

## Is training and development imperative? A bibliometric and systematic literature review

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**Abstract:** Training and development play a significant role in improving employee skills and capabilities for higher performance and in producing high-quality work. They are important for ensuring employee efficiency and for organizations to cultivate a professional workforce. The aim of this bibliometric and systematic literature review is to address the research gap and serve as a guideline for policymakers, academicians, and organizations in effectively utilizing training and development. The current study followed the Preferred Reporting Items for Meta-Analyses (PRISMA) and Systematic Reviews. The Scopus database was used due to its broad journal coverage. A holistic keyword search identified 2,299 articles, and after applying criteria, 169 relevant articles were gathered. Quantitative methods were commonly used, followed by qualitative and mixed methods. Descriptive statistics, Structural Equation Modeling (SEM), exploratory factor analysis, and multiple regression were common statistical techniques. This review enriched the literature and suggested future directions for understanding training and development and refining methodological approaches. The study recommends customized methods, innovative technologies, and the integration of AI in training frameworks.

**Keywords:** Bibliometric and systematic literature review, HR training, PRISMA, Scopus, Training and development.

### 1. Introduction

Nowadays, training and development have become very important for businesses aiming to gain competitive advantage in the changing environment. It is playing a role in enhancing employees' quality of work, development and growth of an organization [1]. Achieving organizational objectives and enhancing employee performance in most organizations rely on training and development [2]. According to Karim, et al. [1] training and development play a significant role in improve both employee and organisation performance. The study recommends that all employee should have compulsory training programs for equipping them with the skills needed to adapt to changes and improve their performance. Thus, training and development Incorporate methods and strategies which help employees update with change and improve their abilities and performance.

The aim of this bibliometric and systematic literature review (SLR) is to be a guideline for policymakers, academicians and organisations in effectively using training and development in order to achieve organisational goals and success. The originality of this study was based on the distinctive and unique integration of bibliometric analysis and the SLR via PRISMA guidelines [3] which enabled a comprehensive examination in training and development to determine research methodologies, statistical analysis technique, and emerging trends. The study first conducted a bibliometric analysis and second systematic literature review in order to answer the next research questions:

1. What are the top countries, year distribution, educational universities, keywords in researching training and development?

The systematic literature review was guided by two research questions (RQs) as follows:

2. Which methodologies have widely been utilised in researching training and development?
3. Which statistical analysis techniques have extensively been employed in researching training and development?

## 2. Methodology

### 2.1. Study Design

The study first conducted a bibliometric analysis and second SLR. A uniform approach was performed to determine training and development methods and statistical analysis techniques. The analysis also performed to determine methodologically by reviewing different journal articles.

### 2.2. Study Strategy

This study used Scopus database to undertake an extensive search of relevant journal articles on March 15, 2025. The initial search for the bibliometric analysis produced 2,299 articles, which were downloaded and mapped via the Visualization of Similarities (VOS) viewer software according to the occurrences. 29 articles were published in 2024, in 2019 (23), in 2017 (18) in 2020 (17) and in 2023 (16) which was higher than those in 2015, 2016, 2018, 2021 and 2022. Training and development were inspected through data visualisation to demonstrate the top countries leading relevant research, including India (23%), the United Kingdom (UK) (14%) and the United States of America (USA) (12%) respectively. The top position of India and the UK Included strong profound governmental funding and educational frameworks. The position of US also reflected by rigorous research initiatives and good financial resources. In addition, the three Asian countries, Pakistan, Malaysia and Indonesia thoroughly carried out performed innovative research, applications and creative approaches. United Arab Emirates, Australia, Saudi Arabia and South Africa provided also valuable contributions.

A sequence of keywords, such as “training and development” and “HR training”, was used to Precisely determine relevant articles. Most used keywords in publications in the field were provided as TITLE-ABS-KEY (training AND development AND hr AND training) AND PUBYEAR > 2014 AND PUBYEAR < 2025 AND (LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "SOCI")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (DOCTYPE, "ar")) AND ( LIMIT-TO ( EXACTKEYWORD, "Training") OR LIMIT-TO (EXACTKEYWORD, "Human Resource Management") OR LIMIT-TO (EXACTKEYWORD, "Training And Development") OR LIMIT-TO (EXACTKEYWORD, "HR Practices") OR LIMIT-TO (EXACTKEYWORD, "HRM Practices") OR LIMIT-TO (EXACT KEY WORD, "Human Resource Practices") OR LIMIT-TO (EXACTKEYWORD, "Human Resource Development") OR LIMIT-TO (EXACTKEYWORD, "Employee Development") OR LIMIT-TO (EXACTKEYWORD, "Personnel Training") OR LIMIT-TO (EXACTKEYWORD, "Employee Training") OR LIMIT-TO ( EXACTKEYWORD, "Development"). The search was only for two fields: “Business, Management and Accountant and Social Science”, AND (LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "SOCI"))”. The research were analysed only journal articles, namely “AND (LIMIT-TO (DOCTYPE, "ar"))”.

### 2.3. Data Synthesis and Analysis

A content analysis was performed to identify and group emerging themes, discovered obstacles, and potential research avenues according to the nature and occurrence to guarantee a deep comprehension while suggesting potential directions.

### 2.4. Inclusion and Exclusion Criteria

Through the established inclusion and exclusion criteria the gathered articles were assessed in this

study. English articles published between 2015 and 2025 and relevant keywords were the inclusion criteria. A total of 73 articles were determined. The robust quality evaluation process also guaranteed high relevance and clarity of the RQs and hypotheses in the gathered articles. The quality evaluation in the gathered articles guaranteed lucidity of the hypotheses and RQs as well data collection and data analysis evaluated in order to ensure a strong fit with RQs, unbiased findings and generate holistic. Thus, current study determined a final set of 25 high-quality articles. The selection procedures of these articles were carefully documented. The following table 1 delineated the inclusion and exclusion criteria.

**Table 1.**

The inclusion and exclusion criteria.

Inclusion	Exclusion
Articles published between 2015 and 2025	Non-peer-reviewed articles, such as blog posts or news articles.
Articles published in English	Publications in other languages
Articles primarily concentrated on training and development.	Articles irrelevant to training and development

### 2.5. Discussion and Critical Analysis

The data critically assessed and discussed to provide clear insights by analysing results and implications in literature gaps.

### 2.6. Quality Evaluation

The selection procedures of these articles were carefully documented and systemically appraised. A total of 73 out of 169 articles were retained after applying the inclusion and exclusion criteria. Further assessment based on the study design, data collection strategies, and the reliability and validity of the findings resulted in only 25 articles finalised for the SLR. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) function as structured guidelines for high exactness and clarity in SLRs and meta-analyses, which can ensure high research rigour through provide clear insights (see Figure 1).

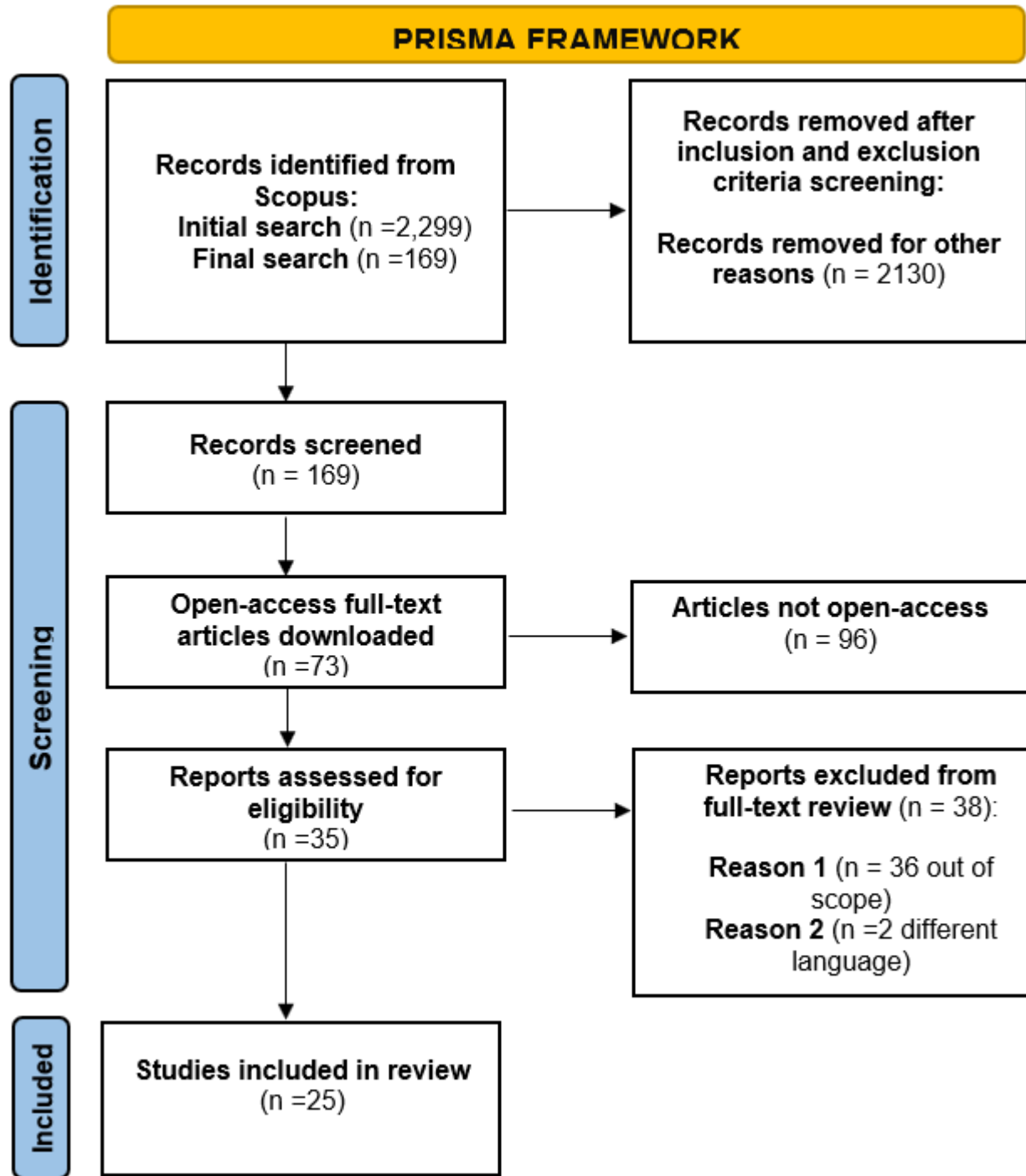


Figure 1.  
PRISMA Framework.

### 3. Findings

The bibliometric analysis and Systematic Literature Reviews were performed to obtain in-depth detailed about training and development through gain perspectives from bibliometric analysis and SLR

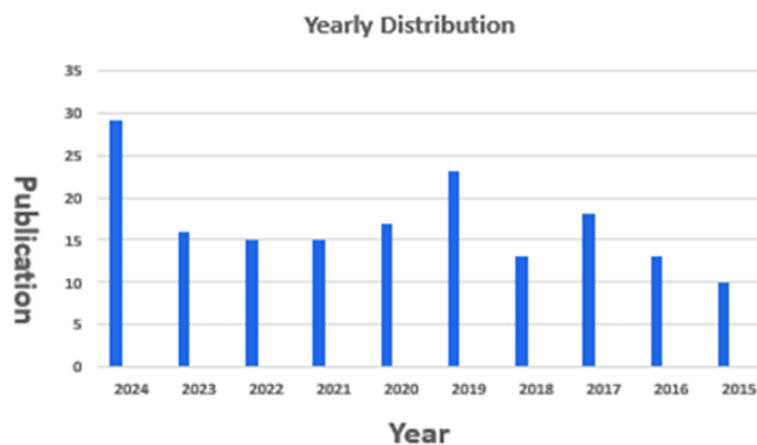
to achieve narrative clarity. Furthermore, to ensure comprehension of the investigation topic and the logical flow of the results. In this study cross-referencing was also used to enhance the Integration of both bibliometric analysis and Systematic Literature Reviews. Bibliometric analysis focused on themes and key advancements whereas Systematic Literature Reviews scrutinised the articles.

### 3.1. The First Phase (Bibliometric Analysis)

In the business context, training and development are important factors that support organizations in the market and help enhance both employee and organizational performance in a highly turbulent environment. Scholars, organisations and researchers continuously strive to improve the comprehension of emerging trends and key influencers for conveying training and development outcomes. Thus, this bibliometric analysis will impact the future of training and development trend and is a tool for researchers to evaluate the existing study trend.

#### 3.1.1. The Top Yearly Distribution of the Research on Training and Development

The research question for bibliometric analysis was answered by evaluating the top yearly distribution of publications from 2015 to 2025. Across the decade as showing in figure 2 a fluctuating trend, in which both growth and decline noted rather than a linear trend. Specifically, 29 articles were published in 2024, which was higher than other years. A significant increase was noted in 2019 and 2017, which was the high distribution also with 23 and 18 publications which was higher than those in 2015, 2016 and 2018. This increase may because increased awareness of the importance of training and development, governments funding initiatives around 2017 and 2019, or corporate investment peaks. In contrast, 2015, 2016 and 2018 displayed the lowest distribution, with only 10, 13 and 13 published articles relatively lower attention.

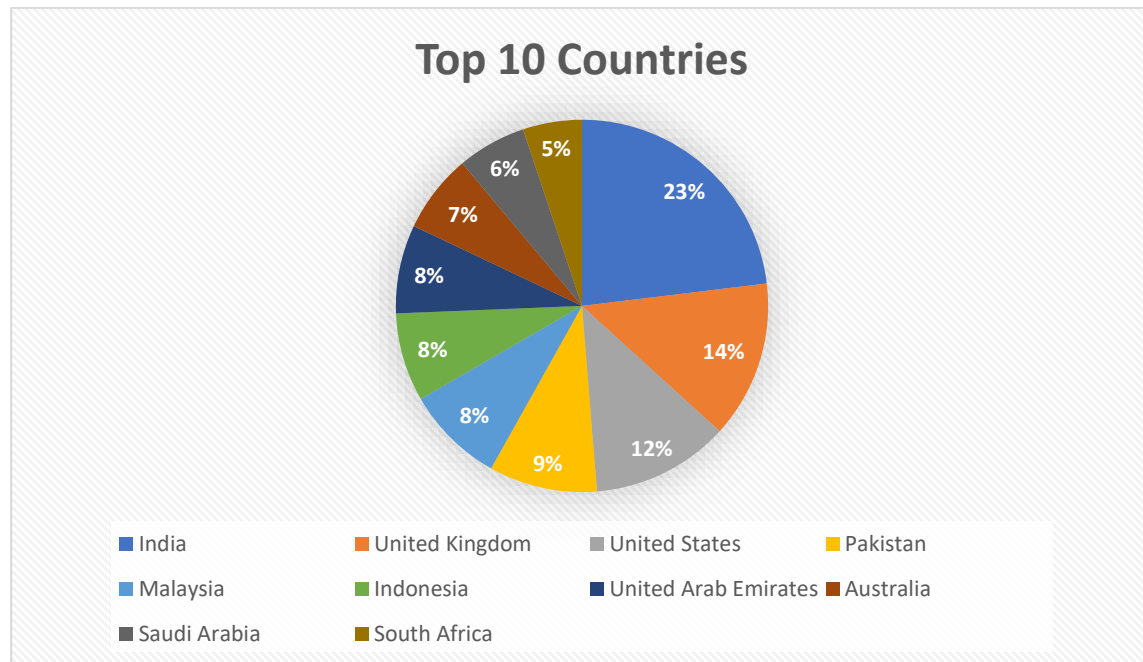


**Figure 2.**  
The top yearly distribution of studies on training and development.

#### 3.1.2. The Top Countries for the Research on Training and Development

The bibliometric analysis enables the mapping of training and development by evaluating related published articles, academic collaboration trends and citations. The VOS viewer software was employed to add more valuable insights by uncovering the nation's leading the field. The results as showing in figure 3 revealed that the India, UK and the USA significantly contributed to the field at 23%, 14%, and 12% respectively. The top position of India and the UK included strong profound governmental funding and educational frameworks. The position of US also reflected by rigorous research initiatives and good financial resources. In addition, the three Asian countries, Pakistan, Malaysia and Indonesia thoroughly

carried out performed innovative research, applications and creative approaches. Australia, United Arab Emirates, South Africa and Saudi Arabia provided also valuable contributions.



**Figure 3.**

The top 10 countries contributing to worldwide publications on training and development.

### 3.1.3. The top educational universities for the research on training and development

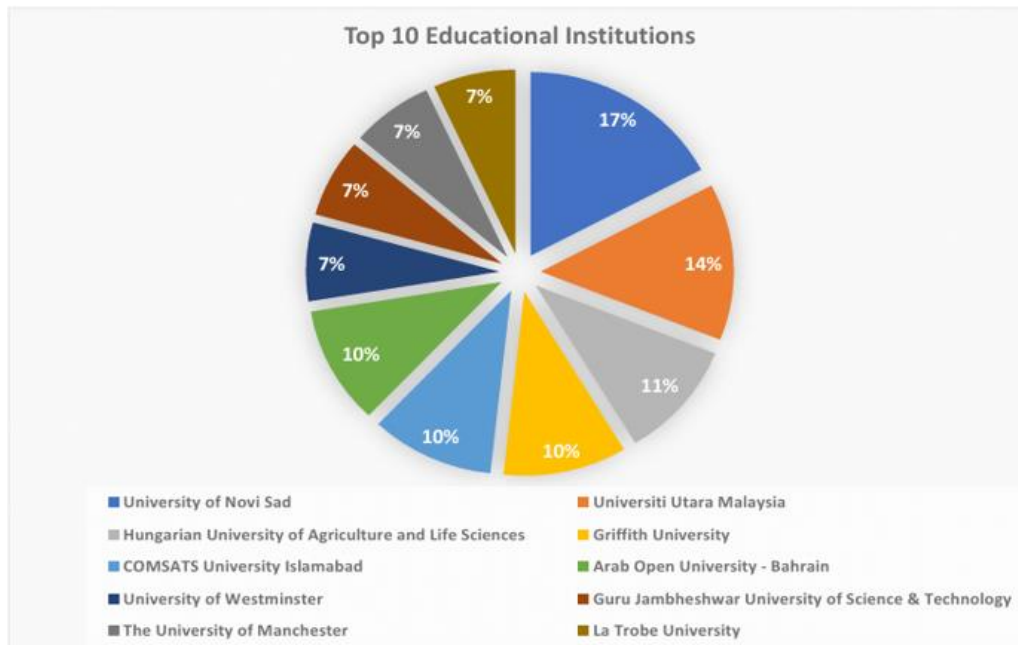
The fourth question is What are the top educational universities that have made the most notable contributions to the study of training and development? Figure 4 and Table 2 show that University of Novi Sad in Serbia was the top educational institution with the highest total publications (TP) by contributing 29 articles on training and development. The Universiti Utara Malaysia in Malaysia was ranked second with 23 published articles, which emphasized Malaysia educational commitment to progressive academic investigation and research. Hungarian University of Agriculture and Life Sciences in Hungary was ranked third by contributing 18 TPs, which show the dedication to impactful research. The Universities aforementioned in various nations the global research trend on training and development by applying incorporating unique perspectives and different methodologies. Thus, current literature was improved and enriched.

**Table 2.**

The top educational universities in the study of training and development.

Educational Institution	*TP	Nation
University of Novi Sad	29	Serbia
Universiti Utara Malaysia	23	Malaysia
Hungarian University of Agriculture and Life Sciences	18	Hungary
Griffith University	17	Australia
COMSATS University Islamabad	17	Pakistan
Arab Open University	17	Bahrain
University Westminster	12	UK
Guru Jambheshwar University of Science and Technology	12	India
The University of Manchester	12	UK
La Trobe University	12	Australia

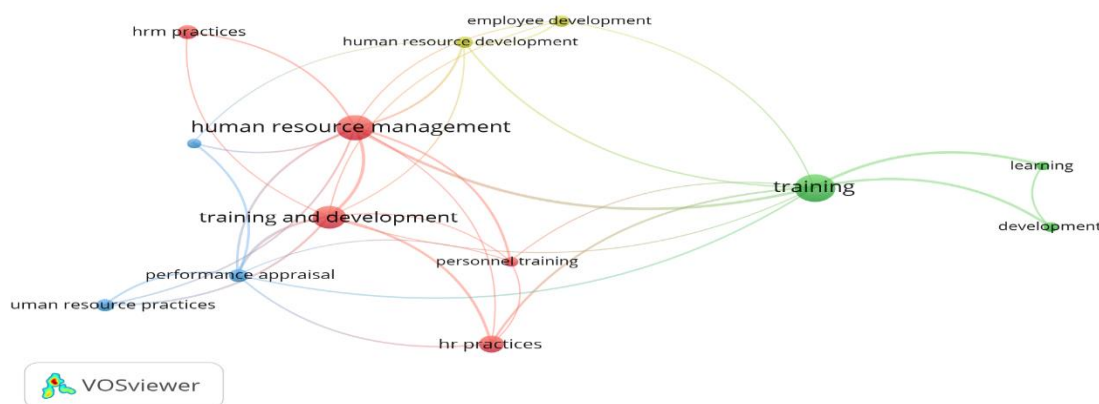
**Note:** \*TP= Total Publication.



**Figure 4.**  
Publication distribution by educational universities.

#### 3.1.4. The top keywords applied in research on training and development

The fifth question answer the analysis of keywords demonstrates as show in figure 5. This showed the most frequently utilised terms, with “Training” emerging as the most popular term, followed by “Human Resource Management” and “Training and Development”. Other terms, such as “HR Practices”, “HRM Practices”, “Human Resource Practices”, “Human Resource Development” “Employee Development” and “Personnel Training” also important in determining the research trend, which postulated research intricacies on training and development and the combined effect of the keywords on the present growing literature.



**Figure 5.**  
The most frequently applied keywords in studies training and development.

### 3.2. The Second Phas (Systematic Literature Review)

#### 3.2.1. Most Offen Applied Methodologies

Different methodologies, qualitative, quantitative, mixed methods and literature review applied in past research were assessed as showing in Table 3. Specifically, quantitative (questionnaire) studies [4–6] conducted questionnaire to evaluate variables including effective training evaluation, training, human resource management practices and organisational performance, HR practices and employee engagement. Meanwhile, only several studies, such as Asfahani [7]; Bin Othayman, et al. [8] and Meacham, et al. [9] employed qualitative methods include interviews, case study and focus group in order to assess the subjective associated experiences to training and development. Fogarassy, et al. [10]; Rowland, et al. [11] and Capatina, et al. [12] conducted mix method (quantitative and qualitative) techniques to obtain a more comprehensive understanding of training and development. Furthermore, two studies Giannakis, et al. [13] and Enyinda, et al. [14] employed literature review and two studies Morley, et al. [15] and Slavić and Berber [16] applied a survey.

**Table 3.**

Study methodologies used to measure training and development.

Methodology	Number of studies
Quantitative (questionnaire)	18
Qualitative (Focus Groups- Nominal Groups- Delphi Method)	1
Qualitative (Interview)	5
Survey	2
Qualitative (Case Study)	1
Literature Review	2
Mixed-method (Quantitative - Qualitative)	4

#### 3.2.1. Most frequently applied statistical analysis

Different statistical analysis and techniques were employed as showing in Table 4. The most popular method was descriptive statistics in training and development studies which used to test hypothesis and summarise collected data Yfantidou, et al. [17]; Pereira, et al. [18]; Alajlani and Yesufu [19]; Urbancová, et al. [6]; Ahmad, et al. [20]; Slavić and Berber [16]; Ahmed, et al. [21]; Sivashanmugam and Krishnan [22] and Cesário [23]. Sharma, et al. [4]; Capatina, et al. [12]; Dahal, et al. [24]; Mathushan and Shantha [25] and Winarno, et al. [26] applied structural equation modelling (SEM-PLS) to investigate the relationship between training and development and other variables. Sivashanmugam and Krishnan [22]; Darwish, et al. [27] and Cesário [23] also conducted exploratory factor analysis to explore data, test construct validity and reduce data complexity. Darwish, et al. [27]; Slavić and Berber [16] and Alajlani and Yesufu [19] conducted multiple regression analysis to evaluate the effect of multiple predictors on a single outcome and Identify complex relationships regarding to training and development and other variables. Application of sophisticated statistical methods, such as descriptive statistics, SEM, exploratory factor analysis and multiple regression in the study of training and development help in supporting researchers in understanding the multiple facets of training and development.



**Table 4.**  
Study Statistical Analysis used to measure training and development.

Statistical Analysis and Technique	Number of studies
Descriptive Statistics	12
Exploratory Factor Analysis	3
Structural Equation Modeling (SEM) PLS	5
Reliability Analysis	1
Chi-Square Tests	1
Spearman's Correlation- Mann-Whitney Test	2
Confirmatory Factor Analysis	2
Hierarchical Regression Analysis	1
Framework Analysis Technique	1
Correlation Analysis	1
Regression Analysis	2
Pearson Correlation	1
Multiple Regression	3
Analytic Hierarchy Process	1
Manual Thematic Coding and Frequency Counts	2

## 4. Discussion

The current systematic literature review evaluated training and development studies and contributed useful knowledge in expanding the essential human resource management practices. The results related the prevalence of specific methodologies, statistical analyses through different industries, which offered holistic understanding of literature gaps and research trends.

### 4.1. Methodologies

The first research question was associated to methodologies used by researchers in order to achieve study objectives. Especially, quantitative (questionnaire) were commonly used, which may be due to efficiency and the high scalability in collecting large datasets. However, other techniques could also be combined with to provide an in-depth understanding. Meanwhile, three studies ( $n = 3$ ) employed qualitative methods include interviews, focus group and case study in order to evaluate the subjective associated to training and development. Mixed methods (quantitative and qualitative) were also applied due to the capacity to answer various of research questions that was unable effectively fulfilled by either qualitative or quantitative methods by more holistic and subtle findings. These studies provide a comprehensive assessment of the methodology used on training and development which can help future researchers in their study. Thus, future researchers can apply more mixed methods in order to complete the limitations potential in qualitative or quantitative methods.

### 4.2. Statistical Analyses

The second research question was to understand applied statistical analysis techniques in previous study. Descriptive statistics analysis, SEM, exploratory factor analysis and multiple regression were common analysis techniques. Descriptive statistics analysis was the most frequently used technique to evaluate training and development. SEM, exploratory factor analysis and multiple regression also contributed to gain more comprehensive analysis. Future studies can also apply more different statistical tools to discover trends and interactions in complex and large datasets. These studies provide a comprehensive assessment of the methodology used on training and development which help future researchers understand applied statistical analysis techniques.

Future researchers can constantly discover varied innovative statistical analysis techniques to improve research depth and rigour. Most researchers used different software for data analysis such as Smart-PLS, NVivo and SPSS. Thus, Future researchers can use more advanced tools and combining it with mixed methods Smart-PLS, NVivo, MAXQDA and SPSS to enhancing data precision.

#### 4.3. Contributions

This Systematic Literature Review deeply enriched the existing literature on training and development studies. Especially, this study was considerably scrutinised through quantitative and qualitative methods, with mixed methods highly important for provide in-depth insights and nuanced. In addition, SEM and multiple regression were common statistical analysis techniques increasingly explored with innovative approaches, such as machine learning.

#### 4.4. Limitations

The existing Systematic Literature Review was only based on journal articles which meeting specific inclusion criteria. It was also based only on the SCOPUS database for the data collected, that might limit the scope of perspectives, findings and could require additional databases to enhance thoroughness of the insights and the validity. The articles published in English peer-reviewed articles in the inclusion criterion could omit important insights offered by non-English articles where the most articles in this study from the UK and the USA, which in the findings might have geographically bias.

#### 4.5. Future Directions

Future study may comprise different renowned databases such as Web of Science (WoS), PubMed and IEEE Xplore in order to resolve current limitations regarding to applying one database. This will lead guarantee more representative, capture regional insights, widen the breadth of perspectives and comprehensive results. In addition, future researchers can include in the inclusion criteria English articles and non-English articles to alleviate language bias and for a more inclusive conclusion. For Systematic Literature Review future study can apply more mixed methods in order to complete the limitations potential in qualitative or quantitative methods. Future researchers can constantly discover varied innovative statistical analysis techniques to improve research depth and rigour. Future researchers can use more advanced tools and combining it with mixed methods Smart-PLS, NVivo, MAXQDA and SPSS to enhancing data precision. Future study could use innovative technologies to provide a more effective training and development framework as well implement AI in HR training practices. Resultantly, the inclusivity, comprehensiveness, and international relevance of future SLRs are improved and the applicability and robustness of results can be elevated. Thus, comprehensiveness, international relevance and the inclusivity of future Systematic Literature Review are enhanced and the robustness and applicability of findings can be elevated.

### 5. Conclusions

The current study applied a holistic Systematic Literature Review on the training and development contribute useful insights into several aspects. Especially, quantitative (questionnaire) were commonly used with qualitative methods adopted to provide an in-depth understanding. Descriptive statistics analysis, SEM, exploratory factor analysis and multiple regression were common analysis techniques to enhance the research rigour. However, some limitations existed in terms of the geographical constraints and the range of reviewed articles. Future study can apply a more comprehensive method through using different databases and including both English and non-English articles. In concluding, this Systematic Literature Review deeply enriched the existing literature on training and development studies and recommended several future directions to more understanding of the study topic and determining the most common methods.

#### Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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