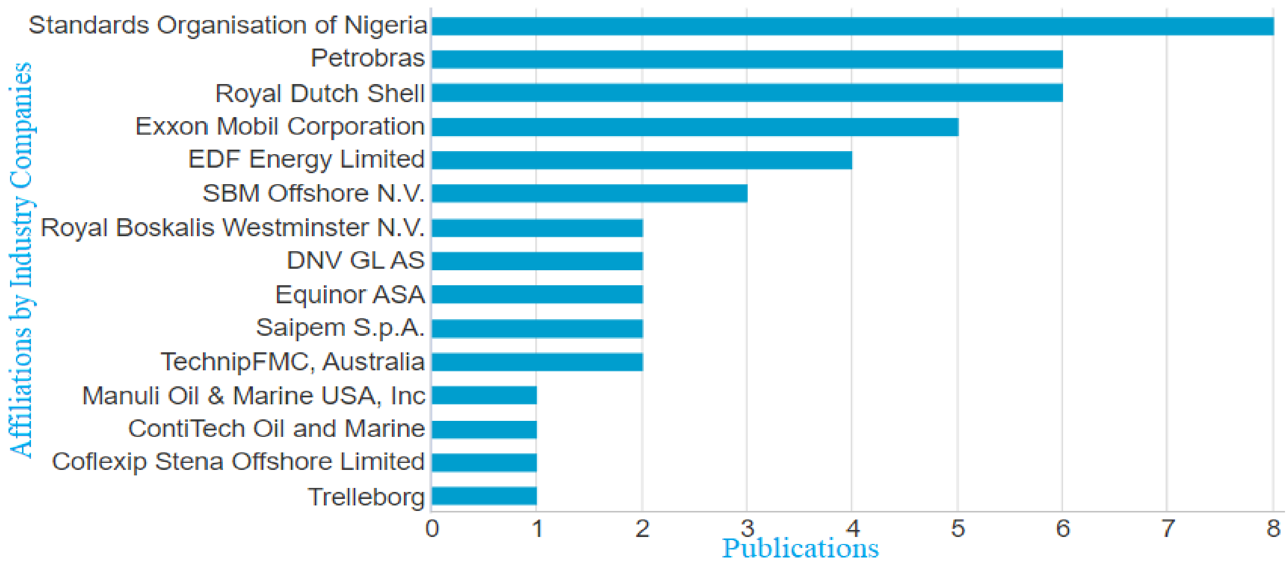


**Figure 11.** The affiliations by industry companies for the research on "marine hose" (data retrieved from Scopus database, 24 July 2022).

Another important aspect of the study is the selection of journals for the submission of publications on the research for marine hoses. It is evident in Table 2 that the highest number of publications by the publishers was published in the *Journal of Marine Science and Engineering (JMSE)* with 10 published works, followed by *Marine Environmental Research* with 7 published works, and *Marine and Freshwater Research* with 6 published works. The next set of journals has five publications, such as *Climate Dynamics*, *Journal of Coastal Research*, *Ocean Engineering*, and *Quaternary Science Reviews*. Then, the next set of journals has four publications, which are *Marine Structures* and the *Marine Technology Society Journal*. The study showed that the publications on marine hoses were both presented as conference proceeding papers and journal articles. Additionally, it showed that there are more papers published as journal articles on marine hoses, as seen in Table 2.

As seen in Figure 13, it was observed that the country with the highest number of publications was the United States of America (USA), which generated 55 publications, followed United Kingdom (UK), which generated 28 publications, and China, which generated 27 publications. Brazil generated 17 documents, followed by Canada, which generated 14 documents. The Netherlands and Nigeria each generated 11 documents, followed by Japan which generated 10 documents. Next, Denmark, India, and Norway each generated nine publications, followed by Australia, which generated seven publications, France, which generated six publications, New Zealand, which generated four publications, and Germany, which generated three publications. As observed in Figure 13, the highest number of publications in mid-2022 was generated by the USA, and it was double the amount generated by the second country (the UK). Additionally, the USA, the UK, China, Brazil, and Canada, which have the broadest global network of collaboration, are at the vanguard of academic engagement. It is hoped that other nations will close the gap in terms of the publication ratio from that of the top countries, such as the USA, which has 55 publications, almost doubling the second (the UK), which has 28 publications.

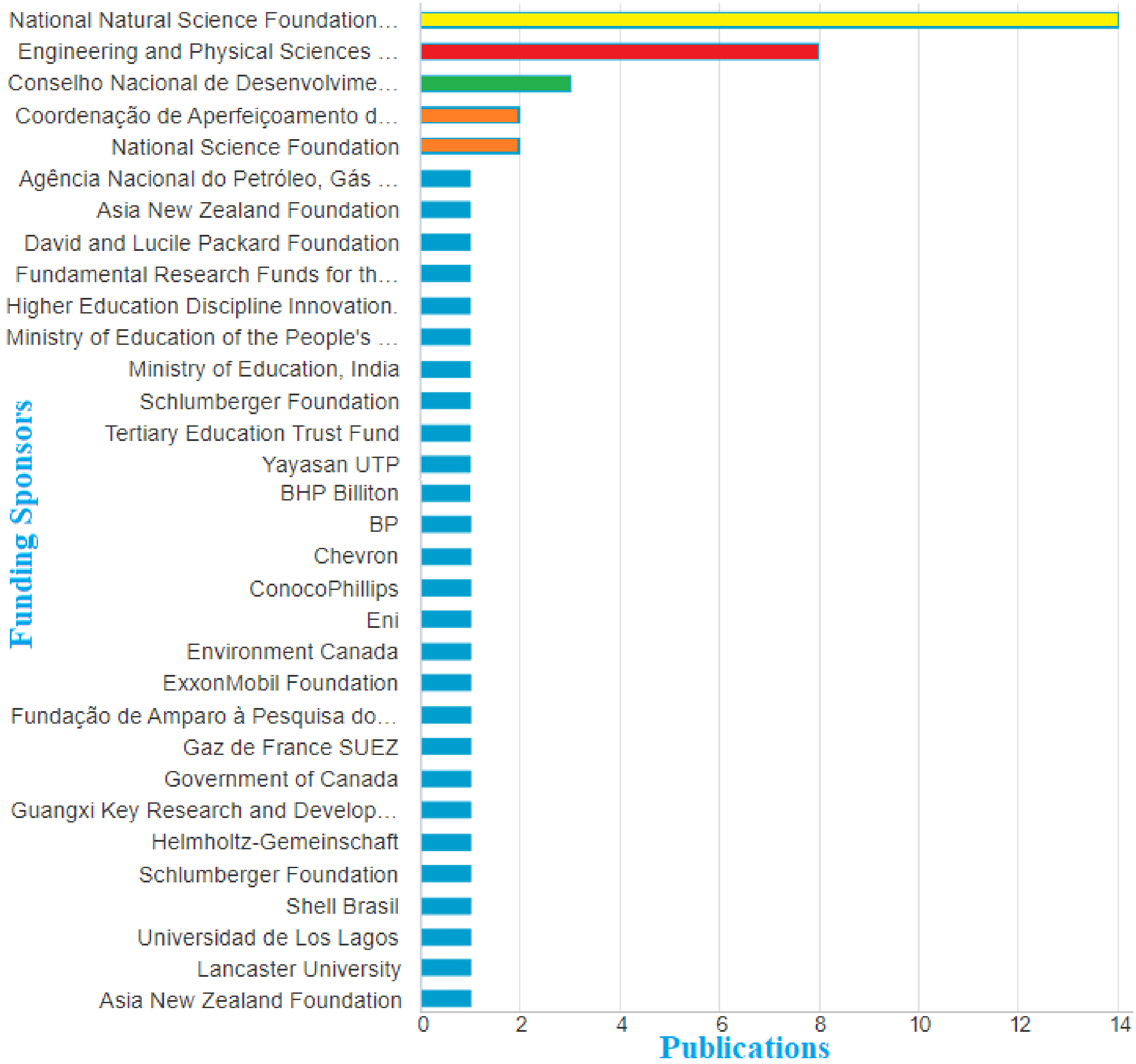


**Figure 12.** The affiliations by industry companies for the research on "marine hose" (data retrieved from Scopus database, 24 July 2022).

**Table 1.** Funding details of the top fundings on marine hose research (data retrieved from WoS database, 24 July 2022).

| Grant Numbers | Record Count | % of 223 | Grant Numbers | Record Count | % of 223 |
|---|---|---|---|---|---|
| 51922064 | 10 | 4.484 | 919929 | 1 | 0.448 |
| 51879143 | 5 | 2.242 | 943682 | 1 | 0.448 |
| 2000.0067652.11.9 | 4 | 1.794 | 1048926 | 1 | 0.448 |
| 200020_172476 | 3 | 1.345 | 1061335 | 1 | 0.448 |
| 17h06323 | 2 | 0.897 | 1063441 | 1 | 0.448 |

**Table 1.** *Cont.*

| Grant Numbers | Record Count | % of 223 | Grant Numbers | Record Count | % of 223 |
|---|---|---|---|---|---|
| 2017561 | 2 | 0.897 | 11170682 | 1 | 0.448 |
| 22101005 | 2 | 0.897 | 11171068 | 1 | 0.448 |
| 243908 | 2 | 0.897 | 1118615 | 1 | 0.448 |
| Jp1801633 | 2 | 0.897 | 1129580 | 1 | 0.448 |
| Nrg-2006.06 | 2 | 0.897 | 118 | 1 | 0.448 |
| S-10 | 2 | 0.897 | 1266 | 1 | 0.448 |
| Sg-06-267 | 2 | 0.897 | 139656 | 1 | 0.448 |
| 325421 | 1 | 0.448 | 1401778 | 1 | 0.448 |
| 325556 | 1 | 0.448 | 1401802 | 1 | 0.448 |
| 744636 | 1 | 0.448 | 14gs0202 | 1 | 0.448 |

NB: Please see Supplementary Data for detailed list.

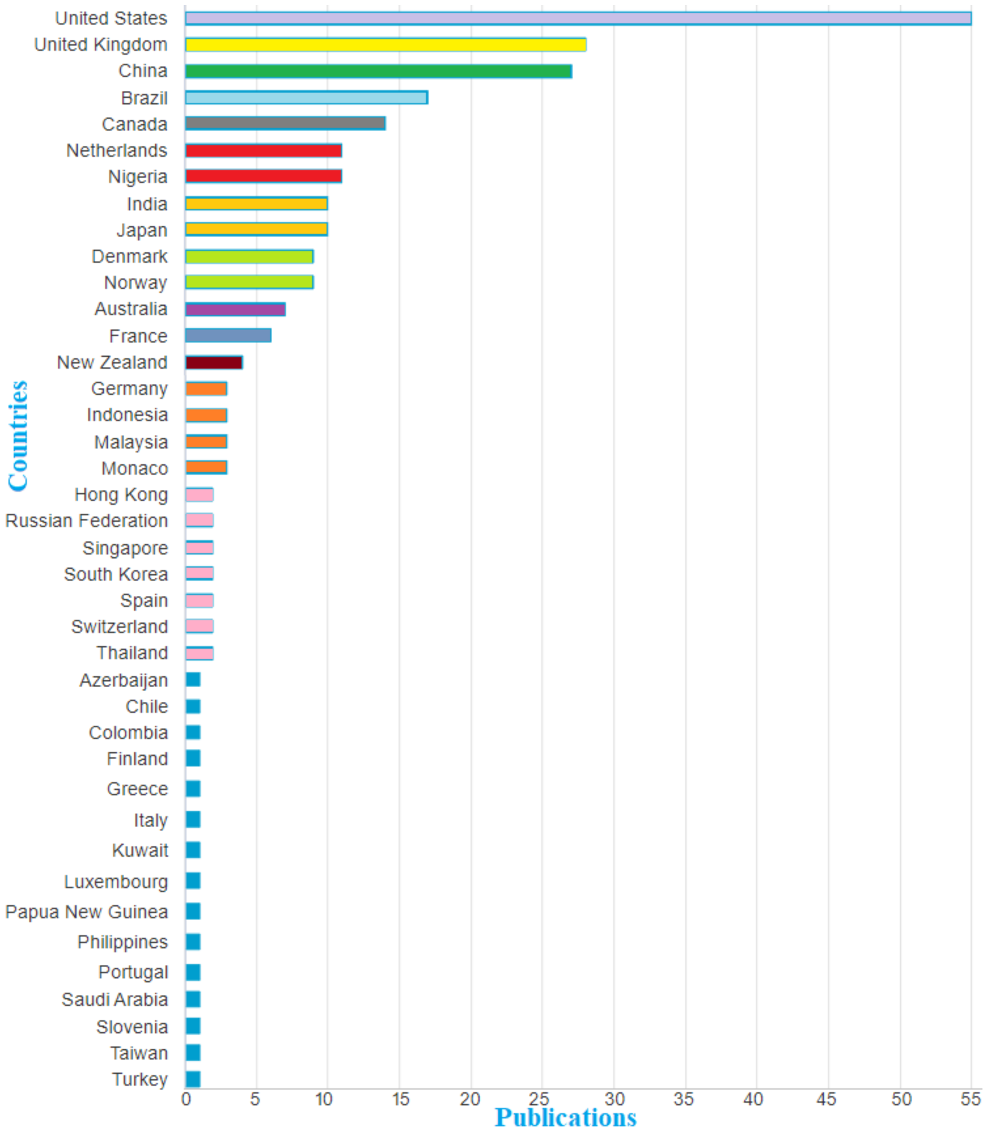


**Figure 13.** The research on "marine hose" research (data retrieved from Scopus database, 24 July 2022).

**Table 2.** Funding details of the top funders on marine hose research (data retrieved from WoS database, 24 July 2022).

| Publication Titles | H-Index | Record Count | % of 223 |
|---|---|---|---|
| Journal of Marine Science and Engineering | 29 | 10 | 4.484 |
| Marine Environmental Research | 100 | 7 | 3.139 |
| Marine and Freshwater Research | 93 | 6 | 2.691 |
| Climate Dynamics | 172 | 5 | 2.242 |
| Journal of Coastal Research | 95 | 5 | 2.242 |
| Ocean Engineering | 109 | 5 | 2.242 |
| Quaternary Science Reviews | 192 | 5 | 2.242 |
| Marine Structures | 71 | 4 | 1.794 |
| Marine Technology Society Journal | 45 | 4 | 1.794 |
| Proceedings of the International Offshore and Polar Engineering Conference | 49 | 3 | 1.345 |
| Science of the Total Environment | 275 | 3 | 1.345 |
| Engineering Structures | 155 | 2 | 0.897 |
| Environmental Science Technology | 425 | 2 | 0.897 |
| ICES Journal of Marine Science | 125 | 2 | 0.897 |
| IOP Conference Series Earth and Environmental Science | 34 | 2 | 0.897 |
| Proc. of the ASME Inter. Conf. on Ocean Offshore Mech. and Arctic Engin.-OMAE | 47 | 2 | 0.897 |
| Proc. of the Inst. Of Mech. Engin. Part L Journal of Materials Design And Appli. | 38 | 2 | 0.897 |
| Proc. of the Inst. of Mech. Engin. Part M Journal of Engin. for The Maritime Env. | 36 | 2 | 0.897 |
| Ships and Offshore Structures | 32 | 2 | 0.897 |
| Engineering with Computers | 60 | 1 | 0.448 |
| Environmental Health Perspectives | 297 | 1 | 0.448 |
| Environmental Research Letters | 142 | 1 | 0.448 |
| Fluids | 18 | 1 | 0.448 |
| Frontiers in Earth Science | 35 | 1 | 0.448 |
| Inventions | 18 | 1 | 0.448 |
| Journal of Advances in Modeling Earth Systems | 69 | 1 | 0.448 |
| Journal of Composites Science | 23 | 1 | 0.448 |
| Journal of Engineering Mechanics ASCE | 131 | 1 | 0.448 |
| Journal of Marine Science and Application | 25 | 1 | 0.448 |
| Journal of Marine Science and Technology | 50 | 1 | 0.448 |
| Journal of Ocean University of China | 26 | 1 | 0.448 |
| Maritime Policy Management | 61 | 1 | 0.448 |
| Ocean Coastal Management | 90 | 1 | 0.448 |
| Ocean Dynamics | 61 | 1 | 0.448 |
| Ocean Science | 60 | 1 | 0.448 |
| Science | 1229 | 1 | 0.448 |
| Science Advances | 178 | 1 | 0.448 |

NB: Please see Supplementary Data for detailed list.

Another parameter investigated is the authorship of the research pattern for marine hoses. The impact of authorship on the research and its breakdown of publication volume is understood in the first part of the component meta-analysis. The scholarly material on marine hoses used to visualize the mapped network was authored by a variety of researchers. Looking at the publication output based on the influence of authors in Figure 14, the author with the most publications was identified as Amaechi C.V., with 11 publications in this study area. They were followed by Wang F., 10 publications, and Ye J., 9 publications, then Brown M.J. with 5 publications. Next, a set of authors published four publications, which were Amico S.C., Butler H.O., Chesterton C., and Tonatto M.L.P. They were followed by the next set of authors who published three publications, which were Fore MMC, Hvidbak F., Moffatt C., Tita V., and Yang Z. The last set of authors published two publications and included authors such as Ahlf J. and Halliwell A.R.

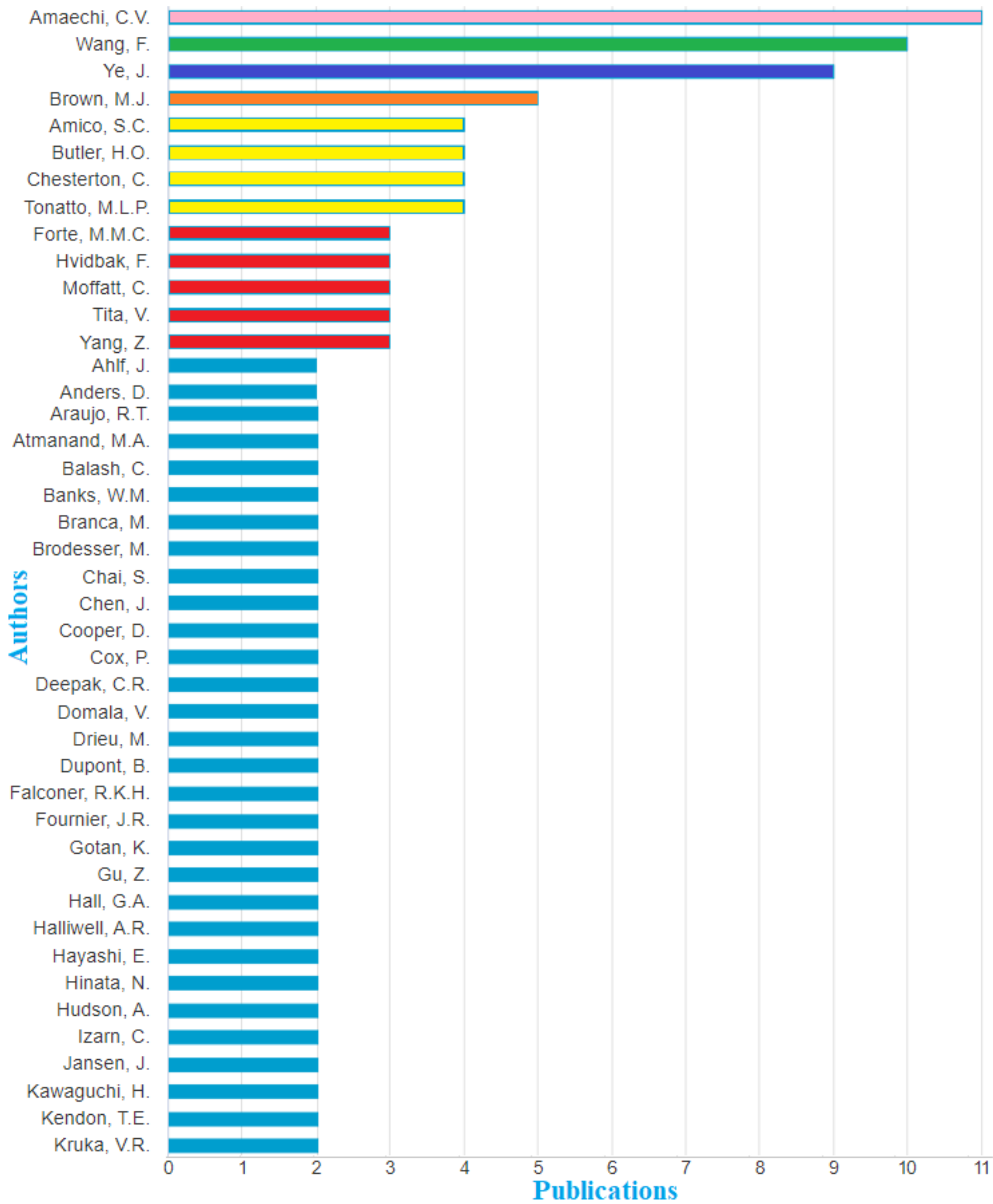


**Figure 14.** The authorship for the research on "marine hose" showing the top authors in chronological order (data retrieved from Scopus database, 24 July 2022).

The authors' names were further filtered to check how many papers were created annually on this topic to visualize the influence of affiliations. This search made it easier to understand how the author's research interests affected the calibre of that field's research. However, there were several other authors that were not included in this bar chart in Figure 14 based on other authors that also published works on marine hoses, with over 80 authors having two publications each and 70 authors having one publication each. This study shows that there are more recent studies in this area. The authors with the highest number of citations per publication were also further investigated. It should be noted that the most extensively cited related works are the contributions of the most recent works by authors with the highest h-index. However, authors with the greatest h-index are among those who have conducted extensive research on the topic of marine hoses over a long period of time. The postprocessing of the authorship data was conducted in VOSviewer, as shown in Figure 15. It shows 13 clusters for different authorships as coloured nodes on the density visualization map.

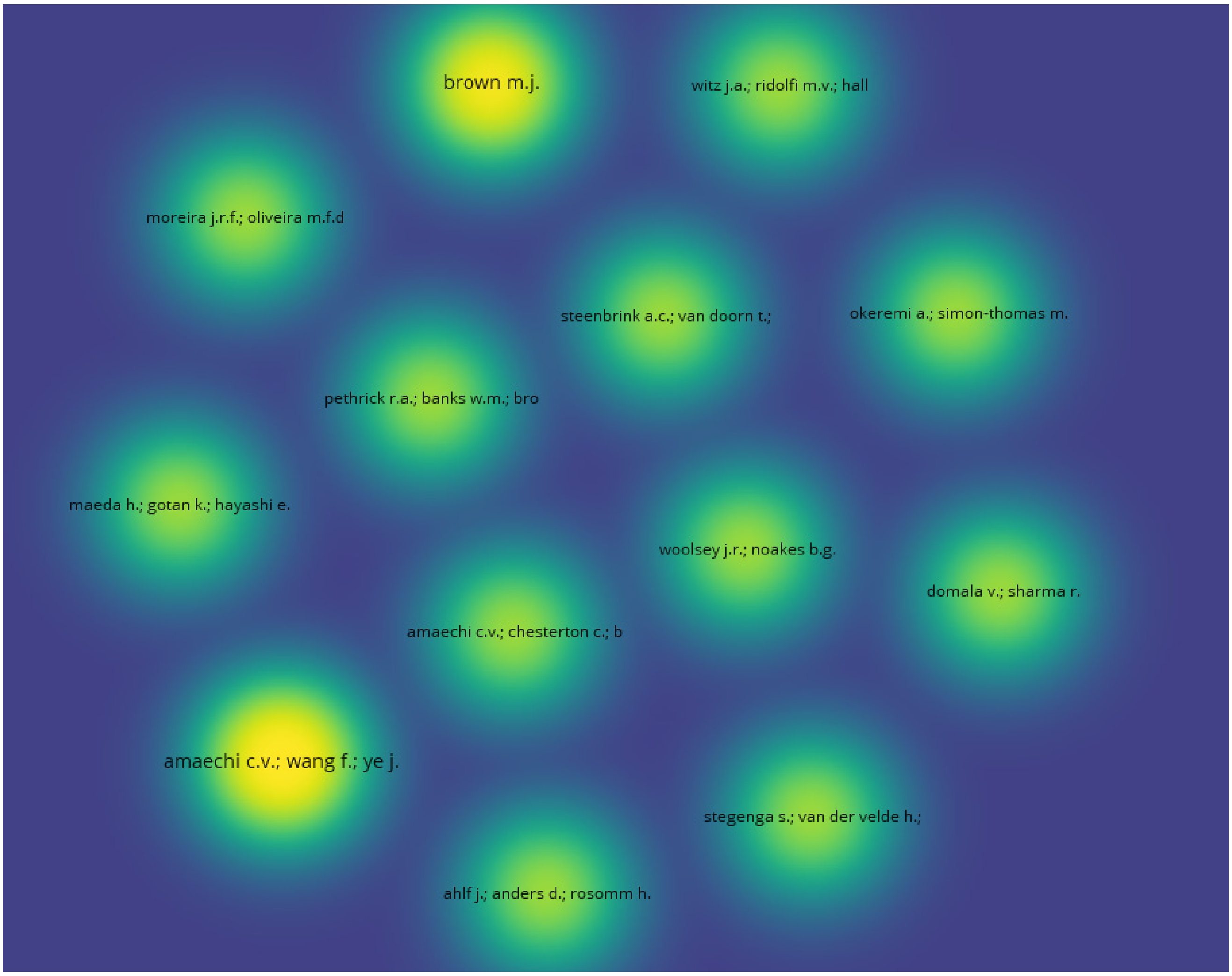


**Figure 15.** The density visualization map on co-authorship for the research on "marine hose using VOSviewer (data retrieved from Scopus database, 24 July 2022).

## 4. Thematic Areas for the Research Trends on Marine Hose

The consideration of thematic areas from the meta-analysis on marine hoses has been presented using standard research methods. The goal of this section is to examine themes for conducting thematic analysis based on qualitative research. The procedure involves findings obtained from the literature search, analyzing the data, and reporting patterns (themes) within the subject area. In principle, thematic analysis is similar to a literature review, which is an evaluation of prior research on this particular topic of marine hoses [7,8,17–21]. The taxonomy framework criteria listed in Section 3 were used to identify the thematic areas for the research trends on marine hoses. However, future research should include both qualitative and quantitative analyses in relation to the highlighted issues, such as performance gap, market value, constraints, etc. Table 3 lists the subject areas that were discovered through references to marine hose research.

The findings from the research trends on applications for marine hoses are seen in various industry standards [188–199], design specifications in various literature [200–211] and other industry regulations [188,192,212–215]. The future marine hoses research area is described in this section. In upcoming scientific literature reviews on research trends for marine hoses, visualization mapping and network mapping are proposed as potential areas for future study. Due to the difficulty of adaption, acceptance, qualification, and application of composites on marine hoses in the industry, this topic requires further study concerning marine hose development. Therefore, future efforts should focus on adapting novel rubber and composite material models for marine hoses.

**Table 3.** Thematic area for research trend on marine hose.

| No. | Thematic Areas | Sources |
|---|---|---|
| 1 | Classification and Impact of marine hose research | [7,8,17–21] |
| 2 | Technology Adaptation on marine hoses | [4–6,8–13] |
| 3 | Frameworks and Research Designs | [14–16] |
| 4 | Assessments and Research Methods | [20–25] |
| 5 | Drivers of marine hose technology | [26–29] |
| 6 | Benefits or Importance of marine hose | [36–45] |
| 7 | Issues or Barriers of marine hose | [46–49] |
| 8 | Certifications, Guidelines, and Standardization | [8,17–19,189–199] |
| 9 | Application of marine hoses on SPMs | [7,70,111,200–211] |

## 5. Future Research Areas on Marine Hose

Some areas require further research and development work involving collaboration between industry and academia to enable marine hose development with FRP composites. This will enable the optimization of marine hoses for deep-water applications. More research and collaboration on the application of marine hoses in the offshore oil and gas industry is recommended. To enable FRP composites to be used for critical deep-water applications in the offshore oil and gas industry, more research and development work involving collaboration between industry and academia is needed in the following areas:

1. There is a need for the design of more novel configurations for both flexible and rigid marine risers and pipelines for deep water applications using more numerical models. Since marine hoses are represented by beam elements, the effect of internal pressure on the performance of the hoses is not directly involved. Further research on the effect of the stiffness of the beams can be investigated to represent the effect of internal pressure. Further recommendations include conducting structural verifications on the marine hose model. It could include studying each hose section in local design for tensions and moments. Additionally, structural verifications should be obtained regarding crucial points, end fittings, couplings, and hose end valves (HEVs). This could be achieved using a specified and examined model for the full hose under global loads. The adequacy of all sections to bear the pressures and moments owing to global loads can be validated.

2. Given that cyclic loads are indicative of a continuous process during hose tests, it is evident that loading affects the hose behavior, and this may result in increased fatigue of the hose, particularly indicating the potential for fatigue studies on various bonding layers used in the submarine hose. Additionally, there is a requirement for the assessment of long-term characteristics of composite materials in deep-water environments in the oil and gas industry. More work is needed to develop precise, detailed designs of the connectors, marine hose joints, end valves, and hose layers. Additionally, future work could include

the application of additive manufacturing in the oil and gas industry for marine hose development. Further work can be continued in manufacturing components for marine hoses, such as end fitting and hose section couplings.

3. The cost implications of marine hoses should be considered in future research. Additionally, the implication of global events such as oil price fluctuation, economic recession, and the COVID-19 pandemic on marine hose development can be studied in future studies. Based on recent findings on marine hoses, it is recommended that a new standard on guidance for the design, utilization factor, and material combinations for marine hoses be elaborated. This is proposed based on the findings of assessing the strength of submarine hoses attached to CALM buoys. Additionally, hose connections to FPSOs under water waves and global loading should be proposed for elaboration in future research.

4. More understanding on the motion of submarine hoses and floating hoses using fluid–structure interaction (FSI) and computational fluid dynamic (CFD) models is recommended on marine hoses for oil and gas applications. A typical hose motion behavior that requires more studies is the snaking behavior of marine hoses. Additionally, the determination of the dynamic responses of marine hoses, such as the surface current effect, the wave–current interaction (WCI), and vortex-induced vibrations (VIV), is required.

5. Due to the short service life of marine hoses, further study on the reliability analysis of the marine hose is recommended in future research. There is limited literature in the public domain on the reliability analysis of marine hoses, reliability analysis of CALM buoy systems, and structural verification of marine hoses, which are all significant gaps in the literature. Additionally, safety analysis of single point mooring system (SPM) terminals is also recommended in future research to include hawsers and other mooring lines.

6. Creation of databases for the development of marine hoses. Additionally, update the existing manufacturing technology to develop faster and more cost-effective manufacturing processes. Furthermore, the creation of specific databases to record accidents related to marine hoses and failures of marine hoses is suggested. However, existing industry databases, such as HSE's RIDDOR, consider marine risers and pipelines.

7. Further study is recommended on the analysis methods for hose designs using specialized software, such as Orcaflex, for assessing the fatigue of marine hoses and for the investigation of the behavior of marine hoses is recommended. More research is required to include fatigue analysis of submarine hoses in future research. Future research can look into developing a specialized FE code for marine hose analysis. This can be achieved through collaboration between engineering fields and computer code developers on the influence of debonding on the performance of the marine bonded composite hose (MBCH).

8. A full sensitivity study could be included in the global analysis based on different layers designed for hose sections to examine the resilience of the hose model and provide further validation, even if another FEA convergence study is not required. The effect of the shortest period (Tz) or peak period (Tp) on the marine hose structure per hose section can be studied. Additionally, the effect of different fluid densities in the marine hose under global design is recommended in future research. Based on the novel method for the assessment of the strength of marine hoses proposed in this study, that is, the guidance values using the proposed $DAF_{hose}$ method, we recommend that more work is conducted to develop a table of these values for different types of marine hoses, and different bore dimensions. This will serve as design guidance for hose designers and hose manufacturers.

9. Future research should also work towards implementing a new manufacturing framework for marine hoses that will reduce the failure of marine composite tubulars along the longitudinal lines, aligning to the manufacturing die piece. Full-scale testing of marine bonded hoses to investigate parameters such as delamination and metal-to-composite interfaces (MCI) is recommended. It is also recommended that more experimental work on full-scale marine hoses be conducted. Additionally, there should be more collaboration between the industry and academia on marine hose research. This will help to promote knowledge transfer in the subject area and improve research trends.

## 6. Concluding Remarks

Currently, there is still high global dependence on fossil fuels, which require lighter sustainable materials for energy production, such as marine hoses. The deluge of publications that are released each year could obscure much of the knowledge gained from research on marine hoses. Consequently, it is important to examine the bibliographic output of marine hose research. In this study, a scientometric review of research trends for marine hoses with visualization mapping was presented. The study expatiated an understanding of marine hoses from meta-analysis and bibliometric review using data retrieved from academic databases. This paper detailed the findings from the scientometric review on research trends conducted on marine hoses, which shows the progress made in the development of marine hoses. This research also presented the application of state-of-the-art tools for scientific literature reviews. Section 1 introduced the research on marine hoses and the application of a scientific literature review in this industry and related areas. In Section 2, the methodology for the detailed meta-science analysis was presented. It also showed how it was conducted with comprehensive steps taken with a focus on the publication data obtained from source databases. The research design included the use of recent scholarly articles from two academic databases, SCOPUS and Web of Science (WoS). Both databases cover high-impact journal papers and conference papers in the subject area. Despite this, some sorting was carried out as it was noticed that some related articles on marine composites were captured and evaluated by considering the state-of-the-art on marine hoses. In Section 3 of this meta-science analysis and scientometric review, the results and discussion were presented. The results were based on findings from these data retrieval and text-mining tools, while Section 4 presented thematic areas with some implications of the research trends with future areas. Section 5 presented the conclusions drawn from this study.

The following are the research's key highlights:

- The research on marine hoses for the offshore marine industry is the first subject of this scientometric review.
- Secondly, a thorough meta-science study of marine hoses was performed using academic databases.
- Thirdly, using the available literature, the assessment of the marine hose research was examined.
- Fourthly, to visualize the outcomes, a thorough analysis of the data was conducted utilizing cutting-edge techniques using tools such as Voyant tools for the word cloud.
- Lastly, the examination of the research pattern was based on the outcome of this scientometric analysis on marine hoses, which also showed progress on the developments made.

The findings from this study reflect that there are currently more publications on marine hoses. These publication fields from the data gathered include general research, engineering, and science. An important finding from the research trend is the increased research on the reinforcements for marine hoses, as conducted in more recent studies [68,74,75,88,216–220]. Additionally, based on the publication categories, journal articles, review articles, conference papers, and notes are among the publication categories. There are various authors from each of these universities, and various sponsors or donors have funded some of the articles. A more in-depth examination of the funding agencies' effects is provided in the following subsection. As hoses are still being developed for various applications such as the marine industry, the affiliations have a range of publication types, which include collections of documents, and some only have one publication. Additionally, it was noted that the papers from these prestigious affiliations were additionally published in high-impact periodicals. The authors of the papers from these highest affiliations are among individuals with a wealth of research experience on marine hoses. This thorough meta-science examination of the topic also revealed recent developments, geographical activity by countries, authorship histories, partnerships, funding organizations, affiliations, co-occurrences, and potential research subjects. According to the study trends, it was discovered that the USA has the most publications in the field of maritime hoses and associated fields. The study showed other countries that had publications, but there were fewer co-occurrences with other associations outside the cluster. In addition, the meta-analysis offers research funders a useful analysis of the advancement of the field and the impact of their financial support on research projects. The outcomes also display authorship, co-authorship, citations, affiliations, and keywords related to the study on the "marine hose". Therefore, to sustainably advance the research trend, more funding sources and collaborations on marine hoses are required. Additionally, this study demonstrates the impact of affiliations and the accurate documentation of financial acknowledgements on research databases and repositories. Lastly, this study demonstrates the techno-economic benefits that are derived from marine hoses as its research trend sets future paths for both academia and business.

**Supplementary Materials:** The supplementary data used in the study can be downloaded at: https://data.mendeley.com/drafts/sv792pk7c3 (accessed on 4 October 2022); with the following details: Amaechi, C.V. (2022), "Supplementary Data on Scientometrics of Marine Hose", *Mendeley Data*, V2, doi: 10.17632/sv792pk7c3.2. Also, for the word clouds using Voyant tools, the following URL suffices: https://voyant-tools.org/?corpus=9f569e9097a7c565cf86c2df9cf42474 (accessed on 4 October 2022).

**Author Contributions:** Conceptualization, C.V.A.; methodology, C.V.A.; software, C.V.A.; validation, C.V.A., I.A.J., A.R. and X.J.; formal analysis, C.V.A.; investigation, C.V.A.; resources, C.V.A.; writing—original draft preparation, C.V.A.; writing—reviewing the draft, C.V.A., I.A.J., A.R. and X.J.; data curation, C.V.A.; visualization, C.V.A., I.A.J., A.R. and X.J.; supervision, C.V.A.; project administration, C.V.A.; funding acquisition, C.V.A. All authors have read and agreed to the published version of the manuscript.

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**Data Availability Statement:** The raw/processed data required to reproduce these findings are to be shared as supplementary data. The data also forms part of an ongoing study.

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## References

1. BP. *BP Statistical Review of World Energy-2022*, 71st ed.; BP PLC: London, UK, 2022; Available online: https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2022-full-report.pdf (accessed on 29 August 2022).
2. IEA. *World Energy Outlook 2021 (WEO-2021). International Energy Agency (IEA), Directorate of Sustainability, Technology and Outlooks*; IEA: Paris, France, 2021; Available online: https://iea.blob.core.windows.net/assets/4ed140c1-c3f3-4fd9-acae-789a4e14a23c/WorldEnergyOutlook2021.pdf (accessed on 29 August 2022).
3. Hamza, M.F.; Sinnathambi, C.M.; Merican, Z.M.A. Recent advancement of hybrid materials used in chemical enhanced oil recovery (CEOR): A review. *IOP Conf. Ser. Mater. Sci. Eng.* **2017**, *206*, 012007. [CrossRef]
4. Hassan, A.M.; Al-Shalabi, E.W.; Ayoub, M.A. Updated Perceptions on Polymer-Based Enhanced Oil Recovery toward High-Temperature High-Salinity Tolerance for Successful Field Applications in Carbonate Reservoirs. *Polymers* **2022**, *14*, 2001. [CrossRef] [PubMed]

5. Aravind, D.; Senthilkumar, K.; Rajini, N.; Kumar, T.S.M.; Chandrasekar, M.; Ismail, S.O.; Yeetsorn, R.; Parameswaranpillai, J.; Siengchin, S.; Devi, M.I. Feasibility of elastomeric composites as alternative materials for marine applications: A compendious review on their properties and opportunities. *Proc. Inst. Mech. Eng. Part M J. Eng. Marit. Environ.* **2022**, *236*, 14750902221095321. [CrossRef]
6. Campion, R.P.; Thomson, B.; Harris, J.A. *Elastomers for Fluid Containment in Offshore Oil and Gas Production: Guidelines and Review*; Research Report 320; Prepared by MERL Ltd. for the Health and Safety Executive (HSE): Norwich, UK, 2005. Available online: https://www.hse.gov.uk/research/rrpdf/rr320.pdf (accessed on 29 August 2022).
7. Amaechi, C.V.; Wang, F.; Ye, J. Mathematical Modelling of Bonded Marine Hoses for Single Point Mooring (SPM) Systems, with Catenary Anchor Leg Mooring (CALM) Buoy application—A Review. *J. Mar. Sci. Eng.* **2021**, *9*, 1179. [CrossRef]
8. Craig, I. Review of Bonded Rubber Flexible Hose Design Codes and Guidelines in Relation to Sea Water Intake Risers on FPSO Vessels. In Proceedings of the Paper Presented at the Offshore Technology Conference Asia, Kuala Lumpur, Malaysia, 22–25 March 2016. [CrossRef]
9. McGeorge, D.; Sodahl, N.; Moslemian, R.; Horte, T. Hybrid and composite risers for deep waters and aggressive reservoirs. In Proceedings of the 14th Offshore Mediterranean Conference (OMC) and Exhibition, Ravenna, Italy, 27–29 March 2019.
10. Cheldi, T.; Cavassi, P.; Serricchio, M.; Spenelli, C.M.; Vietina, G.; Ballabio, S. Use of spoolable reinforced thermoplastic pipes for oil and water transportation. In Proceedings of the 14th Offshore Mediterranean Conference (OMC) and Exhibition, Revenna, Italy, 27–29 March 2019.
11. de Leon, A.C.C.; da Silva, G.; Pangilinan, K.D.; Chen, Q.; Caldona, E.B.; Advincula, R.C. High performance polymers for oil and gas applications. *React. Funct. Polym.* **2021**, *162*, 104878. [CrossRef]
12. Raj, K.; Vasudevan, A.; Pugazhendhi, L. A review on different hybrid composites for aircraft structures. *Mater. Today Proc.* **2021**. *ahead of print*. [CrossRef]
13. Swolfs, Y.; Gorbatikh, L.; Verpoest, I. Fibre hybridisation in polymer composites: A review. *Compos. Part A Appl. Sci. Manuf.* **2014**, *67*, 181–200. [CrossRef]
14. Antaki, G.A. *Piping and Pipeline Engineering*; Marcel Dekker Inc.: New York, NY, USA, 2013; pp. 104–174. [CrossRef]
15. Yu, K.; Morozov, E.V.; Ashraf, M.A.; Shankar, K. A review of the design and analysis of reinforced thermoplastic pipes for offshore applications. *J. Reinf. Plast. Compos.* **2017**, *36*, 1514–1530. [CrossRef]
16. Oladele, I.O.; Omotosho, T.F.; Adediran, A.A. Polymer-Based Composites: An Indispensable Material for Present and Future Applications. *Int. J. Polym. Sci.* **2020**, *2020*, 8834518. [CrossRef]
17. Amaechi, C.V.; Chesterton, C.; Butler, H.O.; Wang, F.; Ye, J. Review on the design and mechanics of bonded marine hoses for Catenary Anchor Leg Mooring (CALM) buoys. *Ocean Eng.* **2021**, *242*, 110062. [CrossRef]
18. Amaechi, C.V.; Chesterton, C.; Butler, H.O.; Wang, F.; Ye, J. An Overview on Bonded Marine Hoses for sustainable fluid transfer and (un)loading operations via Floating Offshore Structures (FOS). *J. Mar. Sci. Eng.* **2021**, *9*, 1236. [CrossRef]
19. Amaechi, C.V.; Wang, F.; Ja'E, I.A.; Aboshio, A.; Odijie, A.C.; Ye, J. A literature review on the technologies of bonded hoses for marine applications. *Ships Offshore Struct.* **2022**, 1–32, *ahead of print*. [CrossRef]
20. Løtveit, S.A.; Muren, J.; Nilsen-Aas, C. *Bonded Flexibles–State of the Art Bonded Flexible Pipes*; 26583U-1161480945-354, Revision 2.0, Approved on 17.12.2018; PSA: Asker, Norway, 2018; pp. 1–75. Available online: https://www.4subsea.com/wp-content/uploads/2019/01/PSA-Norway-State-of-the-art-Bonded-Flexible-Pipes-2018_4Subsea.pdf (accessed on 17 June 2022).
21. Muren, J.; Caveny, K.; Eriksen, M.; Viko, N.G.; MÜLler-Allers, J.; JØRgen, K.U. *Un-Bonded Flexible Risers–Recent Field Experience and Actions for Increased Robustness*; 0389-26583-U-0032, Revision 5.0; PSA: Asker, Norway, 2013; Volume 2, pp. 1–78. Available online: https://www.ptil.no/contentassets/c2a5bd00e8214411ad5c4966009d6ade/un-bonded-flexible-risers--recent-field-experience-and-actions--for-increased-robustness.pdf (accessed on 12 June 2022).
22. Drumond, G.P.; Pasqualino, I.P.; Pinheiro, B.C.; Estefen, S.F. Pipelines, risers and umbilicals failures: A literature review. *Ocean Eng.* **2018**, *148*, 412–425. [CrossRef]
23. Li, X.; Jiang, X.; Hopman, H. A review on predicting critical collapse pressure of flexible risers for ultra-deep oil and gas production. *Appl. Ocean Res.* **2018**, *80*, 1–10. [CrossRef]
24. Xiao, L.; Jiang, X.; Hopman, H. Prediction of the critical collapse pressure of ultra-deep water flexible risers-a: Literature review. *FME Trans.* **2018**, *46*, 306–312. [CrossRef]
25. Muren, J. *Failure Modes, Inspection, Testing and Monitoring*; PSA Norway Report. Report Number D5996-RPT01-REV02; PSA: Asker, Norway, 2017; Available online: https://www.ptil.no/contentassets/a4c8365164094826a24499ef9f22742b/p5996rpt01rev02cseaflex_janmuren.pdf (accessed on 2 November 2021).
26. Piccoli, D. Hose Design for Unusual Hose Applications. *J. Elastomers Plast.* **1976**, *8*, 403–413. [CrossRef]
27. Amaechi, C.V.; Chesterton, C.; Butler, H.O.; Gillet, N.; Wang, C.; Ja'E, I.A.; Reda, A.; Odijie, A.C. Review of Composite Marine Risers for Deep-Water Applications: Design, Development and Mechanics. *J. Compos. Sci.* **2022**, *6*, 96. [CrossRef]
28. Hanonge, D.; Luppi, A. Challenges of flexible riser systems in shallow waters. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 3–6 May 2010; pp. 1–10. [CrossRef]
29. Mikulić, A.; Katalinić, M.; Ćorak, M.; Parunov, J. The effect of spatial correlation of sea states on extreme wave loads of ships. *Ships Offshore Struct.* **2021**, *16*, 22–32. [CrossRef]
30. Sasmal, K.; Miratsu, R.; Kodaira, T.; Fukui, T.; Zhu, T.; Waseda, T. Statistical model representing storm avoidance by merchant ships in the North Atlantic Ocean. *Ocean Eng.* **2021**, *235*, 109163. [CrossRef]

31. Miratsu, R.; Fukui, T.; Matsumoto, T.; Zhu, T. Quantitative Evaluation of Ship Operational Effect in Actually Encountered Sea States. In Proceedings of the ASME 2019 38th International Conference on Ocean, Offshore and Arctic Engineering. Volume 3: Structures, Safety, and Reliability, Glasgow, UK, 9–14 June 2019; ASME: New York, NY, USA, 2019; p. V003T02A043. [CrossRef]
32. Miratsu, R.; Fukui, T.; Matsumoto, T.; Zhu, T. Study on Ship Operational Effect for Defining Design Values on Ship Motion and Loads in North Atlantic. In Proceedings of the ASME 2020 39th International Conference on Ocean, Offshore and Arctic Engineering. Volume 2A: Structures, Safety, and Reliability, Virtual, Online, 3–7 August 2020; ASME: New York, NY, USA, 2020; p. V02AT02A043. [CrossRef]
33. Taboada, J.V.; Lemu, H.G. Analysis of Wave Energy Sources in the North Atlantic Waters in View of Design Challenges. In Proceedings of the ASME 2016 35th International Conference on Ocean, Offshore and Arctic Engineering. Volume 6: Ocean Space Utilization; Ocean Re-newable Energy, Busan, South Korea, 19–24 June 2016; ASME: New York, NY, USA, 2016; p. V006T09A011. [CrossRef]
34. Yadav, A.; Varghese, S.M.; Thiagarajan, K.P. Parametric Study of Yaw Instability of a Weathervaning Platform. In Proceedings of the 16th Australasian Fluid Mechanics Conference, Crown Plaza, GC, Australia, 2–7 December 2007; Available online: https://people.eng.unimelb.edu.au/imarusic/proceedings/16/Yadav.pdf (accessed on 29 August 2022).
35. Hasselmann, K.; Barnett, T.P.; Bouws, E.; Carlson, H.; Cartwright, D.E.; Enke, K.; Ewing, J.A.; Gienapp, A.; Hasselmann, D.E.; Kruseman, P.; et al. Measurements of wind-wave growth and swell decay during the Joint North Sea Wave Project (JONSWAP). *Ergänzungsheft Zur Dtsch. Hydrogr. Z. Ergänzungsheft Reihe A* **1973**, *12*. Available online: https://pure.mpg.de/pubman/faces/ViewItemOverviewPage.jsp?itemId=item_3262854 (accessed on 29 August 2022).
36. Amaechi, C.V.; Wang, F.; Ye, J. Numerical studies on CALM buoy motion responses and the effect of buoy geometry cum skirt dimensions with its hydrodynamic waves-current interactions. *Ocean Eng.* **2021**, *244*, 110378. [CrossRef]
37. Amaechi, C.V.; Wang, F.; Ye, J. Numerical Assessment on the Dynamic Behaviour of Submarine Hoses Attached to CALM Buoy Configured as Lazy-S under Water Waves. *J. Mar. Sci. Eng.* **2021**, *9*, 1130. [CrossRef]
38. Rampi, L.; Lavagna, P.; Mayau, D. TRELLINE? A Cost-Effective Alternative for Oil Offloading Lines (OOLs). In Proceedings of the Paper presented at the Offshore Technology Conference, Houston, TX, USA, 1–4 May 2006. [CrossRef]
39. Mayau, D.; Rampi, L. Trelline—A New Flexible Deepwater Offloading Line (OLL). In Proceedings of the Paper presented at the The Sixteenth International Offshore and Polar Engineering Conference, San Francisco, CA, USA, 28 May–2 June 2006; Available online: https://onepetro.org/ISOPEIOPEC/proceedings-abstract/ISOPE06/All-ISOPE06/ISOPE-I-06-127/9875 (accessed on 22 August 2022).
40. Nehme, R.; Dethoor, X. Oil Offloading Lines and Fiber Optic Cable Package. In Proceedings of the Paper Presented at the Offshore Technology Conference, Houston, TX, USA, 4–7 May 2015. [CrossRef]
41. Prischi, N.; Mazuet, F.; Frichou, A.; Lagarrigue, V. SS-Offshore Offloading Systems and Operations Bonded Flexible Oil Offloading Lines, A Cost Effective Alternative to Traditional Oil Offloading Lines. In Proceedings of the Paper presented at the Offshore Technology Conference, Houston, TX, USA, 30 April–3 May 2012. [CrossRef]
42. Minguez, M.; Clergue, S.; Van Kessel, J.; Bessière, L.; Pattedoie, S.; Renaud, M.; Skledar, M.; Lange, F.; Miller, E.; Masterton, S. Water Intake Riser WIR–from Design to Installation, an Example of Complex Structure Requiring Multi-Disciplinary Approach. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 4–7 May 2020. [CrossRef]
43. Katona, T.; Nagy, T.; Zandiyeh, A.R.K.; Prinz, M.; Boros, A. High performance flexible lines for the Oil industry. In Proceedings of the IRC 2009, Nuremberg, Germany, 29 June–2 July 2009; Kautschuk und Gummi Kun-ststoffe KGK: Heidelberg, Germany, 2009; pp. 589–592. Available online: https://www.kgk-rubberpoint.de/wp-content/uploads/migrated/paid_content/artikel/910.pdf (accessed on 24 July 2022).
44. Nagy, T.; Antal, S.; Boros, A.; Sergely, Z.I. High pressure hoses for the offshore oil industry. Hochdruckschläuche in der Offshore Ölindustrie. In Proceedings of the DKG-Fachlagung 98, Fulda, Germany, 30 June–1 July 1999; Kautschuk und Gummi Kunststoffe: Heidelberg, Germany, 1999; Volume 52, pp. 482–485. Available online: https://www.researchgate.net/publication/291532602_High_pressure_hoses_for_the_offshore_oil_industry (accessed on 2 November 2021).
45. Lagarrigue, V.; Hermary, J.; Mauries, B. Qualification Of A Cryogenic Floating Flexible Hose Enabling Safe And Reliable Offshore LNG Transfer For Tandem FLNG Offloading Systems. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 5–8 May 2014. [CrossRef]
46. Lassen, T.; Eide, A.L.; Meling, T.S. Ultimate Strength and Fatigue Durability of Steel Reinforced Rubber Loading Hoses. In Proceedings of the 29th International Conference on Ocean, Offshore and Arctic Engineering: Volume 5, Parts A and B, Shanghai, China, 6–11 June 2010. [CrossRef]
47. Lassen, T.; Lem, A.I.; Imingen, G. Load Response and Finite Element Modelling of Bonded Loading Hoses. In Proceedings of the ASME 2014 33rd International Conference on Ocean, Offshore and Arctic Engineering, San Francisco, CA, USA, 8–13 June 2014; Volume 6A, pp. 1–17. [CrossRef]
48. Lebon, L.; Remery, J. Bonga: Oil Off-loading System using Flexible Pipe. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 6–9 May 2002; pp. 1–12. [CrossRef]
49. Szekely, G.; Peixoto, E. Flexible Hose Technology Benefits for Ship-to-Shore High Pressure Natural Gas Transfer. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 30 April–3 May 2018. [CrossRef]
50. Verschuur, J.; Koks, E.E.; Hall, J.W. Global economic impacts of COVID-19 lockdown measures stand out in high-frequency shipping data. *PLoS ONE* **2021**, *16*, e0248818. [CrossRef] [PubMed]

51. Guzman, J.; Recoco, G.A.; Pandi, A.W.; Padrones, J.M.; Ignacio, J.J. Evaluating workplace safety in the oil and gas industry during the COVID-19 pandemic using occupational health and safety Vulnerability Measure and partial least square Structural Equation Modelling. *Clean. Eng. Technol.* **2022**, *6*, 100378. [CrossRef] [PubMed]
52. Gui, D.; Wang, H.; Yu, M. Risk Assessment of Port Congestion Risk during the COVID-19 Pandemic. *J. Mar. Sci. Eng.* **2022**, *10*, 150. [CrossRef]
53. Jaroń, A. Analysis of the Impact of the COVID-19 Pandemic on the Value of $CO_2$ Emissions from Electricity Generation. *Energies* **2022**, *15*, 4514. [CrossRef]
54. Malkawi, S.; Kiwan, S.; Alzghoul, S. Impact of COVID-19 Response Measures on Electricity Sector in Jordan. *Energies* **2022**, *15*, 3810. [CrossRef]
55. Pilloni, M.; Kádár, J.; Abu Hamed, T. The Impact of COVID-19 on Energy Start-Up Companies: The Use of Global Financial Crisis (GFC) as a Lesson for Future Recovery. *Energies* **2022**, *15*, 3530. [CrossRef]
56. Rutitis, D.; Smoca, A.; Uvarova, I.; Brizga, J.; Atstaja, D.; Mavlutova, I. Sustainable Value Chain of Industrial Biocomposite Consumption: Influence of COVID-19 and Consumer Behavior. *Energies* **2022**, *15*, 466. [CrossRef]
57. Li, L.; Mao, Z.; Du, J.; Chen, T.; Cheng, L.; Wen, X. The Impact of COVID-19 Control Measures on Air Quality in Guangdong Province. *Sustainability* **2022**, *14*, 7853. [CrossRef]
58. Hartwig, L.; Hössinger, R.; Susilo, Y.O.; Gühnemann, A. The Impacts of a COVID-19 Related Lockdown (and Reopening Phases) on Time Use and Mobility for Activities in Austria—Results from a Multi-Wave Combined Survey. *Sustainability* **2022**, *14*, 7422. [CrossRef]
59. Szczepanek, W.K.; Kruszyna, M. The Impact of COVID-19 on the Choice of Transport Means in Journeys to Work Based on the Selected Example from Poland. *Sustainability* **2022**, *14*, 7619. [CrossRef]
60. Stankowska, A. Sustainability Development: Assessment of Selected Indicators of Sustainable Energy Development in Poland and in Selected EU Member States Prior to COVID-19 and Following the Third Wave of COVID-19. *Energies* **2022**, *15*, 2135. [CrossRef]
61. Liu, F.; Ding, Y.; Gao, J.; Gong, P. Effects of Cost Factors on National Manufacturing Based on Global Perspectives. *Economies* **2017**, *5*, 45. [CrossRef]
62. Mills, F.C. Changes in Prices, Manufacturing Costs, and Industrial Productivity, 1929–1934. In *National Bureau of Economic Research, Bulletin 53*; NBER: New York, NY, USA, 1934; pp. 1–16. Available online: https://www.nber.org/system/files/chapters/c1732/c1732.pdf (accessed on 24 July 2022).
63. BIS. Manufacturing in the UK: An Economic Analysis of the Sector. BIS Economics Paper No. 10A, December 2010. BIS, Department for Business Innovation & Skills (BIS), UK. 2010. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/31785/10-1333-manufacturing-in-the-UK-an-economic-analysis-of-the-sector.pdf (accessed on 24 July 2022).
64. Meixell, M.J.; Kenyon, G.N.; Westfall, P. The effects of production outsourcing on factory cost performance: An empirical study. *J. Manuf. Technol. Manag.* **2014**, *25*, 750–774. [CrossRef]
65. Thomas, D.S.; Gilbert, S.W. *Costs and Cost Effectiveness of Additive Manufacturing: A Literature Review and Discussion*; NIST: Gaithersburg, MA, USA, 2014. [CrossRef]
66. Siyanbola, T.T.; Raji, G.M. The Impact of Cost Control on Manufacturing Industries' Profitability. *Int. J. Manag. Soc. Sci. Res. (IJMSSR)* **2013**, *2*, 1–7. Available online: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.300.5829&rep=rep1&type=pdf (accessed on 24 July 2022).
67. Tonatto, M.L.; Tita, V.; Amico, S.C. Composite spirals and rings under flexural loading: Experimental and numerical analysis. *J. Compos. Mater.* **2020**, *54*, 2697–2705. [CrossRef]
68. Tonatto, M.L.; Tita, V.; Forte, M.M.; Amico, S.C. Multi-scale analyses of a floating marine hose with hybrid polyaramid/polyamide reinforcement cords. *Mar. Struct.* **2018**, *60*, 279–292. [CrossRef]
69. Amaechi, C.V.; Wang, F.; Ye, J. Understanding the fluid–structure interaction from wave diffraction forces on CALM buoys: Numerical and analytical solutions. *Ships Offshore Struct.* **2022**. *ahead-of-print*. [CrossRef]
70. O'Donoghue, T. The Dynamic Behaviour of a Surface Hose Attached to a CALM Buoy. Ph.D. Thesis, Heriot-Watt University, Edinburgh, UK; pp. 1–197. Available online: https://www.ros.hw.ac.uk/handle/10399/1045?show=full (accessed on 22 January 2022).
71. Berhault, C.; Guerin, P.; le Buhan, P.; Heurtier, J.M. Investigations on Hydrodynamic and Mechanical Coupling Effects for Deepwater Offloading Buoy. In Proceedings of the 14th International Offshore and Polar Engineering Conference, Toulon, France, 23–28 May 2004; International Society of Offshore and Polar Engineers (ISOPE): Cupertino, CA, USA; Volume 1, pp. 374–379. Available online: https://onepetro.org/ISOPEIOPEC/proceedings-abstract/ISOPE04/All-ISOPE04/ISOPE-I-04-363/10313 (accessed on 11 September 2021).
72. Ricbourg, C.; Berhault, C.; Camhi, A.; Lecuyer, B.; Marcer, R. Numerical and Experimental Investigations on Deepwater CALM Buoys Hydrodynamics Loads. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 1–4 May 2006. [CrossRef]

73. Ryu, S.; Duggal, A.S.; Heyl, C.N.; Liu, Y. Coupled Analysis of Deepwater Oil Offloading Buoy And Experimental Verification. In Proceedings of the Fifteenth International Offshore and Polar Engineering Confer-ence, Seoul, Korea, 19–24 June 2005. Available online: https://onepetro.org/ISOPEIOPEC/proceedings-abstract/ISOPE05/All-ISOPE05/ISOPE-I-05-022/9182 (accessed on 24 July 2022).
74. Tonatto, M.L.; Roese, P.B.; Tita, V.; Forte, M.M.; Amico, S.C. Offloading marine hoses: Computational and experimental analyses. In *Marine Composites*; 2019; pp. 389–416. Available online: https://www.researchgate.net/publication/330045225_Offloading_marine_hoses_Computational_and_experimental_analyses (accessed on 24 July 2022). [CrossRef]
75. Tonatto, M.L.; Forte, M.M.; Amico, S.C. Compressive-tensile fatigue behavior of cords/rubber composites. *Polym. Test.* **2017**, *61*, 185–190. [CrossRef]
76. Ho, R.-T. Engineering Considerations for Offshore FSRU LNG Receiving Terminals. In Proceedings of the Offshore Technology Conference (OTC), Houston, TX, USA, 5–8 May 2008. [CrossRef]
77. Araújo, J.B.; Fernandes, A.C.; Sales, J.S., Jr.; Thurler, A.C.; Vilela, A.M. Innovative Oil Offloading System for Deep Water. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 6–9 May 2019. [CrossRef]
78. Gonzalez, G.M.; de Sousa, J.R.M.; Sagrilo, L.V.S. A study on the axial behavior of bonded flexible marine hoses. *Mar. Syst. Ocean Technol.* **2016**, *11*, 31–43. [CrossRef]
79. Gonzalez, G.M.; de Sousa, J.R.M.; Sagrilo, L.V.S. Behavior of offloading marine hose submitted to bending. In Proceedings of the Ibero-Latin American Congress on Computational Methods in Engineering Conference (CILAMCE2014), Fortaleza-Ceara, Brazil, 23–26 November 2014; pp. 1–15. Available online: https://www.researchgate.net/publication/301493289_BEHAVIOR_OF_OFFLOADING_MARINE_HOSE_SUBMITTED_TO_BENDING (accessed on 24 July 2022).
80. Amaechi, C.V.; Wang, F.; Hou, X.; Ye, J. Strength of submarine hoses in Chinese-lantern configuration from hydrodynamic loads on CALM buoy. *Ocean Eng.* **2018**, *171*, 429–442. [CrossRef]
81. Amaechi, C.V.; Wang, F.; Ye, J. Investigation on Hydrodynamic Characteristics, Wave–Current Interaction and Sensitivity Analysis of Submarine Hoses Attached to a CALM Buoy. *J. Mar. Sci. Eng.* **2022**, *10*, 120. [CrossRef]
82. Odonoghe, T.; Halliwell, A.R. Floating Hose-Strings Attached To A Calm Buoy. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 2–5 May 1988; pp. 313–320. [CrossRef]
83. O'Donoghue, T.; Halliwell, A. Vertical bending moments and axial forces in a floating marine hose-string. *Eng. Struct.* **1990**, *12*, 124–133. [CrossRef]
84. Brown, M.; Elliott, L. A design tool for static underbuoy hose-systems. *Appl. Ocean Res.* **1987**, *9*, 171–180. [CrossRef]
85. Brown, M.; Elliott, L. Two-dimensional dynamic analysis of a floating hose string. *Appl. Ocean Res.* **1988**, *10*, 20–34. [CrossRef]
86. Hasanvand, E.; Edalat, P. Petroleum University of Technology Sensitivity Analysis of the Dynamic Response of CALM Oil Terminal, in The Persian Gulf Region Under Different Operation Parameters. *J. Mar. Eng.* **2020**, *16*, 73–84. [CrossRef]
87. Hasanvand, E.; Edalat, P. A Comparison of the Dynamic Response of a Product Transfer System in CALM and SALM Oil Terminals in Operational and Non-Operational Modes in the Persian Gulf region. *Int. J. Coast. Offshore Eng.* **2021**, *6*, 1–14. Available online: https://www.ijcoe.org/article_149354.html (accessed on 24 July 2022).
88. Tonatto, M.L.; Forte, M.M.; Tita, V.; Amico, S.C. Progressive damage modeling of spiral and ring composite structures for offloading hoses. *Mater. Des.* **2016**, *108*, 374–382. [CrossRef]
89. Tonatto, M.L.; Tita, V.; Araujo, R.T.; Forte, M.M.; Amico, S.C. Parametric analysis of an offloading hose under internal pressure via computational modeling. *Mar. Struct.* **2017**, *51*, 174–187. [CrossRef]
90. Zhou, Y.; Duan, M.; Ma, J.; Sun, G. Theoretical analysis of reinforcement layers in bonded flexible marine hose under internal pressure. *Eng. Struct.* **2018**, *168*, 384–398. [CrossRef]
91. Hua, G.; Changgeng, S.; Jianguo, M.; Guomin, X. Study on theoretical model of burst pressure of fiber reinforced arc-shaped rubber hose with good balance performance. *Polym. Polym. Compos.* **2020**, *29*, 919–930. [CrossRef]
92. Hua, G.; Changgeng, S.; Guomin, X. Establishment and verification of theoretical model for forming design of balanced curved rubber hose. *Polym. Polym. Compos.* **2020**, *29*, 470–483. [CrossRef]
93. Gao, P.; Gao, Q.; An, C.; Zeng, J. Analytical modeling for offshore composite rubber hose with spiral stiffeners under internal pressure. *J. Reinf. Plast. Compos.* **2020**, *40*, 352–364. [CrossRef]
94. Hua, G.; Changgeng, S.; Jianguo, M.; Guomin, X. Free vibration of rubber matrix cord-reinforced combined shells of revolution under hydrostatic pressure. *J. Vib. Acoust.* **2021**, *144*, 011002. [CrossRef]
95. Cozijn, J.L.; Bunnik, T.H.J. Coupled Mooring Analysis for a Deep Water CALM Buoy. In Proceedings of the 23rd International Conference on Offshore Mechanics and Arctic Engineering (OMAE), Vancouver, BC, Canada, 20–25 June 2004; OMAE2004-51370; Volume 1, Parts A and B.. The American Society of Mechanical Engineers (ASME): New York, NY, USA, 2004; pp. 663–673. [CrossRef]
96. Cozijn, H.; Uittenbogaard, R.; Brake, E.T. Heave, roll and pitch damping of a deepwater CALM buoy with a skirt. In Proceedings of the International Society of Offshore and Polar Engineering Conference Proceedings, Seoul, Korea (ISOPE). Seoul, Korea, 19–24 June 2005; pp. 388–395. Available online: https://www.researchgate.net/publication/267364857_Heave_Roll_and_Pitch_Damping_of_a_Deepwater_CALM_Buoy_with_a_Skirt (accessed on 21 August 2022).

97. Le Cunff, C.; Ryu, S.; Duggal, A.S.; Ricbourg, C.; Heurtier, J.; Heyl, C.; Liu, Y.; Beauclair, O. Derivation of CALM Buoy coupled motion RAOs in Frequency Domain and Experimental Validation. In Proceedings of the International Society of Offshore and Polar Engineering Conference Proceedings, Lisbon, Portugal, 1–6 July 2007; ISOPE: Lisbon, Portugal, 2007; pp. 1–8. Available online: https://www.sofec.com/wp-content/uploads/white_papers/2007-ISOPE-Derivation-of-CALM-Buoy-Coupled-Motion-RAOs-in-Frequency-Domain.pdf (accessed on 11 September 2021).
98. Bandringa, H.; Jaouën, F.; Helder, J.; Bunnik, T. On the Validity of CFD for Simulating a Shallow Water CALM Buoy in Extreme Waves. In Proceedings of the ASME 2021 40th International Conference on Ocean, Offshore and Arctic Engineering. Volume 1: Offshore Technology; Virtual, Online, 21–30 June 2021; ASME: New York, NY, USA, 2021; p. V001T01A037. [CrossRef]
99. Brady, I.; Williams, S.; Golby, P. A study of the Forces Acting on Hoses at a Monobuoy Due to Environmental Conditions. In Proceedings of the Offshore Technology Conference Proceeding—OTC 2136, Dallas, TX, USA, 5–7 May 1974; pp. 1–10. [CrossRef]
100. Qi, X.; Chen, Y.; Yuan, Q.; Xu, G.; Huang, K. CALM buoy and fluid transfer system study. In Proceedings of the International Offshore and Polar Engineering Conference, San Francisco, CA, USA, 25–30 June 2017; pp. 932–939. Available online: https://onepetro.org/ISOPEIOPEC/proceedings-abstract/ISOPE17/All-ISOPE17/ISOPE-I-17-128/17225?redirectedFrom=PDF (accessed on 22 August 2022).
101. Roveri, F.E.; Volnei Luís Sagrilo, S.; Cicilia, F.B. A Case Study on the Evaluation of Floating Hose Forces in a C.A.L.M. System. In Proceedings of the International Offshore and Polar Engineering Conference, Kitakyushu, Japan, 26–31 May 2002; pp. 190–197. Available online: https://www.academia.edu/26568632/A_Case_Study_on_the_Evaluation_of_Floating_Hose_Forces_in_a_C_A_L_M_System (accessed on 22 August 2022).
102. Montbarbon, S.; Quintin, S.H.; Deroux, G. Experience with new cost-effective solutions to export oil from Deepwater floating production units using suspended pipelines. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 2–5 May 2005. [CrossRef]
103. Bonjour, E.; Simon, J. Offshore Refrigerated LPG Loading/Unloading Terminal Using a CALM Buoy. In Proceedings of the Middle East Oil Technical Conference and Exhibition, Manama, Bahrain, 11–14 March 1985. [CrossRef]
104. Ziccardi, J.J.; Robins, H.J. Selection of Hose Systems for SPM Tanker Terminals. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 21–23 April 1970. [CrossRef]
105. Gordon, R.B.; Ruiz-Rico, J.C.; Brongers, M.P.H.; Gomez, J. Integrity Management and Life Extension for a CALM Buoy Oil Export Terminal. In Proceedings of the 2016 11th International Pipeline Conference. Volume 3: Operations, Monitoring and Maintenance; Materials and Joining, Calgary, AB, Canada, 26–30 September 2016; ASME: New York, NY, USA, 2016; p. V003T04A041. [CrossRef]
106. Saunders, C.; O'Sullivan, T. Integrity management and life extension of flexible pipe. In Proceedings of the SPE Offshore Europe Oil and Gas Conference and Exhibition, Aberdeen, Scotland, UK, 4–7 September 2007. [CrossRef]
107. Girón, A.R.C.; Corrêa, F.N.; Hernández, A.O.V.; Jacob, B.P. An integrated methodology for the design of mooring systems and risers. *Mar. Struct.* **2014**, *39*, 395–423. [CrossRef]
108. Hasanvand, E.; Edalat, P. Evaluation of the Safe and Failure Zones of Mooring and Riser Systems in a CALM Oil Terminal. *J. Mar. Sci. Appl.* **2021**, *20*, 751–766. [CrossRef]
109. Eghbali, B.; Daghigh, M.; Daghigh, Y.; Azarsina, F. Reliability Analysis of Single Point Mooring (SPM) System under Different Environmental Conditions. *Int. J. Marit. Technol.* **2018**, *9*, 41–49. [CrossRef]
110. Khodr, R.A.; Shiban, R.S.; Nawaz, B.A.; Mistry, S.P. Reliability of Very Large Crude Carrier and Single Anchor Leg Mooring Buoy Mooring System During Squall Event. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 4–7 May 2020. [CrossRef]
111. Amaechi, C.V. Novel Design, Hydrodynamics and Mechanics of Marine Hoses in Oil/Gas applications. Ph.D. Thesis, Lancaster University, Lancaster, UK, 2022. [CrossRef]
112. Eiken, C. Pre-Commissioning Hose Operations on the Valemon Field in the North Sea. University of Stavanger, Norway. 2013. Available online: https://uis.brage.unit.no/uis-xmlui/bitstream/handle/11250/183174/Eiken%2C%20Christer.pdf?sequence=1&isAllowed=y (accessed on 22 August 2022).
113. Pecher, A.; Foglia, A.; Kofoed, J.P. Comparison and Sensitivity Investigations of a CALM and SALM Type Mooring System for Wave Energy Converters. *J. Mar. Sci. Eng.* **2014**, *2*, 93–122. [CrossRef]
114. Ali, M.O.A.; Ja'E, I.A.; Hwa, M.G.Z. Effects of water depth, mooring line diameter and hydrodynamic coefficients on the behaviour of deepwater FPSOs. *Ain Shams Eng. J.* **2019**, *11*, 727–739. [CrossRef]
115. Ja'E, I.A.; Ali, M.O.A.; Yenduri, A.; Nizamani, Z.; Nakayama, A. Effect of Various Mooring Materials on Hydrodynamic Responses of Turret-Moored FPSO with Emphasis on Intact and Damaged Conditions. *J. Mar. Sci. Eng.* **2022**, *10*, 453. [CrossRef]
116. Dahl, C.S.; Andersen, B.A.M.; Gronne, M. Developments in Managing Flexible Risers and Pipelines, A Suppliers Perspective. Paper OTC 21844. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 2–5 May 2011. [CrossRef]
117. Duggal, A.; Ryu, S. The dynamics of deepwater offloading buoys. In *WIT Transactions on the Built Environment*; Paper FSI05026FU.; WIT Press: Singapore, 2005; Available online: https://www.witpress.com/Secure/elibrary/papers/FSI05/FSI05026FU.pdf (accessed on 6 July 2021).

118. Rabelo, A.S. Estudo do Comportamento de Mangueiras Termoplásticas de Umbilicais Submarinos Submetidas a Carregamentos Mecânicos (in Portuguese, Meaning: 'Study on the Behavior of Submarine Umbilical Thermoplastic Hoses when Submitted to Mechanical Loading'). Master's Thesis, Universidade Federal do Rio de Janeiro (UFRJ) & COPPE, Rio de Janeiro, Brasil, 2013. Available online: https://w1files.solucaoatrio.net.br/atrio/ufrj-peno_upl//THESIS/6000252/2013_mestrando_alexandre_soares_rabelo_20200405214916875.pdf (accessed on 27 August 2022).
119. Simonsen, A. Inspection and Monitoring Techniques for Un-Bonded Flexible Risers and Pipelines. Master's Thesis, University of Stavanger, Stavanger, Norway, 2014. Available online: http://hdl.handle.net/11250/219671 (accessed on 27 August 2022).
120. Asmara, I.P.S.; Wibowo, V.A.P. Safety analysis of mooring hawser of FSO and SPM buoy in irregular waves. In Proceedings of the 2nd Maritime Safety International Conference (MASTIC), Surabaya, Indonesia, 18 July 2020; Volume 557, p. 012003.
121. Lee, G.-C.; Kim, H.-E.; Park, J.-W.; Jin, H.-L.; Lee, Y.-S.; Kim, J.-H. An experimental study and finite element analysis for finding leakage path in high pressure hose assembly. *Int. J. Precis. Eng. Manuf.* **2011**, *12*, 537–542. [CrossRef]
122. Chen, C.; Song, M. Visualizing a field of research: A methodology of systematic scientometric reviews. *PLoS ONE* **2019**, *14*, e0223994. [CrossRef]
123. Cash-Gibson, L.; Rojas-Gualdrón, D.F.; Pericas, J.M.; Benach, J. Inequalities in global health inequalities research: A 50-year bibliometric analysis (1966–2015). *PLoS ONE* **2018**, *13*, e0191901. [CrossRef] [PubMed]
124. Chandra, Y. Mapping the evolution of entrepreneurship as a field of research (1990–2013): A scientometric analysis. *PLoS ONE* **2018**, *13*, e0190228. [CrossRef]
125. Chen, C. Searching for intellectual turning points: Progressive knowledge domain visualization. *Proc. Natl. Acad. Sci. USA* **2004**, *101*, 5303–5310. [CrossRef] [PubMed]
126. Chen, C. Cite Space II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *J. Am. Soc. Inf. Sci. Technol.* **2006**, *57*, 359–377. [CrossRef]
127. Chen, C. System and Method for Automatically Generating Systematic Reviews of a Scientific Field. *US Patent US2011029 5903A1*, 2010.
128. Chen, C. *CiteSpace: A Practical Guide for Mapping Scientific Literature*; Nova Science Publishers: Hauppauge, NY, USA, 2016.
129. Chen, C. Science Mapping: A Systematic Review of the Literature. *J. Data Inf. Sci.* **2017**, *2*, 1–40. [CrossRef]
130. Chen, C. A Glimpse of the First Eight Months of the COVID-19 Literature on Microsoft Academic Graph. *Front. Res. Metr. Anal.* **2020**, *5*, 607286. [CrossRef]
131. Chen, C.; Ibekwe-SanJuan, F.; Hou, J. The structure and dynamics of co-citation clusters: A multiple-perspective co-citation analysis. *JASIST* **2010**, *61*, 1386–1409. [CrossRef]
132. Hosseini, M.R.; Martek, I.; Zavadskas, E.K.; Aibinu, A.A.; Arashpour, M.; Chileshe, N. Critical evaluation of off-site construction research: A Scientometric analysis. *Autom. Constr.* **2018**, *87*, 235–247. [CrossRef]
133. Nelson, J.R.; Grubesic, T.H. Oil spill modeling: Mapping the knowledge domain. *Prog. Phys. Geogr. Earth Environ.* **2020**, *44*, 120–136. [CrossRef]
134. Umeokafor, N.; Umar, T.; Evangelinos, K. Bibliometric and scientometric analysis-based review of construction safety and health research in developing countries from 1990 to 2021. *Saf. Sci.* **2022**, *156*, 105897. [CrossRef]
135. Jin, H.; Chan, M.; Morda, R.; Lou, C.X.; Vrcelj, Z. A scientometric review of sustainable infrastructure research: Visualization and analysis. *Int. J. Constr. Manag.* **2021**, 1–9, *ahead-of print*. [CrossRef]
136. Jun, S.-P.; Yoo, H.S.; Choi, S. Ten years of research change using Google Trends: From the perspective of big data utilizations and applications. *Technol. Forecast. Soc. Chang.* **2018**, *130*, 69–87. [CrossRef]
137. Khan, S.A.R.; Mardani, A. A state-of-the-art review and meta-analysis on sustainable supply chain management: Future research directions. *J. Clean. Prod.* **2021**, *278*, 123357. [CrossRef]
138. Khan, G.F.; Wood, J. Information technology management domain: Emerging themes and keyword analysis. *Scientometrics* **2015**, *105*, 959–972. [CrossRef]
139. Krauskopf, E. A bibiliometric analysis of the Journal of Infection and Public Health: 2008–2016. *J. Infect. Public Health* **2018**, *11*, 224–229. [CrossRef]
140. Liao, H.; Tang, M.; Luo, L.; Li, C.; Chiclana, F.; Zeng, X.-J. A Bibliometric Analysis and Visualization of Medical Big Data Research. *Sustainability* **2018**, *10*, 166. [CrossRef]
141. Martínez-López, F.J.; Merigó, J.M.; Valenzuela-Fernández, L.; Nicolás, C. Fifty years of the European Journal of Marketing: A bibliometric analysis. *Eur. J. Mark.* **2018**, *52*, 439–468. [CrossRef]
142. Mascarenhas, C.; Ferreira, J.; Marques, C.; Mascarenhas, C.; Ferreira, J.; Marques, C. University–industry cooperation: A systematic literature review and research agenda. *Sci. Public Policy* **2018**, *45*, 708–718. [CrossRef]
143. Olawumi, T.O.; Chan, D.W. A scientometric review of global research on sustainability and sustainable development. *J. Clean. Prod.* **2018**, *183*, 231–250. [CrossRef]
144. Sherren, K.; Kent, C. Who's afraid of Allan Savory? Scientometric polarization on Holistic Management as competing understandings. *Renew. Agric. Food Systems* **2019**, *34*, 77–92. [CrossRef]
145. Soosaraei, M.; Khasseh, A.A.; Fakhar, M.; Hezarjaribi, H.Z. A decade bibliometric analysis of global research on leishmaniasis in Web of Science database. *Ann. Med. Surg.* **2018**, *26*, 30–37. [CrossRef] [PubMed]
146. Sweileh, W.M.; Al-Jabi, S.W.; Zyoud, S.H.; Sawalha, A.F.; Abu-Taha, A.S. Global research output in antimi-crobial resistance among uropathogens: A bibliometric analysis (2002–2016). *J. Glob. Antimicrob. Resist.* **2018**, *13*, 104–114. [CrossRef] [PubMed]

147. Palmblad, M.; van Eck, N.J. Bibliometric Analyses Reveal Patterns of Collaboration between ASMS Members. *J. Am. Soc. Mass Spectrom.* **2018**, *29*, 447–454. [CrossRef]
148. Park, J.Y.; Nagy, Z. Data on the interaction between thermal comfort and building control research. *Data Brief* **2018**, *17*, 529–532. [CrossRef]
149. Van Eck, N.J.; Waltman, L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* **2010**, *84*, 523–538. [CrossRef]
150. Perianes-Rodriguez, A.; Waltman, L.; van Eck, N.J. Constructing bibliometric networks: A comparison between full and fractional counting. *J. Inf.* **2016**, *10*, 1178–1195. [CrossRef]
151. Van Eck, N.J.; Waltman, L. VOS: A new method for visualizing similarities between objects. In *Advances in Data Analysis: Proceedings of the 30th Annual Conference of the German Classification Society*; Lenz, H.-J., Decker, R., Eds.; Springer: Berlin/Heidelberg, Germany, 2007; pp. 299–306.
152. van Eck, N.J.; Waltman, L. How to normalize cooccurrence data? An analysis of some well-known similarity measures. *J. Am. Soc. Inf. Sci. Technol.* **2009**, *60*, 1635–1651. [CrossRef]
153. Van Eck, N.J.; Waltman, L. Text mining and visualization using VOSviewer. *ISSI Newsl.* **2011**, *7*, 50–54. Available online: https://www.vosviewer.com/text-mining-and-visualization-using-vosviewer (accessed on 5 August 2022).
154. Van Eck, N.J.; Waltman, L. Visualizing bibliometric networks. In *Measuring Scholarly Impact: Methods and Practice*; Ding, Y., Rousseau, R., Wolfram, D., Eds.; Springer: Berlin/Heidelberg, Germany, 2014; pp. 285–320.
155. van Eck, N.J.; Waltman, L.; Dekker, R.; van den Berg, J. A comparison of two techniques for bibliometric mapping: Multidimensional scaling and VOS. *J. Am. Soc. Inf. Sci. Technol.* **2010**, *61*, 2405–2416. [CrossRef]
156. van Nunen, K.; Li, J.; Reniers, G.; Ponnet, K. Bibliometric analysis of safety culture research. *Saf. Sci.* **2018**, *108*, 248–258. [CrossRef]
157. Waltman, L.; Van Eck, N.J. A smart local moving algorithm for large-scale modularity-based community detection. *Eur. Phys. J. B* **2013**, *86*, 471. [CrossRef]
158. Waltman, L.; van Eck, N.J.; Noyons, E.C.M. A unified approach to mapping and clustering of bibliometric networks. *J. Informetr.* **2010**, *4*, 629–635. [CrossRef]
159. Amaechi, C.V.; Adefuye, E.F.; Kgosiemang, I.M.; Huang, B.; Amaechi, E.C. Scientometric Review for Research Patterns on Additive Manufacturing of Lattice Structures. *Materials* **2022**, *15*, 5323. [CrossRef]
160. Ju, X.; Fang, W.; Yin, H.; Jiang, Y. Stress analysis of the subsea dynamic riser baseprocess piping. *J. Mar. Sci. Appl.* **2014**, *13*, 327–332. [CrossRef]
161. Wang, F.-C.; Wang, J.; Tang, K. A finite element based study on lowering operation of subsea massive structure. *China Ocean Eng.* **2017**, *31*, 646–652. [CrossRef]
162. Sun, G.; Wang, F.; Zhang, Y.; Tang, K.; Wang, J. A Generic Study on Lowering Analysis of Massive Jumper Structures. In Proceedings of the ASME 2015 34th International Conference on Ocean, Offshore and Arctic Engineering. Volume 1: Offshore Technology; Offshore Geotechnics, St. John's, NB, Canada, 31 May–5 June 2015; V001T01A043. ASME: New York, NY, USA. [CrossRef]
163. Roveri, F.; de Oliveira, M.; Moretti, M. Installation of a Production Manifold in 2000 ft Water Depth Offshore Brazil. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 6–9 May 1996. [CrossRef]
164. Hall, R.; Etheridge, C.; Poranski, P.; Boatman, L.; Kawase, M. Installation, Testing, And Commissioning of a Disconnectable Turret Mooring For FSOU Vessel In A Typhoon-Prone Area. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 2–5 May 1994. [CrossRef]
165. Everett, J.W.; Jones, I.L.; Hill, D.J. Design and Development of Electric And Hydraulic Cables For Subsea Wellhead Control In The North Sea. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 5–8 May 1980. [CrossRef]
166. Rees, T.E.; Reber, M.A.; Seery, J.R. Design, Installation and Field Operations of Offshore Tandem Loading System-Nido Field, Offshore Philippines. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 4–7 May 1981. [CrossRef]
167. Moghazy, S.; Smelker, K.; Hernandez, J.; Van Noort, R.; Arnone, M. The Challenges of Deploying an MPD System on a MODU to Drill Narrow Margin Shallow Horizontal Wells in DW GoM. In Proceedings of the SPE Annual Technical Conference and Exhibition, Dallas, TX, USA, 24–26 September 2018. [CrossRef]
168. Diezel, A.R.; Correa, F.N.; Vaz, M.A.; Jacob, B.P. Investigation of roll damping effects on deep water FPSOs with riser balcony through global coupled analysis. *Ships Offshore Struct.* **2021**, 1–8, *ahead-of-print*. [CrossRef]
169. Misund, A. Offshore Loading of Oil and Gas How Increased Availability Can be Achieved. In Proceedings of the Offshore South East Asia Show, Singapore, 9–12 February 1982. [CrossRef]
170. Yan, B.; Yan, L.; Jiang, J.; Gong, X. Investigation On Scheme of Penglai 19-3 Phase ? Jumper Hoses and Cables Installation. In Proceedings of the Twentieth International Offshore and Polar Engineering Conference, Beijing, China, 20–25 June 2010. Available online: https://onepetro.org/ISOPEIOPEC/proceedings-abstract/ISOPE10/All-ISOPE10/ISOPE-I-10-156/11172 (accessed on 5 August 2022).
171. Badeghaish, W.; Noui-Mehidi, M.; Parvez, A. Nonmetallic Technologies Supporting Water Transport and Store Management in Drilling and Fracturing Operations. In Proceedings of the International Petroleum Technology Conference, Dhahran, Kingdom of Saudi Arabia, 13–15 January 2020. [CrossRef]
172. Nguyen-Duc, X.; Rogez, J.; Falcimaigne, J. Flare Buoy on Tensioned Hose. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 2–5 May 1976. [CrossRef]

173. Gruy, R.; Kiely, W. The World's Largest Single Point Mooring Terminals: Design and Construction Of The SALM System For 750,000 DWT Tankers. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 1–4 May 1977. [CrossRef]
174. Liu, M.; Li, F.; Mi, X.; Cheng, H.; Zhang, X.; Li, Y. Investigation of Flow Characteristics for Internal Fluid in Cryogenic LNG Hoses Based on Structure Feature. In Proceedings of the 32nd International Ocean and Polar Engineering Conference, Shanghai, China, 5–10 June 2022; Available online: https://onepetro.org/ISOPEIOPEC/proceedings-abstract/ISOPE22/All-ISOPE22/ISOPE-I-22-171/493810 (accessed on 5 August 2022).
175. Do, A.T.; Legeay, S.; Pere, J.M.; Charliac, D.; Roques, J.P.; Karnikian, A. New Design of Lightweight Flexible Pipe For Offshore Oil Offloading Transfer. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 5–8 May 2014. [CrossRef]
176. Luppi, A.; Mayau, D. FLNG Cold Sea Water Intake Risers. In Proceedings of the Offshore Technology Conference-Asia, Kuala Lumpur, Malaysia, 25–28 March 2014. [CrossRef]
177. John, K.M.; Morkved, M.L.; Grannes, I.; Haugvaldstad, J.; Steinsholm, S. Successful Deployment of a New Intervention Technology Using a Reinforced, Flexible, High Pressure Hose; a World's First. In Proceedings of the Abu Dhabi International Petroleum Exhibition & Conference, Abu Dhabi, UAE, 11–14 November 2019. [CrossRef]
178. Arceneaux, C.; DeKerlegand, K. Safety in Offshore Frac Hose Rig Hookups. In Proceedings of the SPE Americas E&P Environmental and Safety Conference, San Antonio, TX, USA, 23–25 March 2009. [CrossRef]
179. Lirola, F.; Perreau, E.; Dubois, A.; Roubertie, C. Lessons Learnt From Pre-Commissioning of Large Diameter Pipeline Using Coiled Tubing in Ultra-Deep Water Offshore Brazil. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 2–5 May 2016. [CrossRef]
180. Mauriès, B.; Lirola, F. Development of an LNG Tandem Offloading System Using Floating Cryogenic Hoses-Breaking the Boundaries of LNG Transfer in Open Seas. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 5–8 May 2014. [CrossRef]
181. Cox, A. Large Bore Flexible Hose Lifetime Prediction. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 5–8 May 1986. [CrossRef]
182. Quash, J.E.; Burgess, S.E. Improving Underbuoy Hose System Design Using Relaxed Storm Design Criteria. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 30 April–3 May 1979. [CrossRef]
183. Hong, J.; Pannebakker, M.; Bhaskaran, H. Offshore Fresh Water Deluge Test. In Proceedings of the SPE Symposium: Asia Pacific Health, Safety, Security, Envi-ronment and Social Responsibility, Kuala Lumpur, Malaysia, 23–24 April 2019. [CrossRef]
184. Dallas, M. Offshore Loading Systems Shuttle Tanker Installation. In Proceedings of the European Offshore Technology Conference and Exhibition, London, UK, 21–24 October 1980. [CrossRef]
185. Versluis, J. Exposed Location Single Buoy Mooring. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 5–8 May 1980. [CrossRef]
186. Pinkster, J.; Remery, G. The Role of Model Tests in the Design of Single Point Mooring Terminals. In Proceedings of the Offshore Technology Conference, Houston, TX, USA, 4–7 May 1975. [CrossRef]
187. Uasetwattana, J.; Kanchiak, S.; Kornkitsuwan, C.; Wattanasuwankorn, R.; Jiemsawat, N.; Toh, Y. The First Application of a Coiled Tubing Catenary System in the Gulf of Thailand. A Technology Break Through for Offshore Facilities with Space and Weight Limitations. In Proceedings of the IADC/SPE Asia Pacific Drilling Technology Conference and Exhibition, Bangkok, Thailand, 9–10 August 2022. [CrossRef]
188. ABS. *Guide for Position Mooring Systems*; American Bureau of Shipping: New York, NY, USA, 2022; Available online: https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/offshore/292_position_mooring_systems_2022/position-mooring-guide-apr22.pdf (accessed on 5 August 2022).
189. OCIMF. *Guide to Manufacturing and Purchasing Hoses for Offshore Moorings (GMPHOM)*; Witherby Seamanship International Ltd.: Livingstone, UK, 2009.
190. OCIMF. *Guideline for the Handing, Storage, Inspection and Testing of the Hose*, 2nd ed.; Witherby & Co., Ltd.: London, UK, 1995.
191. OCIMF. *Single Point Mooring Maintenance and Operations Guide (SMOG)*; Witherby & Co., Ltd.: London, UK, 1995.
192. ABS. *Rules for Building and Classing—Single Point Moorings*; American Bureau of Shipping: New York, NY, USA, 2022; Available online: https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/offshore/8_single_point_mooring_2022/spm-rules-july22.pdf (accessed on 5 August 2022).
193. DNVGL. *DNVGL-OS-E403 Offshore Loading Buoys, No. July*; Det Norske Veritas & Germanischer Lloyd: Oslo, Norway, 2015; Available online: https://rules.dnv.com/docs/pdf/DNV/os/2015-07/DNVGL-OS-E403.pdf (accessed on 5 August 2022).
194. API. *API 17K: Specification for Bonded Flexible Pipe*, 3rd ed.; American Petroleum Institute, API Publishing Services: Washington, DC, USA, 2016.
195. API. *API 17J: Specification for Unbonded Flexible Pipe*, 4th ed.; American Petroleum Institute, API Publishing Services: Washington, DC, USA, 2014.
196. API. *API Spec. 7K. Specification for Drilling and Well Service Equipment*, 6th ed.; American Petroleum Institute, API Publishing Services: Washington, DC, USA, 2015.
197. API. *API RP 17B. Recommended Practice for Flexible Pipe*, 5th ed.; American Petroleum Institute, API Publishing Services: Washington, DC, USA, 2014.
198. DNVGL. *DNVGL-OS-E301, Position Mooring: Offshore Standard*; Det Norske Veritas & Germanischer Lloyd: Oslo, Norway, 2015; Available online: https://rules.dnv.com/docs/pdf/DNV/os/2015-07/DNVGL-OS-E301.pdf (accessed on 5 August 2022).

199. BV. *BV NR 493 DT R03 E- Rule Note, Classification of Mooring Systems for Permanent and Mobile Offshore Units*; Bureau Veritas: Neuilly-sur-Seine, France, 2015.
200. Bai, Y.; Bai, Q. *Subsea Pipelines and Risers*, 1st ed.; Elsevier Science Ltd.: Kidlington, UK, 2005; pp. 3–19.
201. Bai, Y.; Bai, Q. *Subsea Engineering Handbook*; Elsevier: Oxford, UK, 2010.
202. Berteaux, H.O. Buoy Engineering. John Wiley & Sons Inc.: Hoboken, NJ, USA, 1976.
203. Wichers, J. A Simulation Model for a Single Point Moored Tanker. Ph.D. Thesis, Delft University of Technology, Delft, The Netherlands, 1988. Available online: http://resolver.tudelft.nl/uuid:efd9dd4e-da6a-48b7-9349-4a7541e89456 (accessed on 5 August 2022).
204. Wichers, J. *Guide to Single Point Moorings*, 1st ed.; WMooring Inc.: Houston, TX, USA, 2013; Available online: http://www.wmooring.com/files/Guide_to_Single_Point_Moorings.pdf (accessed on 5 August 2022).
205. Ja'E, I.A.; Ali, M.O.A.; Yenduri, A.; Nizamani, Z.; Nakayama, A. Optimisation of mooring line parameters for offshore floating structures: A review paper. *Ocean Eng.* **2022**, *247*, 110644. [CrossRef]
206. Ju, X.; Li, Z.; Dong, B.; Wang, J.; Meng, X. Engineering Investigation of a Deepwater Turret Mooring Suction Pile Inverse Catenary Based on BV and DNVGL Rules. *For. Chem. Rev.* **2022**, 788–802, *ahead-of-print*. Available online: http://www.forestchemicalsreview.com/index.php/JFCR/article/view/966 (accessed on 5 August 2022).
207. Ju, X.; Li, Z.; Dong, B.; Meng, X.; Huang, S. Mathematical Physics Modelling and Prediction of Oil Spill Trajectory for a Catenary Anchor Leg Mooring (CALM) System. *Adv. Math. Phys.* **2022**, *2022*, 3909552. [CrossRef]
208. Boo, S.Y.; Shelley, S.A. Design and Analysis of a Mooring Buoy for a Floating Arrayed WEC Platform. *Processes* **2021**, *9*, 1390. [CrossRef]
209. Davidson, J.; Ringwood, J.V. Mathematical Modelling of Mooring Systems for Wave Energy Converters—A Review. *Energies* **2017**, *10*, 666. [CrossRef]
210. ITTC. The Specialist Committee on Deep Water Mooring: Final Report and Recommendations to the 22nd ITTC. Available online: https://ittc.info/media/1502/specialist-committee-on-deep-water-mooring.pdf (accessed on 17 May 2022).
211. Irvine, H.M. *Cable Structures*; M.I.T. Press: Cambridge, MA, USA, 1981.
212. ACS. *Rules for Building and Classing Single Point Moorings (SPM Rules)*. Asia Classification Society (ACS): Tehran, Iran. Available online: http://asiaclass.org/wp-content/uploads/2018/04/ACS-SPM-Rules.pdf (accessed on 5 August 2022).
213. American Bureau of Shipping (ABS). *Guide for the Certification of Offshore Mooring Chain*; American Bureau of Shipping (ABS): Houston, TX, USA, 2017; Available online: https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/survey_and_inspection/39_certificationoffshoremooringchain_2017/Mooring_Chain_Guide_e-May17.pdf (accessed on 17 May 2022).
214. American Petroleum Institute (API). *API RP 2SM, Recommended Practice for Design, Manufacture, Installation, and Maintenance of Synthetic Fiber Ropes for Offshore Mooring*, 2nd ed.; American Petroleum Institute (API): Washington, DC, USA, 2014.
215. American Petroleum Institute (API). *API-RP-2SK, Design and Analysis of Stationkeeping Systems for Floating Structures*, 3rd ed.; American Petroleum Institute (API): Washington, DC, USA, 2005.
216. Wei, D.; An, C.; Zhang, J.; Huang, Y.; Gu, C. Effect of Winding Steel Wire on the Collapse Pressure of Submarine Hose. *J. Mar. Sci. Eng.* **2022**, *10*, 1365. [CrossRef]
217. Amaechi, C.V.; Chesterton, C.; Butler, H.O.; Gu, Z.; Odijie, A.C. Numerical Modelling on the Local Design of a Marine Bonded Composite Hose (MBCH) and Its Helix Reinforcement. *J. Compos. Sci.* **2022**, *6*, 79. [CrossRef]
218. Bai, Y.; Han, P.; Liu, T.; Yuan, S.; Tang, G. Mechanical responses of metallic strip flexible pipe subjected to combined bending and external pressure. *Ships Offshore Struct.* **2017**, *13*, 320–329. [CrossRef]
219. Amaechi, C.V.; Chesterton, C.; Butler, H.O.; Gu, Z.; Odijie, A.C.; Wang, F.; Hou, X.; Ye, J. Finite Element Modelling on the Mechanical Behaviour of Marine Bonded Composite Hose (MBCH) under Burst and Collapse. *J. Mar. Sci. Eng.* **2022**, *10*, 151. [CrossRef]
220. Wang, H.; Yang, Z.; Yan, J.; Wang, G.; Shi, D.; Zhou, B.; Li, Y. Prediction Method and Validation Study of Tensile Performance of Reinforced Armor Layer in Marine Flexible Pipe/Cables. *J. Mar. Sci. Eng.* **2022**, *10*, 642. [CrossRef]