Unveiling the Intellectual Landscape of Indian Research Journal of Extension Education (IRJEE) : A Bibliometric Content Analysis

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HIGHLIGHTS

- Indian Research Journal of Extension Education (IRJEE) holds a prominent position in the domain of academic publishing.
- A comprehensive bibliometric content analysis of IRJEE reveals that it had published mostly full papers, joint authorship articles, South Indian context, agricultural extension education domain, with descriptive investigation method, on reflective thinking framework, survey research, used simple random sampling process, mainly adopted personal interview method, analysed data through correlation analysis, mainly farmer oriented, on adoption/innovation, mainly communicated by national institutes.
- The bibliometric study identified the co-authorship pattern, co-citation pattern and co-occurrence pattern which are self-revealing and self-propelling

GRAPHICAL ABSTRACT
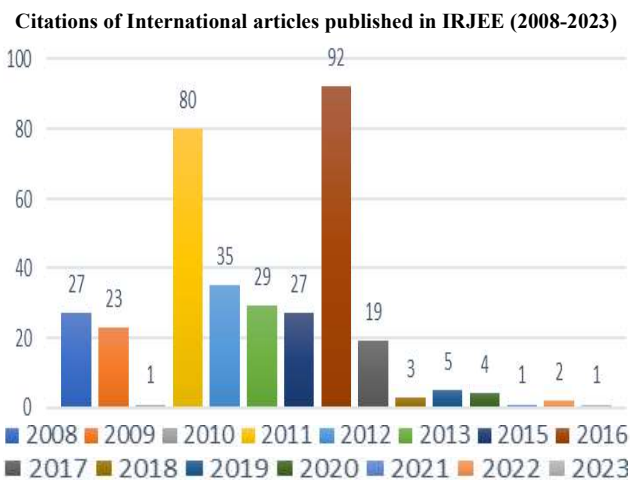
Citations of International articles published in IRJEE (2008-2023)

ARTICLE INFO

ABSTRACT

Context: Indian Research Journal of Extension Education (IRJEE) holds a prominent position in the domain of academic publishing of multidisciplinary research articles with a special emphasis on extension education and other extant social issues of farming community. The present article envisages a comprehensive bibliometric content analysis of IRJEE.

Objective: This study aims to identify the trend of research in IRJEE and to analyse the content of the articles published in IRJEE in terms of length and structure of the article, authorship pattern, geographical distribution pattern, authors' subject specialisation, types of investigation, theoretical framework, research methods

IRJEE METRICS

Google citations	- 8695
h-index	- 43
i10-index	- 291
NAAS rating	- 4.99

applied, sampling design, data collection technique, method of data analysis, target population, research areas, authors' institutional pattern, time taken from submission to acceptance and ten best article citations.

Method: The main investigation was based on the publication data of IRJEE available in the website from 2012 to 2023. The complete enumeration of 1280 IRJEE publications were taken into consideration. The data were collected, organized and analysed for different aspects. The bibliometric analysis was based on the publication data of IRJEE available in the Crossref. All available documents were analysed by using VOSviewer package.

Results and discussion: The study identified the categories of published articles in terms of full paper (84.14%), joint authorship (60.47%), highest contribution from South India (24.30%), agricultural extension domain (53.58%), descriptive investigation method (61.02%), reflective thinking framework (42.19%), survey research (68.52%), use of simple random sampling (46.64%), personal interview method (55.39%), correlation analysis (34.92%), farmers orientation(54.45%), adoption/innovation study (22.19%), communicated from national institutes (95.39%), submission to acceptance time 1-2 months (40.00%) and ten best articles had citations between 5-10 times (87.73%). The bibliometric study identified the co-authorship pattern, co-citation pattern and co-occurrence pattern. A good number of papers received from international authors and their citations were quite high which indicates the quality of papers and outreach of IRJEE among international authors.

Significance: The study confirms the result of content analysis through bibliometric study. The study also identified the distinctive situations revealing the growth and development of the journal IRJEE, coming up with worthwhile viewpoint for the researchers, stakeholders and beneficiaries of this journal.

The secret of cultural development has been research, pushing back the areas of ignorance by discovering new truths, which in turn, lead to better ways of doing things and better products' (Best *et al.,* 2017). Systematic research is an essential tool in guiding man towards progress and hence its importance cannot be overemphasized. As a result of ever-evolving innovative scientific research tools, there has been a tremendous growth of knowledge in all domains, the physical, the biological, the social, the psychological field etc.

Central to the conduct of any research is the method. The methods essentially lead to collection of reliable data that would subsequently be analysed in order to proffer solutions to the identified social problem that necessitated the research in the first instance. A number of such methods exist and social scientists have found them very useful depending on the nature of the study. Notable among the methods are experiments, survey, field research, use of available data, and content analysis (Mustapha and Ebomoyi, 2019). Content analysis as a methodological tool occasionally used or applied in social sciences researches remains a very important and useful unobtrusive tool of research analysis (Das and Bhaskaran, 2008). The utmost aim of the application of content analysis in social science research is to distinguish information and classifying such as negative and positive in order to make or produce inferences.

In the changing scenario of agri-rural ecosystem, the role of extension education and technology delivery systems has also seen a paradigm shift from a uni-disciplinary orientation to a multi-disciplinary approach involving multi-faceted across thematic sectors research. Extension education plays a crucial role in disseminating knowledge and fostering innovation in areas like agriculture, rural development, and social change. Scholarly journals serve as essential platforms for extension education professionals to share research findings, best practices and emerging trends. The Indian Research Journal of Extension Education (IRJEE) published by Society of Extension Education, Agra since 2001 holds a prominent position in this domain.

Academic publishing mainly aims to convey scientific wisdom to a larger audience. Today, the extensive use of social media and various online platforms facilitates fast dissemination, sharing, and even discussion of scientific outputs (Garcia-Villar, 2021; Koceigit and Akyol, 2021). The impact of

articles is evaluated with various metric measurements. The most important factor that traditional metric take into account is the number of citations that an article receives. However, for even a very high-quality article, it takes a certain amount of time to reach high citation numbers (Floyd *et. al.,* 2021). Meanwhile, the article may lose its actuality, or the attention of the relevant audience may divert away from the topic of the article (Ahmed and Gupta, 2020). As a consequence, there may be a decrease in the influence of the article. Today, in the era of the internet and social media, alternative metrics methods (Altmetrics) may be needed for the evaluation of scientific articles in addition to traditional metrics. Altmetrics is considered as a practical method for estimation of the impact of research studies on the internet (Bardus *et. al.*, 2020; Evereklioglu *et. al.*, 2022). Altmetrics is a web-based metric system and has been developed as an adjunct to traditional metrics to show the impact of studies from different aspects (Chien *et. al.*, 2022). Some academic and funding organizations now accept altmetrics as alternative forms of impact (Trueger *et. al.,* 2015). Bibliometrics, the quantitative analysis of scholarly literature, offers valuable insights into research trends, author collaborations and influential publications.

Bibliometrics refers to the quantitative study of scholarly literature. It uses statistical methods to analyse information about publications, such as authorship, publication dates, citations, keywords, and publication venues (journals, conferences). Content analysis involves a systematic qualitative examination of the written content of the publications. Researchers can analyse the themes, topics, methodologies, theoretical frameworks, and emerging areas of research within a body of literature. By combining these approaches, bibliometric content analysis provides a more comprehensive understanding of a research field. It allows researchers to not only identify trends in publication volume and citation patterns but also delve deeper into the actual content of the publications.

By analysing the intellectual landscape of IRJEE, this study aims to provide valuable insights for researchers, stakeholders and the broader field of extension education in India. It helps researchers understand the evolution of a field over time, including emerging areas of focus and declining areas of interest. By analysing co-citation patterns (when two publications are cited together by a third) and keyword co-occurrence (how often keywords appear together), researchers can map the intellectual structure of a field and identify key research themes and sub-themes. Citation analysis is a key element of bibliometrics, allowing researchers to assess the influence of individual publications and authors within a field. By analysing co-authorship patterns, researchers can identify key research communities and collaborations within a field. Overall, bibliometric content analysis is a powerful tool for researchers seeking to gain a deeper understanding of the structure, trends and impact of research within a specific field.

This paper employs bibliometric content analysis approach to unveil the intellectual landscape of IRJEE and is conceptualised with an aim to identify the trend of research in IRJEE and to analyse the content of the articles published in the journal.

METHODOLOGY

The main investigation was based on the publication data of IRJEE from 2012 to 2023 available in the website. The complete enumeration of 1280 IRJEE publications were taken into consideration. The data were collected, organized and analyzed from different aspects such as length and structure of the article, authorship pattern, geographical distribution pattern, authors' subject specialisation, types of investigation, theoretical framework, research methods applied, sampling design, data collection technique, method of data analysis, target population, research areas, authors' institutional pattern, time taken from submission to acceptance and ten best article citations using MS-EXCEL. The table and graphs were generated in accordance with the objectives of the study and necessary analysis work was done keeping in view the objectives of the study. The bibliometric analysis was based on the publication data of IRJEE available in the Crossref. All available documents were analysed using VOSviewer package, compiled and organised. The analysis in VOSviewer is catered through the sections namely co-authorship, co-occurrence, citations etc. All the analyses using the created file in the VOSviewer were considered for the "Networking Visualisation".

RESULTS

Categories of articles published : Table 1 highlights the total number of papers published in IRJEE during the last twelve years from 2012-2023 and gives detailed numeric information on type of articles published in

Table 1. Categories of articles published in IRJEE (2012-2023) on the basis of length and structure of the articles (N=1280) (Percentage in parentheses)

Year	Categories of articles published				
	Full Paper	Short Communication	Review Article	Clinical Article	Total
2012	200 (94.79)	11 (5.21)	0 (0.00)	0 (0.00)	211 (16.48)
2013	61 (76.25)	19 (23.75)	0 (0.00)	0 (0.00)	80 (6.25)
2014	80 (73.39)	27 (24.77)	1 (0.92)	1 (0.92)	109 (8.51)
2015	103 (88.79)	12 (10.34)	1 (0.86)	0 (0.00)	116 (9.06)
2016	54 (81.82)	12 (18.18)	0 (0.00)	0 (0.00)	66 (5.15)
2017	92 (83.64)	18 (16.36)	0 (0.00)	0 (0.00)	110 (8.59)
2018	73 (82.95)	14 (15.91)	1 (1.14)	0 (0.00)	88 (6.88)
2019	51 (79.69)	11 (17.19)	2 (3.13)	0 (0.00)	64 (5.00)
2020	41 (61.19)	15 (22.39)	11 (16.42)	0 (0.00)	67 (5.23)
2021	69 (78.41)	17 (19.32)	2 (2.27)	0 (0.00)	88 (6.87)
2022	164 (86.32)	22 (11.58)	2 (1.05)	2 (1.05)	190 (14.84)
2023	89 (97.80)	0 (0.00)	2 (2.20)	0 (0.00)	91 (7.11)
Total	1077 (84.14)	178 (13.91)	22 (1.72)	3 (0.23)	1280
Mean	**89.75**	**14.83**	**1.83**	**0.25**	
SD	**47.33**	**6.73**	**3.01**	**0.62**	

Table 2. Categorisation of the articles published in IRJEE during 2012-2023 according to the authorship pattern (N=1280) (Percentage in parentheses)

Year	Collaborative Author	Joint Author	Single Author	Total
2012	48 (22.75)	136 (64.45)	27 (12.80)	211 (16.48)
2013	20 (25.00)	48 (60.00)	12 (15.00)	80 (6.25)
2014	28 (25.69)	72 (66.06)	9 (8.26)	109 (8.51)
2015	22 (18.97)	81 (69.83)	13 (11.21)	116 (9.06)
2016	27 (40.91)	36 (54.55)	3 (4.55)	66 (5.15)
2017	53 (48.18)	51 (46.36)	6 (5.45)	110 (8.59)
2018	40 (45.45)	40 (45.45)	8 (9.09)	88 (6.88)
2019	26 (40.63)	33 (51.56)	5 (7.81)	64 (5.00)
2020	23 (34.33)	37 (55.22)	7 (10.45)	67 (5.23)
2021	33 (37.50)	50 (56.82)	5 (5.68)	88 (6.87)
2022	45 (23.68)	139 (73.16)	6 (3.16)	190 (14.84)
2023	36 (39.56)	51 (56.04)	4 (4.40)	91 (7.11)
Total	401 (31.33)	774 (60.47)	105 (8.20)	1280
Mean	**33.42**	**64.5**	**8.75**	
SD	**10.98**	**36.93**	**6.50**	

the said duration, categorized as full papers, short communication, review articles and clinical articles.

Authorship pattern : Table 2 explains the type of authorship pattern of papers published in IRJEE during the last twelve years (2012-2023). The authorship pattern is divided into mainly three categories; collaborative authorship, joint authorship and single authorship. This authorship pattern shows that majority of the papers were published as collaborative and joint authorship.

Countrywide distribution of published articles : Table 3 shows in-depth analysis of several articles published by the authors within the country, zone-wise of the country and by international authors. For easy understanding and clarity; papers published by Indian authors were further divided into South India, Western

India, Eastern India, Central India, Northeastern India and Union Territory. The data presented in the table shows that IRJEE journal has wide publicity and reach all over the country.

Subject specialisation of articles : Table 4 throws light on the subject specialization of authors of the articles published in IRJEE during the last twelve years. Also, it has given an effort to classify the articles into various subject specializations and fields. Even subjects like Extension Education had been further categorized into various disciplines like agricultural extension, veterinary extension, dairy extension, fishery extension and home science extension to get more clarity and understanding with a clear focus on the specific discipline.

Types of investigation : A research paper's type

Year	South India	Western India	Eastern India	Central India	North-eastern India	Union Territory	Total of Indian publications	International
2012	38 (18.01)	28 (13.27)	23 (10.90)	60 (28.44)	58 (27.49)	0 (0.00)	207	4 (1.90)
2013	25 (31.25)	15 (18.75)	12 (15.00)	12 (15.00)	9 (11.25)	2 (2.50)	75	5 (6.25)
2014	22 (20.18)	20 (18.35)	17 (15.60)	25 (22.94)	21 (19.27)	2 (1.83)	107	2 (1.83)
2015	22 (18.97)	22 (18.97)	25 (21.55)	18 (15.52)	18 (15.52)	5 (4.31)	110	6 (5.17)
2016	16 (24.24)	15 (22.73)	11 (16.67)	5 (7.58)	8 (12.12)	2 (3.03)	57	9 (13.64)
2017	29 (26.36)	21 (19.09)	15 (13.64)	25 (22.73)	15 (13.64)	2 (1.82)	107	3 (2.73)
2018	25 (28.41)	18 (20.45)	16 (18.18)	11 (12.50)	14 (15.91)	1 (1.14)	85	3 (3.41)
2019	20 (31.25)	11 (17.19)	11 (17.19)	11 (17.19)	8 (12.50)	1 (1.56)	62	2 (3.13)
2020	15 (22.39)	15 (22.39)	7 (10.45)	5 (7.46)	15 (22.39)	5 (7.46)	62	5 (7.46)
2021	19 (21.59)	11 (12.50)	19 (21.59)	16 (18.18)	15 (17.05)	5 (5.68)	85	3 (3.41)
2022	52 (27.37)	37 (19.47)	46 (24.21)	23 (12.11)	28 (14.74)	0 (0.00)	186	4 (2.11)
2023	28 (30.77)	12 (13.19)	22 (24.18)	12 (13.19)	12 (13.19)	2 (2.20)	88	3 (3.30)
Total	311(24.30)	225(17.58)	224(17.50)	223(17.42)	221(17.27)	27(2.11)		49(3.83)
Mean	25.92	18.75	18.67	18.58	18.42	2.25		4.08
SD	10.33	7.65	10.17	14.76	13.71	1.82		1.98

Table 3. State and Countrywide distribution of published articles in IRJEE during 2012-2023 (N=1280) (Percentage in parentheses)

of investigation gives basic information about the methodology and scope and same is presented in Table 5. The table gives detailed information on the type of investigation done by the researchers in their investigation and the table shows the trend followed in the last twelve years of doing research. The table reveals that most of the papers published in the journal were of descriptive type of study followed by comparative, explanatory, conceptual and so on. This shows the trend of research and researcher's priority to study and analyse problems. Although the share of constructive and methodological type research of investigation is less in comparison to others, it is good that the journal is open to all types of research publications which further enriches the journal's work area.

Theoretical framework of the articles : Table 6 gives an insightful discussion on theoretical framework adopted by the researchers in conducting their research work. Theoretical framework not only gives the methods, tools and technologies adopted by the researcher to get the final findings and results but also it shows a trend why the researchers are following the trend, whether it's a demand of that particulate time or it's just a fashion to follow the research trends or the suitability or easiness of conducting researches. It also shows the peculiar mindset of the research community to conduct the trials of their preference to conduct the study. In depth analysis also shows that particular time duration,

research criteria, understanding of the researchers to get the solutions of the present issues, focussing on the future points or dealing with the past problems could affect their present and future.

Types of research methods used : Table 7 gives clear information on types of research methods used by the researchers to conduct their study. This table shows that survey technique (68.52%) of data collection was mostly used followed by case study method (5.94%), review (5.93%) and observation (3.59%). The table further highlights that survey and content analysis (0.94%) and policy analysis (0.47%) are still less popular as compared to other research methods used by the researchers in their study. From the table, it is visible that survey method (68.52%) is the most commonly used research method among researchers.

Sampling design used : Table 8 explains the type of sampling design used to conduct the study. It is clearly seen from the table that simple random sampling design (49.75%) was mostly adopted in various studies followed by purposive sampling (32.34%), stratified random sampling (9.06%), composite (92.50%) and others.

Data collection method : Data collection techniques used by the researchers of the papers published in IRJEE in the last twelve years are explained in Table 9. The most commonly used data techniques by the researchers are primary data, secondary data, observation and personal interview.

Table 4. Categorisation of the articles published in IRJEE during 2012-2023 in terms of the authors' subject specialisation (N=1280) (Percentage in parentheses)

Years	Agri. Ex	Vet. Ext	Dairy Ext	Fishery ext	Home Sci	ICT	Psycho and socio	Management science	Agro	Hort	Ento	Engg	Soil	AS	Other
2012	50 (23.70)	42 (19.91)	5 (2.37)	7 (3.32)	33 (15.64)	1 (0.47)	0 (0.00)	0 (0.00)	12 (5.69)	21 (9.95)	5 (2.37)	10 (4.74)	11 (5.21)	2 (0.95)	12 (5.69)
2013	18 (22.50)	13 (16.25)	3 (3.75)	9 (11.25)	13 (16.25)	1 (1.25)	0 (0.00)	1 (1.25)	3 (3.75)	6 (7.50)	0 (0.00)	4 (5.00)	5 (6.25)	1 (1.25)	3 (3.75)
2014	38 (34.86)	33 (30.28)	7 (6.42)	4 (3.67)	5 (4.59)	0 (0.00)	0 (0.00)	0 (0.00)	5 (4.59)	5 (4.59)	0 (0.00)	0 (0.00)	4 (3.67)	2 (1.83)	6 (5.50)
2015	34 (29.31)	12 (10.34)	3 (2.59)	4 (3.45)	9 (7.76)	1 (0.86)	0 (0.00)	0 (0.00)	7 (6.03)	17	3 (2.59)	4 (3.45)	7 (6.03)	10 (8.62)	5 (4.31)
2016	49 (74.24)	6 (9.09)	1 (1.52)	3 (4.55)	1 (1.52)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.52)	0 (0.00)	0 (0.00)	1 (1.52)	1 (1.52)	3 (4.55)
2017	65 (59.09)	20 (18.18)	8 (7.27)	0 (0.00)	6 (5.45)	0 (0.00)	0 (0.00)	3 (2.73)	1 (0.91)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.91)	1 (0.91)	5 (4.55)
2018	60 (68.18)	7 (7.95)	3 (3.41)	2 (2.27)	9 (10.23)	0 (0.00)	0 (0.00)	1 (1.14)	0 (0.00)	1 (1.14)	2 (2.27)	0 (0.00)	1 (1.14)	0 (0.00)	2 (2.27)
2019	43 (67.19)	5 (7.81)	3 (4.69)	1 (1.56)	2 (3.13)	2 (3.13)	0 (0.00)	0 (0.00)	2 (3.13)	2 (3.13)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	4 (6.25)
2020	52 (77.61)	9 (13.43)	0 (0.00)	0 (0.00)	3 (4.48)	0 (0.00)	2 (2.99)	1 (1.49)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
2021	58 (65.91)	4 (4.55)	6 (6.82)	2 (2.27)	8 (9.09)	0 (0.00)	0 (0.00)	0 (0.00)	4 (4.55)	2 (2.27)	1 (1.14)	2 (2.27)	1 (1.14)	0 (0.00)	0 (0.00)
2022	116 (61.05)	22 (11.58)	14 (7.37)	2 (1.05)	19 (10.00)	2 (1.05)	2 (1.05)	2 (1.05)	1 (0.53)	3 (1.58)	1 (0.53)	2 (1.05)	0 (0.00)	1 (0.53)	3 (1.58)
2023	54 (59.34)	19 (20.88)	3 (3.30)	2 (2.20)	7 (7.69)	0 (0.00)	0 (0.00)	3 (3.30)	1 (1.10)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2 (2.20)
Total	637 (53.58)	192 (14.19)	56 (4.12)	36 (2.97)	115 (7.98)	7 (0.56)	4 (0.34)	11 (0.91)	36 (2.52)	58 (3.86)	12 (0.74)	22 (1.38)	31 (2.16)	18 (1.30)	45 (3.39)
Mean	**53.08**	**16**	**4.67**	**3**	**9.58**	**0.58**	**0.33**	**0.92**	**3**	**4.83**	**1**	**1.83**	**2.58**	**1.5**	**3.75**
SD	**23.60**	**11.86**	**3.75**	**2.70**	**8.88**	**0.79**	**0.78**	**1.16**	**3.59**	**6.94**	**1.60**	**3.01**	**3.50**	**2.78**	**3.19**

Table 5. Categorisation of the articles published in IRJEE during 2012-2023 in terms of types of investigation (N=1280) (Percentage in parentheses)

Year	Descriptive	Comparative	Explanatory	Conceptual	Theoretical	Methodological	Constructive	Others	Total
2012	113 (53.55)	10 (4.74)	22 (10.43)	26 (12.32)	10 (4.74)	20 (9.48)	10 (4.74)	0 (0.00)	211
2013	67 (83.75)	3 (3.75)	0 (0.00)	3 (3.75)	3 (3.75)	3 (3.75)	1 (1.25)	0 (0.00)	80
2014	87 (79.82)	2 (1.83)	0 (0.00)	0 (0.00)	2 (1.83)	18 (16.51)	0 (0.00)	0 (0.00)	109
2015	95 (81.90)	1 (0.86)	0 (0.00)	9 (7.76)	2 (1.72)	8 (6.90)	1 (0.86)	0 (0.00)	116
2016	39 (59.09)	6 (9.09)	7 (10.61)	0 (0.00)	0 (0.00)	3 (4.55)	11 (16.67)	0 (0.00)	66
2017	72 (65.45)	12 (10.91)	11 (10.00)	1 (0.91)	2 (1.82)	0 (0.00)	5 (4.55)	7 (6.36)	110
2018	29 (32.95)	26 (29.55)	14 (15.91)	1 (1.14)	0 (0.00)	2 (2.27)	16 (18.18)	0 (0.00)	88
2019	21 (32.81)	21 (32.81)	5 (7.81)	0 (0.00)	0 (0.00)	4 (6.25)	13 (20.31)	0 (0.00)	64
2020	47 (70.15)	1 (1.49)	9 (13.43)	4 (5.97)	1 (1.49)	5 (7.46)	0 (0.00)	0 (0.00)	67
2021	45 (51.14)	4 (4.55)	20 (22.73)	4 (4.55)	6 (6.82)	9 (10.23)	0 (0.00)	0 (0.00)	88
2022	120 (63.16)	14 (7.37)	17 (8.95)	4 (2.11)	6 (3.16)	5 (2.63)	12 (6.32)	12 (6.32)	190
2023	46 (50.55)	18 (19.78)	13 (14.29)	4 (4.40)	3 (3.30)	3 (3.30)	3 (3.30)	1 (1.10)	91
Total	781 (61.02)	118 (9.22)	118 (9.22)	56 (4.38)	35 (2.74)	80 (6.25)	72 (5.63)	20 (1.56)	1280
Mean	**65.08**	**9.83**	**9.83**	**4.67**	**2.92**	**6.67**	**6.00**	**1.67**	
SD	**32.70**	**8.47**	**7.71**	**7.21**	**3.03**	**6.28**	**5.99**	**3.83**	

**Table 6. Categorisation of the articles published in IRJEE during 2012-2023
in terms of theoretical framework (N=1280) (Percentage in parentheses)**

Year	Constructivism	Critical thinking	Reflective thinking	Action research	Multiple intelligence theory	Life long learning	Others	Total
2012	20 (9.48)	25 (11.85)	31 (14.69)	125 (59.24)	7 (3.32)	3 (1.42)	0 (0.00)	211
2013	4 (5.00)	1 (1.25)	4 (5.00)	69 (86.25)	1 (1.25)	1 (1.25)	0 (0.00)	80
2014	1 (0.92)	1 (0.92)	3 (2.75)	104 (95.41)	0 (0.00)	0 (0.00)	0 (0.00)	109
2015	4 (3.45)	2 (1.72)	7 (6.03)	99 (85.34)	4 (3.45)	0 (0.00)	0 (0.00)	116
2016	17 (25.76)	1 (1.52)	34 (51.52)	12 (18.18)	1 (1.52)	0 (0.00)	1 (1.52)	66
2017	4 (3.64)	8 (7.27)	74 (67.27)	18 (16.36)	0 (0.00)	0 (0.00)	6 (5.45)	110
2018	18 (20.45)	4 (4.55)	60 (68.18)	5 (5.68)	0 (0.00)	0 (0.00)	1 (1.14)	88
2019	13 (20.31)	2 (3.13)	36 (56.25)	11 (17.19)	0 (0.00)	0 (0.00)	2 (3.13)	64
2020	4 (5.97)	2 (2.99)	48 (71.64)	13 (19.40)	0 (0.00)	0 (0.00)	0 (0.00)	67
2021	14 (15.91)	8 (9.09)	55 (62.50)	9 (10.23)	2 (2.27)	0 (0.00)	0 (0.00)	88
2022	9 (4.74)	17 (8.95)	136 (71.58)	17 (8.95)	0 (0.00)	4 (2.11)	7 (3.68)	190
2023	10 (10.99)	16 (17.58)	52 (57.14)	12 (13.19)	0 (0.00)	1 (1.10)	0 (0.00)	91
Total	118(9.22)	87(6.80)	540(42.19)	494(38.59)	15(1.17)	9(0.70)	17(1.33)	1280
Mean	**9.83**	**7.25**	**45.00**	**41.17**	**1.25**	**0.75**	**1.42**	
SD	**6.49**	**7.97**	**36.67**	**44.68**	**2.18**	**1.36**	**2.47**	

**Table 7. Categorisation of the articles published in IRJEE during 2012-2023 in
terms of research methods used (N=1280) (Percentage in parentheses)**

Year	Survey	Case study	Review	Content analysis	Integrated	Policy analysis	Participatory	Observation	Experimental	Total
2012	130 (61.61)	6 (2.84)	23 (10.90)	1 (0.47)	3 (1.42)	2 (0.95)	12 (5.69)	13 (6.16)	21 (9.95)	211
2013	61 (76.25)	3 (3.75)	4 (5.00)	1 (1.25)	0 (0.00)	0 (0.00)	2 (2.50)	1 (1.25)	8 (10.00)	80
2014	87 (79.82)	2 (1.83)	1 (0.92)	1 (0.92)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	18 (16.51)	109
2015	82 (70.69)	4 (3.45)	6 (5.17)	0 (0.00)	0 (0.00)	0 (0.00)	11 (9.48)	3 (2.59)	10 (8.62)	116
2016	49 (74.24)	0 (0.00)	1 (1.52)	2 (3.03)	1 (1.52)	0 (0.00)	1 (1.52)	5 (7.58)	7 (10.61)	66
2017	65 (59.09)	9 (8.18)	6 (5.45)	0 (0.00)	0 (0.00)	0 (0.00)	8 (7.27)	9 (8.18)	13 (11.82)	110
2018	60 (68.18)	20 (22.73)	0 (0.00)	1 (1.14)	0 (0.00)	1 (1.14)	2 (2.27)	1 (1.14)	3 (3.41)	88
2019	39 (60.94)	5 (7.81)	6 (9.38)	4 (6.25)	0 (0.00)	0 (0.00)	4 (6.25)	1 (1.56)	5 (7.81)	64
2020	43 (64.18)	4 (5.97)	6 (8.96)	1 (1.49)	5 (7.46)	1 (1.49)	1 (1.49)	0 (0.00)	6 (8.96)	67
2021	50 (56.82)	4 (4.55)	12 (13.64)	13 (14.77)	3 (3.41)	1 (1.14)	1 (1.14)	0 (0.00)	4 (4.55)	88
2022	146 (76.84)	10 (5.26)	2 (1.05)	0 (0.00)	0 (0.00)	1 (0.53)	10 (5.26)	9 (4.74)	12 (6.32)	190
2023	65 (71.43)	9 (9.89)	2 (2.20)	0 (0.00)	0 (0.00)	0 (0.00)	8 (8.79)	4 (4.40)	3 (3.30)	91
Total	877(68.52)	76(5.94)	69(5.39)	24(1.88)	12(0.94)	6(0.47)	60(4.69)	46(3.59)	110(8.59)	1280
Mean	**73.08**	**6.33**	**5.75**	**2.00**	**1.00**	**0.50**	**5.00**	**3.83**	**9.17**	
SD	**33.65**	**5.25**	**6.37**	**3.64**	**1.71**	**0.67**	**4.47**	**4.34**	**5.86**	

Data analysis/ methodology: Table 10 clearly explains the data analysis/ methodology of the studies conducted in the papers published in the journal. The methodologies were divided into two major categories, non-parametric and parametric. Non-parametric techniques included central tendency, relative standing, variability, and parametric included ANOVA, reliability, correlation, multivariate analysis and innovative (SNA/FCM/FAHP etc.) analysis.

Respondents of the study : Table 11 explains the types of respondents covered for the study. This includes farmers (54.45%), administrators/officials (12.57%), policy makers/planners (8.82%), students (6.01%), academicians (6.79%), entrepreneurs (4.92%) and others (6.40%).

Research areas: Research area shows the preferences of the papers published in the journal during the last twelve years. Table 12 gives a clear picture of research areas selected by the researchers to conduct their study. Also, it shows the trend of study during the last 12

Table 8. Categorisation of the articles published in IRJEE during 2012-2023 in terms of sampling design (N=1280) (Percentage in parentheses)

Year	Purposive	Snow ball	Quota	Convenience	Simple random	Stratified random	Systematic	Area	Cluster	Composite	Total
2012	50 (23.70)	6 (2.84)	0 (0.00)	10 (4.74)	124 (58.77)	6 (2.84)	3 (1.42)	1 (0.47)	0 (0.00)	11 (5.21)	211
2013	18 (22.50)	1 (1.25)	0 (0.00)	0 (0.00)	53 (66.25)	3 (3.75)	0 (0.00)	4 (5.00)	0 (0.00)	1 (1.25)	80
2014	25 (22.94)	1 (0.92)	0 (0.00)	2 (1.83)	74 (67.89)	4 (3.67)	1 (0.92)	0 (0.00)	2 (1.83)	0 (0.00)	109
2015	17 (14.66)	0 (0.00)	0 (0.00)	4 (3.45)	85 (73.28)	8 (6.90)	0 (0.00)	0 (0.00)	2 (1.72)	0 (0.00)	116
2016	24 (36.36)	0 (0.00)	0 (0.00)	1 (1.52)	36 (54.55)	2 (3.03)	0 (0.00)	0 (0.00)	0 (0.00)	3 (4.55)	66
2017	48 (43.64)	4 (3.64)	2 (1.82)	0 (0.00)	24 (21.82)	17 (15.45)	5 (4.55)	0 (0.00)	4 (3.64)	6 (5.45)	110
2018	19 (21.59)	0 (0.00)	0 (0.00)	0 (0.00)	55 (62.50)	13 (14.77)	0 (0.00)	0 (0.00)	1 (1.14)	0 (0.00)	88
2019	22 (34.38)	3 (4.69)	0 (0.00)	0 (0.00)	32 (50.00)	6 (9.38)	0 (0.00)	0 (0.00)	1 (1.56)	0 (0.00)	64
2020	30 (44.78)	1 (1.49)	4 (5.97)	2 (2.99)	17 (25.37)	2 (2.99)	0 (0.00)	0 (0.00)	2 (2.99)	9 (13.43)	67
2021	31 (35.23)	0 (0.00)	0 (0.00)	0 (0.00)	22 (25.00)	10 (11.36)	8 (9.09)	12 (13.64)	5 (5.68)	0 (0.00)	88
2022	95 (50.00)	6 (3.16)	0 (0.00)	4 (2.11)	44 (23.16)	32 (16.84)	5 (2.63)	1 (0.53)	1 (0.53)	2 (1.05)	190
2023	35 (38.46)	2 (2.20)	0 (0.00)	6 (6.59)	31 (34.07)	13 (14.29)	3 (3.30)	1 (1.10)	0 (0.00)	0 (0.00)	91
Total	414 (32.34)	24 (1.87)	6 (0.46)	29 (2.26)	597 (46.64)	116 (9.06)	25 (1.95)	19 (1.48)	18 (1.40)	32 (2.5)	1280
Mean	**34.50**	**2.00**	**0.50**	**2.42**	**49.75**	**9.67**	**2.08**	**1.58**	**1.50**	**2.67**	
SD	**21.93**	**2.26**	**1.24**	**3.12**	**31.30**	**8.52**	**2.71**	**3.48**	**1.62**	**3.89**	

Table 9. Categorisation of the articles published in IRJEE during 2012-2023 in terms of data collection method (N=1280) (Percentage in parentheses)

Years	Primary data	Secondary data	Observation	Personal interview	Online survey	Focus Group Discussion	Participatory method	Other	Total
2012	25 (11.85)	24 (11.37)	19 (9.00)	123 (58.29)	2 (0.95)	7 (3.32)	11 (5.21)	0 (0.00)	211
2013	5 (6.25)	3 (3.75)	6 (7.50)	60 (75.00)	1 (1.25)	0 (0.00)	4 (5.00)	1 (1.25)	80
2014	0 (0.00)	4 (3.67)	16 (14.68)	87 (79.82)	1 (0.92)	0 (0.00)	1 (0.92)	0 (0.00)	109
2015	9 (7.76)	8 (6.90)	7 (6.03)	73 (62.93)	1 (0.86)	4 (3.45)	14 (12.07)	0 (0.00)	116
2016	27 (40.91)	4 (6.06)	5 (7.58)	23 (34.85)	0 (0.00)	3 (4.55)	2 (3.03)	2 (3.03)	66
2017	4 (3.64)	4 (3.64)	13 (11.82)	67 (60.91)	2 (1.82)	4 (3.64)	10 (9.09)	6 (5.45)	110
2018	32 (36.36)	4 (4.55)	1 (1.14)	40 (45.45)	0 (0.00)	5 (5.68)	6 (6.82)	0 (0.00)	88
2019	13 (20.31)	3 (4.69)	0 (0.00)	36 (56.25)	2 (3.13)	5 (7.81)	5 (7.81)	0 (0.00)	64
2020	53 (79.10)	6 (8.96)	3 (4.48)	2 (2.99)	0 (0.00)	0 (0.00)	3 (4.48)	0 (0.00)	67
2021	40 (45.45)	10 (11.36)	9 (10.23)	21 (23.86)	4 (4.55)	2 (2.27)	2 (2.27)	0 (0.00)	88
2022	5 (2.63)	4 (2.11)	18 (9.47)	123 (64.74)	16 (8.42)	8 (4.21)	10 (5.26)	6 (3.16)	190
2023	14 (15.38)	4 (4.40)	3 (3.30)	54 (59.34)	5 (5.49)	6 (6.59)	5 (5.49)	0 (0.00)	91
Total	227 (17.73)	78 (6.09)	100 (7.81)	709 (55.39)	34 (2.65)	44 (3.43)	73 (5.70)	15 (1.171)	1280
Mean	**18.92**	**6.50**	**8.33**	**59.08**	**2.83**	**3.67**	**6.08**	**1.25**	
SD	**16.53**	**5.90**	**6.65**	**38.31**	**4.43**	**2.74**	**4.19**	**2.30**	

areas. The research areas selected by the researchers were climate resilient extension (0.53%), adoption/innovation (12.63%), behavior (17.89%), knowledge (22.63%), attitude (4.74%), skill (0.53%), performance/motivation (23.16%), perception (6.32%), innovative approaches (7.89%) and others (1.58%).

Affiliation of authors : Table 13 shows the reach of the journal to get papers published by the national and international institutes and as a joint publication. The

data highlights that the journal has wider circulation and major number of papers were from national institutes. International institutes and joint publication are still a herculean task for the journal to be achieved and get recognition at international level. The most probable reasons for the same could be reach/circulation of journal, quality of papers published in the journals, time taken/processing time in journal publication, citations of the papers published in the journal etc. It is

Table 10. Categorisation of the articles published in IRJEE during 2012-2023 in terms of data analysis method (N=1280) (Percentage in parentheses)

Year	Non parametric								Parametric				
	Relative standing (%, Z)	Variability (SD, CV)	Non specified	Chisquare	Mann Whitney	Wilcoxon	Kruskalwallis	ANOVA	t-test/ Z test	Reliability	Correlation	Other multivariate analysis	Innovative (SNA/FCM/FAHP etc.)
2012	54 (25.59)	12 (5.69)	2 (0.95)	6 (2.84)	0 (0.00)	0 (0.00)	0 (0.00)	23 (10.90)	14 (6.64)	17 (8.06)	76 (36.02)	6 (2.84)	1 (0.47)
2013	15 (18.75)	3 (3.75)	0 (0.00)	2 (2.50)	0 (0.00)	0 (0.00)	0 (0.00)	6 (7.50)	8 (10.00)	8 (10.00)	33 (41.25)	4 (5.00)	1 (1.25)
2014	20 (18.35)	3 (2.75)	0 (0.00)	3 (2.75)	1 (0.92)	0 (0.00)	2 (1.83)	13 (11.93)	12 (11.01)	8 (7.34)	41 (37.61)	6 (5.50)	0 (0.00)
2015	26 (22.41)	4 (3.45)	0 (0.00)	5 (4.31)	1 (0.86)	0 (0.00)	9 (7.76)	5 (4.31)	15 (12.93)	5 (4.31)	45 (38.79)	1 (0.86)	0 (0.00)
2016	15 (22.73)	9 (13.64)	1 (1.52)	2 (3.03)	0 (0.00)	0 (0.00)	2 (3.03)	2 (3.03)	3 (4.55)	10 (15.15)	20 (30.30)	2 (3.03)	0 (0.00)
2017	7 (6.36)	3 (2.73)	15 (13.64)	8 (7.27)	0 (0.00)	0 (0.00)	3 (2.73)	4 (3.64)	13 (11.82)	4 (3.64)	47 (42.73)	6 (5.45)	0 (0.00)
2018	39 (44.32)	22 (25.00)	2 (2.27)	5 (5.68)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	12 (13.64)	0 (0.00)	8 (9.09)	0 (0.00)	0 (0.00)
2019	17 (26.56)	10 (15.63)	8 (12.50)	9 (14.06)	0 (0.00)	2 (3.13)	0 (0.00)	1 (1.56)	10 (15.63)	0 (0.00)	7 (10.94)	0 (0.00)	0 (0.00)
2020	6 (8.96)	2 (2.99)	7 (10.45)	9 (13.43)	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.49)	16 (23.88)	3 (4.48)	16 (23.88)	5 (7.46)	2 (2.99)
2021	7 (7.95)	0 (0.00)	9 (10.23)	5 (5.68)	0 (0.00)	0 (0.00)	0 (0.00)	9 (10.23)	14 (15.91)	8 (9.09)	32 (36.36)	3 (3.41)	1 (1.14)
2022	9 (4.74)	2 (1.05)	22 (11.58)	8 (4.21)	10 (5.26)	1 (0.53)	0 (0.00)	12 (6.32)	30 (15.79)	4 (2.11)	83 (43.68)	6 (3.16)	3 (1.58)
2023	6 (6.59)	0 (0.00)	12 (13.19)	5 (5.49)	2 (2.20)	1 (1.10)	1 (1.10)	8 (8.79)	13 (14.29)	1 (1.10)	39 (42.86)	1 (1.10)	2 (2.20)
Total	221(6.59)	70(5.47)	78(13.19)	67(5.49)	14(2.20)	4(1.10)	17(1.10)	84(8.79)	160(14.29)	68(1.10)	447(42.86)	40(1.10)	10(2.20)
Mean	**18.42**	**5.83**	**6.5**	**5.58**	**1.17**	**0.33**	**1.42**	**7**	**13.33**	**5.667**	**37.25**	**3.33**	**0.83**
SD	**14.87**	**6.41**	**7.06**	**2.50**	**2.86**	**0.65**	**2.61**	**6.62**	**6.31**	**4.89**	**23.99**	**2.46**	**1.03**

**Table 11. Categorisation of the articles published in IRJEE during 2012-2023
in terms of target population (N=1280) (Percentage in parentheses)**

Years	Farmers	Administrators/ Officials	Policy makers/ planners	Students	Academicians	Entrepreneurs	Others	Total
2012	138 (65.40)	20 (9.48)	13 (6.16)	2 (0.95)	5 (2.37)	17 (8.06)	16 (7.58)	211
2013	63 (78.75)	5 (6.25)	1 (1.25)	2 (2.50)	2 (2.50)	3 (3.75)	4 (5.00)	80
2014	95 (87.16)	2 (1.83)	1 (0.92)	3 (2.75)	3 (2.75)	0 (0.00)	5 (4.59)	109
2015	77 (66.38)	12 (10.34)	1 (0.86)	3 (2.59)	1 (0.86)	10 (8.62)	12 (10.34)	116
2016	15 (22.73)	15 (22.73)	16 (24.24)	9 (13.64)	10 (15.15)	0 (0.00)	1 (1.52)	66
2017	66 (60.00)	6 (5.45)	6 (5.45)	8 (7.27)	13 (11.82)	0 (0.00)	11 (10.00)	110
2018	15 (17.05)	45 (51.14)	28 (31.82)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	88
2019	7 (10.94)	37 (57.81)	19 (29.69)	0 (0.00)	0 (0.00)	1 (1.56)	0 (0.00)	64
2020	30 (44.78)	4 (5.97)	5 (7.46)	13 (19.40)	10 (14.93)	2 (2.99)	3 (4.48)	67
2021	42 (47.73)	3 (3.41)	5 (5.68)	9 (10.23)	9 (10.23)	13 (14.77)	7 (7.95)	88
2022	93 (48.95)	9 (4.74)	10 (5.26)	22 (11.58)	20 (10.53)	15 (7.89)	21 (11.05)	190
2023	56 (61.54)	3 (3.30)	8 (8.79)	6 (6.59)	14 (15.38)	2 (2.20)	2 (2.20)	91
Total	697 (54.45)	161(12.57)	113(8.82)	77 (6.01)	87 (6.79)	63(4.92)	82 (6.40)	1280
Mean	**58.08**	**13.42**	**9.42**	**6.42**	**7.25**	**5.25**	**6.83**	
SD	**39.07**	**14.09**	**8.31**	**6.37**	**6.43**	**6.54**	**6.78**	

**Table 12. Categorisation of the articles published in IRJEE during 2012-2023
in terms of research areas (N=1280) (Percentage in parentheses)**

Years	Climate resilient extension	Adoption / Innovation	Behaviour	Knowledge	Attitude	Skill	Performance/ Motivation	Perception	Innovative approaches	Satisfaction	Others	Total
2012	15 (7.11)	50 (23.70)	10 (4.74)	19 (9.00)	16 (7.58)	11 (5.21)	35 (16.59)	10 (4.74)	13 (6.16)	3 (1.42)	29(13.74)	211
2013	4 (5.00)	21 (26.25)	6 (7.50)	5 (6.25)	1 (1.25)	6 (7.50)	14 (17.50)	1 (1.25)	11 (13.75)	5 (6.25)	6 (7.50)	80
2014	5 (4.59)	24 (22.02)	11 (10.09)	11 (10.09)	4 (3.67)	4 (3.67)	21 (19.27)	2 (1.83)	11 (10.09)	2 (1.83)	14(12.84)	109
2015	1 (0.86)	30 (25.86)	9 (7.76)	14 (12.07)	2 (1.72)	5 (4.31)	29 (25.00)	0 (0.00)	13 (11.21)	2 (1.72)	11 (9.48)	116
2016	3 (4.55)	14 (21.21)	12 (18.18)	5 (7.58)	5 (7.58)	1 (1.52)	15 (22.73)	0 (0.00)	3 (4.55)	8(12.12)	0 (0.00)	66
2017	1 (0.91)	19 (17.27)	18 (16.36)	27 (24.55)	4 (3.64)	0 (0.00)	14 (12.73)	12 (10.91)	15 (13.64)	0 (0.00)	0 (0.00)	110
2018	4 (4.55)	30 (34.09)	10 (11.36)	9 (10.23)	8 (9.09)	6 (6.82)	9 (10.23)	6 (6.82)	6 (6.82)	0 (0.00)	0 (0.00)	88
2019	4 (6.25)	22 (34.38)	4 (6.25)	8 (12.50)	3 (4.69)	4 (6.25)	3 (4.69)	7 (10.94)	9 (14.06)	0 (0.00)	0 (0.00)	64
2020	4 (5.97)	22 (32.84)	6 (8.96)	6 (8.96)	3 (4.48)	1 (1.49)	1 (1.49)	0 (0.00)	0 (0.00)	7(10.45)	17(25.37)	67
2021	11 (12.50)	16 (18.18)	12 (13.64)	2 (2.27)	7 (7.95)	2 (2.27)	2 (2.27)	1 (1.14)	8 (9.09)	9 10.23)	18(20.45)	88
2022	1 (0.53)	24 (12.63)	34 (17.89)	43 (22.63)	9 (4.74)	1 (0.53)	44 (23.16)	12 (6.32)	15 (7.89)	4 (2.11)	3 (1.58)	190
2023	2 (2.20)	12 (13.19)	17 (18.68)	18 (19.78)	12 (13.19)	0 (0.00)	14 (15.38)	8 (8.79)	8 (8.79)	0 (0.00)	0 (0.00)	91
Total	55(4.29)	284(22.19)	149(11.64)	167(13.05)	74(5.78)	41(3.20)	201(15.70)	59(4.61)	112(8.75)	40(3.13)	98(7.66)	1280
Mean	4.58	23.67	12.42	13.92	6.17	3.42	16.75	4.92	9.33	3.33	8.17	
SD	4.25	9.98	7.96	11.64	4.45	3.26	13.43	4.80	4.66	3.28	9.61	

of utmost importance to update the journal's standard to match with international journals and stand in the publication community.

Time taken for publication : Table 14 explains the general scenario of paper to get acceptance and published in the journals in the last twelve years. This not only shows the progress of the journal to how papers are processed but also the efforts of the editorial team to get quality papers publication to maintain the journal

standards. Paper acceptance and time duration are divided into three major categories, minimum (1-2 months), maximum (4-6 months) and average (2-3 months).

Citation profile of papers : Table 15 shows the average citation profile of the papers published in IRJEE during the last twelve years. For clarity and easy understanding, citation is categorized into three major categories minimum (5-10), maximum (30-50) and average (20-30). The table shows very clearly

Table 13. Categorisation of the articles published in IRJEE during 2012-2023 in terms of Institutes (N=1280) (Percentage in parentheses)

Year	National Institutes	International Institutes	Collaborative	Total
2012	203 (96.21)	5 (2.37)	3 (1.42)	211
2013	74 (92.50)	3 (3.75)	3 (3.75)	80
2014	106 (97.25)	2 (1.83)	1 (0.92)	109
2015	111 (95.69)	5 (4.31)	0 (0.00)	116
2016	56 (84.85)	7 (10.61)	3 (4.55)	66
2017	107 (97.27)	2 (1.82)	1 (0.91)	110
2018	86 (97.73)	2 (2.27)	0 (0.00)	88
2019	58 (90.63)	2 (3.13)	4 (6.25)	64
2020	61 (91.04)	5 (7.46)	1 (1.49)	67
2021	83 (94.32)	2 (2.27)	3 (3.41)	88
2022	188 (98.95)	2 (1.05)	0 (0.00)	190
2023	88 (96.70)	2 (2.20)	1 (1.10)	91
Total	1221(95.39)	39(3.05)	20(1.56)	1280
Mean	**101.75**	**3.25**	**1.67**	
SD	**47.72**	**1.76**	**1.44**	

Table 14. Categorisation of the articles published in IRJEE during 2012-2023 in terms of time taken from submission to acceptance (N=1280) (Percentage in parentheses)

Year	Minimum (1-2 months)	Maximum (4-6 months)	Average (2-3 months)	Total
2012	142 (67.30)	46 (21.80)	23 (10.90)	211
2013	51 (63.75)	17 (21.25)	12 (15.00)	80
2014	96 (88.07)	12 (11.01)	1 (0.92)	109
2015	101 (87.07)	0 (0.00)	15 (12.93)	116
2016	50 (75.76)	2 (3.03)	14 (21.21)	66
2017	58 (52.73)	5 (4.55)	47 (42.73)	110
2018	84 (95.45)	0 (0.00)	4 (4.55)	88
2019	40 (62.50)	11 (17.19)	13 (20.31)	64
2020	46 (68.66)	5 (7.46)	16 (23.88)	67
2021	44 (50.00)	5 (5.68)	39 (44.32)	88
2022	76 (40.00)	21 (11.05)	93 (48.95)	190
2023	26 (28.57)	0 (0.00)	65 (71.43)	91
Total	788(40.00)	124(11.05)	277(48.95)	1280
Mean	**40.00**	**11.05**	**48.95**	
SD	**33.01**	**13.17**	**27.62**	

Table 15. Categorisation of the articles published in IRJEE during 2012-2023 in terms of citations of ten best articles (N=1280) (Percentage in parentheses)

Year	Minimum (5-10)	Maximum (30-50)	Average (20-30)	Total
2012	155 (73.46)	8 (3.79)	48 (22.75)	211
2013	69 (86.25)	3 (3.75)	8 (10.00)	80
2014	96 (88.07)	2 (1.83)	11 (10.09)	109
2015	87 (75.00)	6 (5.17)	23 (19.83)	116
2016	64 (96.97)	1 (1.52)	1 (1.52)	66
2017	108 (98.18)	1 (0.91)	1 (0.91)	110
2018	87 (98.86)	1 (1.14)	0 (0.00)	88
2019	59 (92.19)	5 (7.81)	0 (0.00)	64
2020	48 (71.64)	5 (7.46)	14 (20.90)	67
2021	70 (79.55)	13 (14.77)	5 (5.68)	88
2022	190 (100.00)	0 (0.00)	0 (0.00)	190
2023	90 (98.90)	1 (1.10)	0 (0.00)	91
Total	1123(87.73)	46(3.59)	111(8.67)	1280
Mean	**93.58**	**3.83**	**9.25**	
SD	**41.22**	**3.81**	**14.19**	

Table 16. Citations of International research articles published in IRJEE during 2012-2023

| Year	Countries	Citations
2008	Nigeria	27
2009	Thailand, Nigeria	23
2010	Australia	1
2011	Nigeria, Mozambique	80
2012	Iran, Malawi, Bangladesh	35
2013	Malawi, Bangladesh	29
2015	Nigeria, Bangladesh, Akwa Ibom State	27
2016	Ethiopia, Bangladesh,Nigeria, Iran	92
2017	Bangladesh, Nigeria, Iraq	19
2018	Tanzania	3
2019	Akwa Ibom State	5
2020	Iran	4
2021	Malawi	1
2022	Algeria	2
2023	Bangladesh	1

that majority of the citations fall under the category of minimum (87.73%) with 1123 number of papers which is really a point of concern.

Table 16 and Fig. 1 shows the citation profile of the international papers published in IRJEE during the study period (2012-2023). During the last twelve years a good number of papers were received from thirteen countries including Nigeria, Thailand, Australia, Mozambique, Iran, Malawi, Bangladesh, Akwa Ibom State, Ethiopia, Iraq, Tanzania and Algeria. The citations of some of the international papers published during 2011 and 2016 are quite high as reflected in the table.

BIBLIOMETRICS

VOSviewer is a software program known for its user-friendliness and popularity in creating visualizations of research topics (Orduña-Malea & Costas, 2021). It focuses on using graphics to analyze relationships between terms, unlike other bibliometric
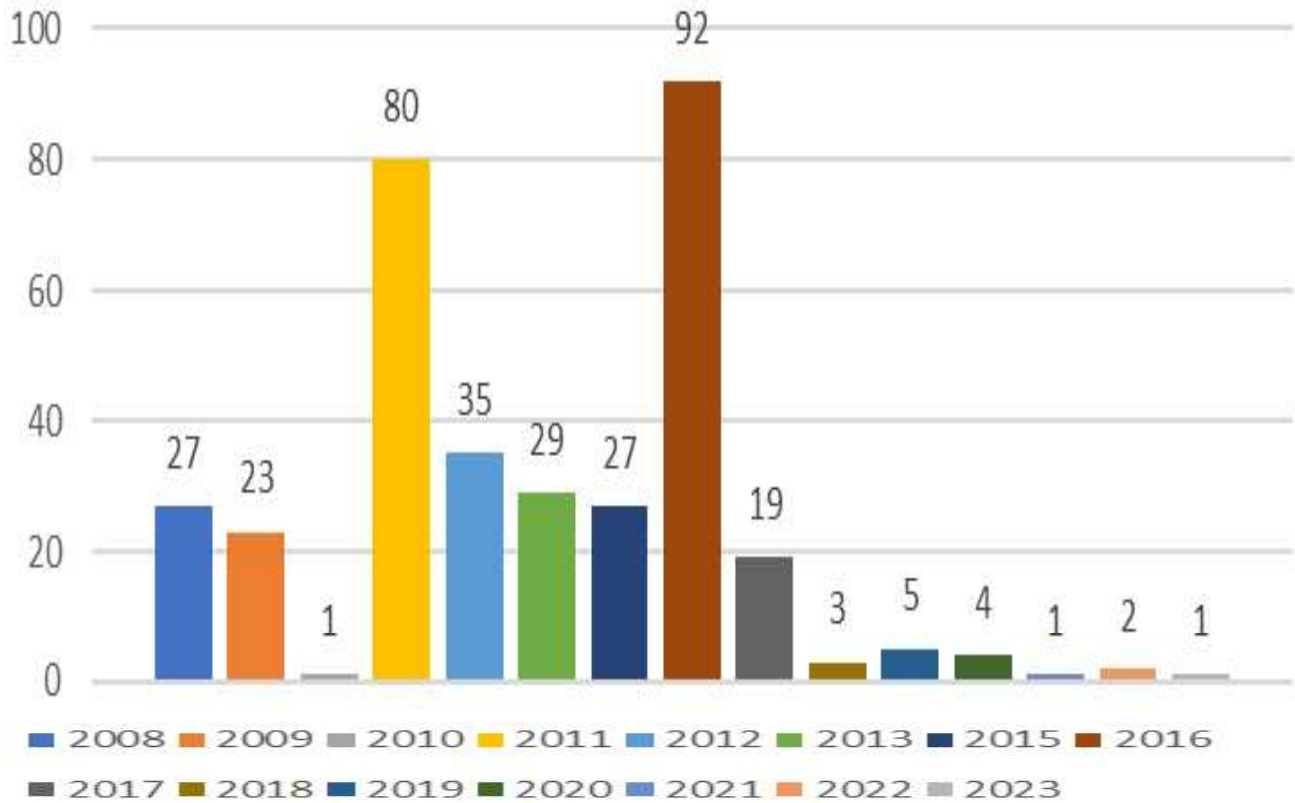
Fig. 1. Citations of International research articles published in IRJEE during 2008-2023

tools (Van Eck & Waltman, 2010). In this study, VOSviewer was used to generate a network map that shows the most frequent terms related to ethics and innovation in construction, along with the connections between these terms.

In this paper, visualization of three bibliometric networks namely bibliographic coupling network of authors, a co-citation network of journals, and a co-occurrence network of terms, has been depicted and analysed.

Bibliographic coupling network of authors : In the visualization presented in Fig.2, each circle represents an author. Large circles represent researchers that have many publications. Small circles represent researchers with only a few publications. In general, the closer two researchers are located to each other in the visualization, the more strongly they are related to each other based on bibliographic coupling. In other words, researchers who are located close to each other tend to cite the same publications, while researchers who are located far away from each other usually do not cite the same publications. Colours indicate clusters of researchers that are relatively strongly related to each other. There are numerous clusters, most of which are fairly small

that means the bibliographic coupling of authors are not so strong.

Co-citation network of authors : Each circle in the visualization presented in Fig. 3 represents an author. The size of a circle reflects the number of citations an author has received. Authors who are located close to each other in the visualization tend to be more strongly related, based on co-citations, than authors who are located far away from each other.

Co-occurrence network of terms : Finally, we consider the construction and visualization of a co-occurrence network of terms extracted from the titles and abstracts of publications in IRJEE.

In the visualization presented in Fig. 4, each circle represents a term. The size of a circle indicates the number of publications that have the corresponding term in their title or abstract. Terms that co-occur a lot tend to be located close to each other in the visualization. VOSviewer has grouped the terms into six clusters, out of which four are of significant size.

DISCUSSION

In depth analysis of table 1 explains that in the last twelve years, a total of 1280 papers and
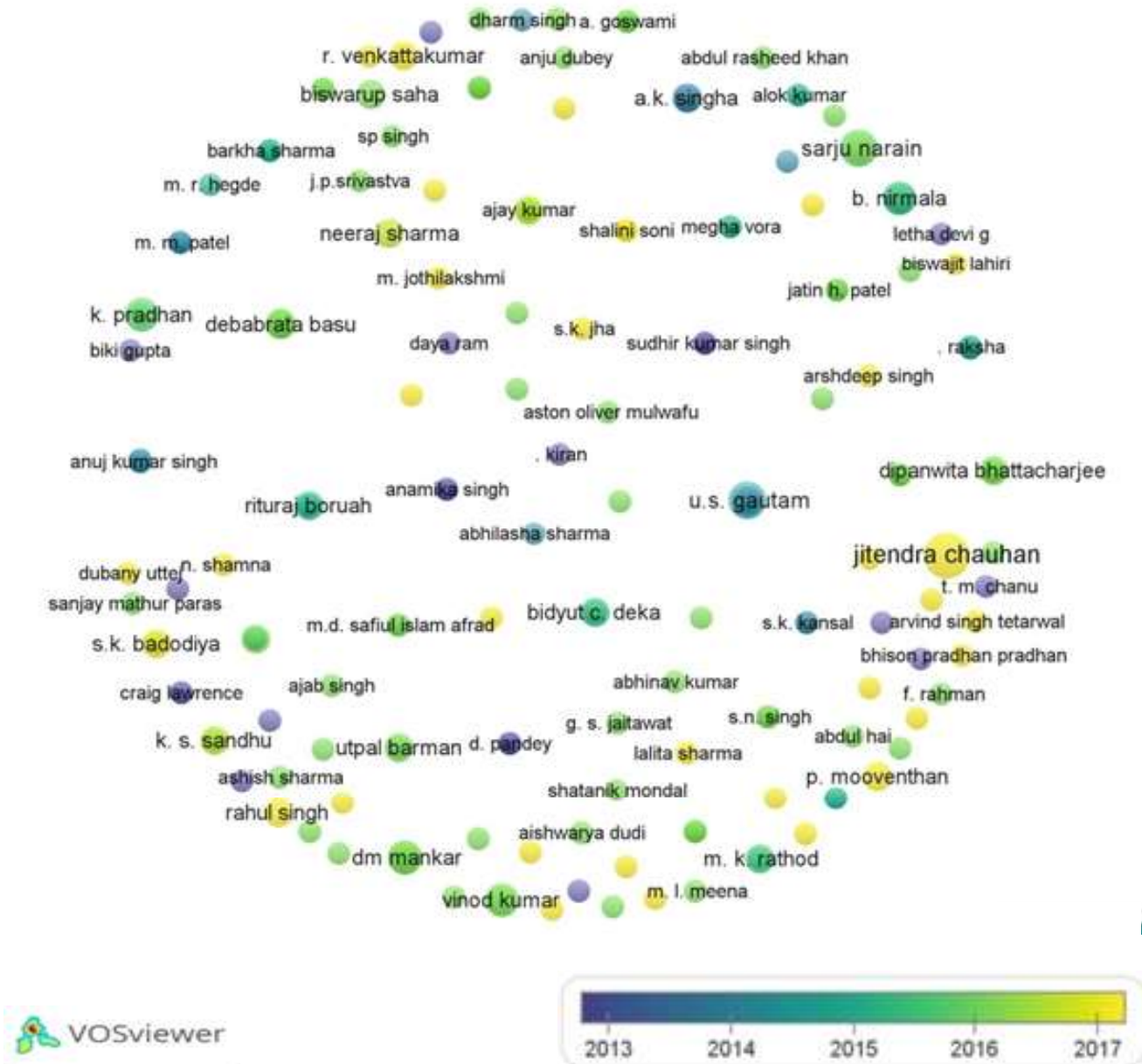
Fig. 2. Bibliographic coupling of authors

articles were published in IRJEE including the major categories of full papers, short communication, review articles and clinical articles. Out of this, no doubt the percentage of full papers was always higher than rest of the categories. In the year, 2016, 2019 and 2020, the number of papers published were the least in the last twelve years. Nevertheless, in other years, good number of papers were published. If we see critically, out of the types of papers published in the journal, the percentage of review articles and clinical articles were very less. The most probable reasons for this could be that clinical articles would have been published in

subject specific journals and in case of review articles, researchers now showed interest to write the review articles to upgrade their citations. It is important to note that during pandemic, the journal received a good number of full papers and short communication but less contribution from of articles and clinical articles forms.

However, review articles were published in the journal after 2013; though the number of published review articles are less, it shows that the journal has introduced a new dimension regarding paper publication and it is in practice now. Three clinical
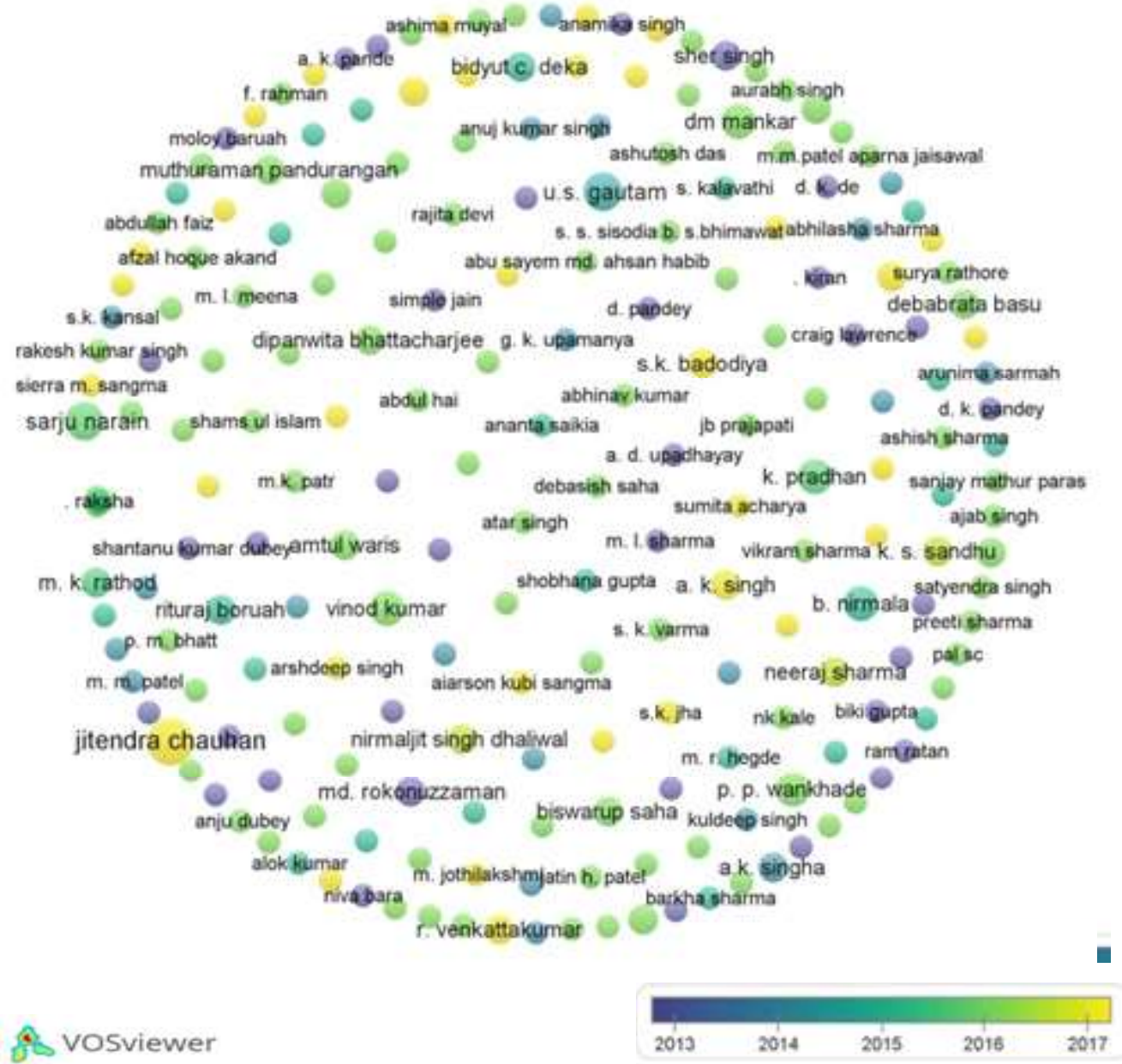
Fig. 3. Co-citation network of authors

articles were published in IRJEE in the year 2014 and 2022.

Detailed analysis of Table 2 showed that 2012 was the year with maximum number of papers publication, out of the twelve years. Year, 2022 and 2012 had the highest percentage of joint authorship. With respect to collaborative authorship, year, 2017, 2012 and 2022 had good number of papers published. Single authorship pattern from the last twelve years shows that year, 2012, 2015 and 2018 had good papers published as single author.

Analytically, a research paper says a lot about not only the researcher but also about the joint efforts of the contributors for a paper. The joint and collaborative papers have efforts of more than one researcher which shows that responsibilities of all authors towards the papers which is going to be published whereas single author paper is the only responsibility of the author. This finding is in line with the study done by Sondarva *et. al.* (2019) where they found in their study that the majority of articles have three authors (31.33%) followed by two authors (60.47%) and single authors (8.20%).

Detailed explanation of the Table 3 shows that
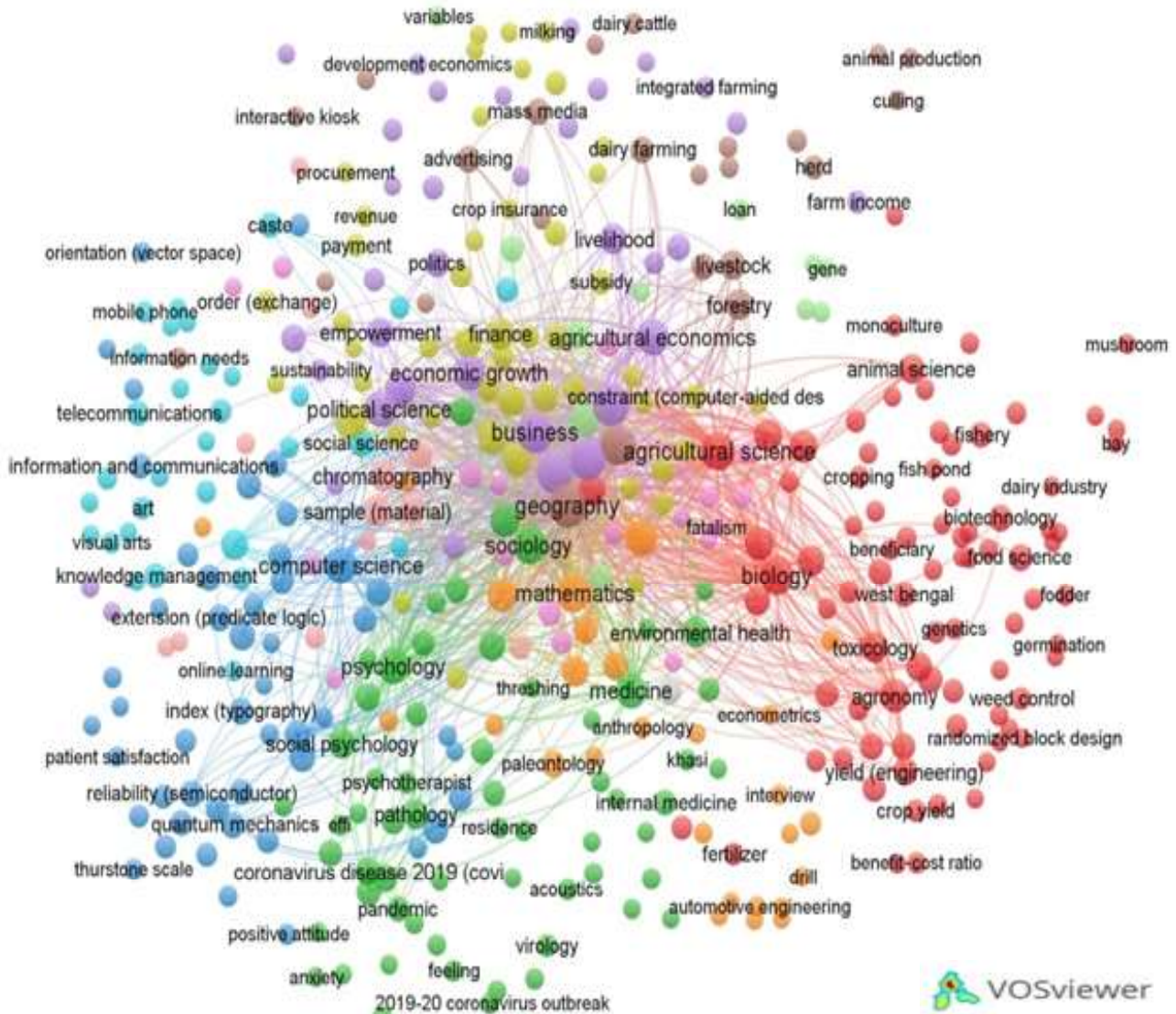
Fig. 4.Co-occurrence network of terms published in IRJEE

year, 2012 (207), 2022 (186), 2015 (110) had a very good number of paper publications from Indian authors whereas year, 2014 and 2017 had equal number of papers published (107). Rest of the period had less than 100 Indian papers annually in the journal. With respect to international publications, papers received from thirteen countries including Nigeria, Thailand, Australia, Mozambique, Iran, Malawi, Bangladesh, Akwa Ibom State, Ethiopia, Iraq, Tanzania and Algeria. It was noticed that in year 2016 had the highest number of International papers published in IRJEE.

To be recognised at the international level, the journal needs a very polished refinement and revision of the guidelines so that it gets recognition at international level, which not only benefits the journal and the Society of Extension Education, Agra, but also

to the authors also who are contributing in the journal. The most probable and priority wise solution for this could be to raise the standard of papers published in the journals, timely revision of the journal's guidelines and policy matching the international journals. The society and IRJEE could also organise some workshops at regular intervals for its permanent members who are contributing through their work so that journals' standards could rise higher and in near future, the IRJEE could be recognised as an international journal.

Table 4 further gives detailed information about year wise and subject wise papers published in the journal. It can be seen from the table that agricultural extension papers were ranked first (53.58%) which got published in the journal followed by veterinary extension (14.19%) and home science (7.98%). The

table also shows the trend that slowly the disciplines like agronomy, entomology, engineering, soil science etc. also got published in the journal although the number is very less and journal has to put efforts to increase the paper publication from these disciplines. It is also important to note that the fields like psychology and management science have very less numbers of papers published. The probable reasons for this could be subject specificity, journals guidelines, assessment criteria and many more. It could be also seen from the table that research papers on Information and Communication Technology also got less publication in the journal.

Detailed analysis of Table 5 shows that descriptive type of study ranked the highest (61.02%) followed by comparative (9.22%) and explanatory on par at 9.22 per cent. The other types of investigation methods were methodological (6.25%) and constructive (9.22%). Theoretical and other types of investigation were less with 2.74 and 1.56 per cent respectively. The present findings are coinciding with the study done by Allahyari *et al.* (2015) which analyzed the content of Iranian articles on agricultural extension and education during the years 2009-2013. The results showed that descriptive-correlational was the most common methods used in researches. Out of 781 articles, 719 articles were written as a result of group participation and the rest (62 articles) were individually written.

Table 6 shows the detailed picture of published papers, with maximum of reflective thinking (42.19%) and action research base (38.59%) followed by constructivism (9.22%) and critical thinking (6.80%). Multiple intelligence theory (1.17%), lifelong learning (0.70%) and others (1.33%) have very less percentage of theoretical frameworks in the study.

From Table 7, it is discernable that survey technique (68.52%) of data collection was frequently used followed by case study (5.94%), review (5.93%) and observation (3.59%). The table further highlights that survey and content analysis (0.94%) and policy analysis (0.47%) are still less popular research methods used by the researchers in their study. From the table it is very clear that till date, survey method (68.52%) is the most commonly used research method in data collection.

Table 8 shows that simple random sampling is the most trusted and frequently used sampling design among researchers. The reason could be because of easy applicability, more structured and less chances of error in using random sampling design and most standardised sampling technique with precision and accuracy. Convenience sampling (2.26%), quota sampling (0.46%) snowball (1.87%), area (1.48%) and cluster (1.40%) sampling are still less used sampling design in the papers published.

Pandemic situation due to corona has introduced the use of online surveys in conducting research work and now this technique has become one of the most commonly used technique in Indian research work. Table 9 had given an opportunity to conclude that the other data collection techniques like focus group discussion (3.45%), participatory methods (5.70%) and others (1.17%) are lesser in use than the other discussed before. The most probable reasons for the same could be these techniques are of majorly descriptive type, needs more expertise, time consuming and analysis needs critical thinking. Data collection techniques in the table shows that most of the research studies used primary data (17.73%) technique than secondary data collection techniques (6.10%). It further shows that primary data collection techniques are more trusted and authentic than secondary data collection techniques. Under primary data collection techniques, personal interview (55.39%) was found to be the most commonly used technique, followed by observation (7.81%). The use of online survey was found less in earlier years but increased during pandemic time period (2020-2022). Although the online survey technique is cost effective and higher reach, it is of low level of authenticity.

According to table 10, the published papers in the journal used the techniques like relative standing (17.26%), variability (5.47%), non-specified (6.09%), chi square (5.23%), Mann Whitney (1.09%), Wilcoxon (0.31%), Kruskalwallis (1.33%), t test/z test (12.50%), ANOVA (6.56%), reliability (5.31%), correlation (34.92%), other multivariate analysis (3.13%) and innovative analysis (0.78%). The data analysis methods show that various techniques used for researches done in the last twelve years and critical analysis of these studies will further give the focussed information on applicability of studies done in the particular time period.

Table 11 further explained that last twelve years' studies are covering every stakeholder in agriculture and allied sector which is a good sign for the research work done and future demands in researches. This is more or less in line with the findings of the study done by Sondarva *et. al.* (2019) which highlighted in their

study that major papers published were on farmers as the respondents (67.68%) and farm women (10%.).

Table 12 highlights that research areas selected by the researchers were climate resilient extension (0.53%), adoption/innovation (12.63%), behavior (17.89%), knowledge (22.63%), attitude (4.74%), skill (0.53%), performance/motivation (23.16%), perception (6.32%), innovative approaches (7.89%) and others (1.58%). Moreover, data presented in the Table 13 shows that national institutes journal have wider circulation and major number of papers. International institutes and joint publication are still a herculean task for the journal to be achieved and get recognition at international level. It is clearly visible from the Table 14 that maximum number of papers got acceptance in 2-3 months (48.95%) followed by 1-2 months (40.0%) and 4-6 months (11.05%).

Table 15 reveals that there are 111 papers which got citation between 20-30 and 46 papers got cited 30-50 times in last twelve years. Overall, it's good to note that IRJEE's papers are recognised with better citation but there is a need to increase the overall citation index of the journal as citation does not only show the author's contribution but also important to the journal to get recognition and stand in journal community. There should be proper points to be considered how to increase the journal's recognition through paper citation.

Table 16 and figure 1 reveals that a good number of papers received from international authors of total thirteen countries for publication and citations of these paper are quite high. It reflects the outreach and popularity of the IRJEE among international authors.

As per the views of Büyükkidik (2022), citation analysis is a method of impact evaluation by authors, documents and journals with their citation rates. This analysis strengthens effectively in identification of crucial studies in the field.

It is also important to note that newer publications have lower citation rates in comparison to older publications as it has more citation counts. Further, Büyükkidik (2022) elaborates that co-citation analysis sees the relationship between authors, documents and journals having its reference lists.

Comparing the visualizations shown in Figures 2, 3, and 4, it can be concluded that we have obtained a quite consistent picture of the structure of the field of scientometrics and closely related fields. The three visualizations suggest a similar division into subfields.

The differences between the visualizations are fairly small and relate mainly to the positioning of the subfields relative to each other and to the level of detail that is provided.

CONCLUSION

Bibliometric content analysis is being used for a variety of purposes like determination of various scientific indicators, evaluation of scientific output, selection of journals for libraries and even forecasting the potential of a particular field. The popularity in the adaptation of bibliometric techniques in various disciplines stimulated stupendous growth of literature on bibliometrics and its related areas. The journal has published 1280 articles during the period of study. The study identified the categories of published articles in IRJEE mostly in terms of full paper, joint authorship article, South Indian context, agricultural extension education domain, with descriptive investigation method, on reflective thinking framework, as survey research, using simple random sampling process, with the help of personal interview method, through correlation analysis, towards farmers orientation, on adoption/innovation, mostly communicated by national institutes. A good number of papers received from international authors and their citations were quite high which indicates the quality of papers and outreach of the IRJEE among international authors.

The bibliometric study identified the co-authorship pattern, co-citation pattern and co-occurrence pattern which are self-revealing and self-propelling. The information, knowledge and wisdom generated from this research study on IRJEE contribute to streamline the journal for its future growth and development by enhancing the citation scores and improving the status of indexing in different indexing parameters.

Author's contribution: The authors conceptualized, operationalized, collected and analyzed the data and interpreted the data, participated in contributing to the text and the content of the manuscript, including revisions and edits. All authors approve the content of the manuscript and agree to be held accountable for the work.

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