Rohitha Abeysinghe[1]
Orcid: 0000-0002-0384-081x

Anuradha Iddagoda[2]
Orcid: 0000-0003-2586-430x

Hiranya Dissanayake[3]
Orcid: 0000-0002-4963-5125

W. P. Richard Wickramaratne[4]
ORCID: ORCID: 0000-0002-2839-2849

Employee Job Performance Studies in the Military Context: A Bibliometric Analysis

Badania wydajności pracy w kontekście wojskowym: analiza bibliometryczna

[1] Rohitha Abeysinghe, National Defence College, Sri Lanka, e-mail: rohitha723@yahoo.com

[2] Anuradha Iddagoda, Senior Lecturer, University of Sri Jayewardenepura, Sri Lanka, e-mail: anuradhaiddagoda@sjp.ac.lk

[3] Hiranya Dissanayake, Senior Lecturer, Wayamba University of Sri Lanka, e-mail: hiranya@wyb.ac.lk

[4] W. P. Richard Wickramaratne, Professor, General Sir John Kotelawala Defence University, Sri Lanka, e-mail: 4wp_richard@kdu.ac.lk

Introduction

Work is a rational and systematic effort to transform living conditions into those more suitable to humanity (Nowakowski, 2005), which is closely related to the issue of job performance. Campbell et al. (1990) defined employee job performance as observable things people do (i.e. behaviours) that are relevant for the goals of the organisation. Iddagoda and Dissanayake (2022) conducted a study about the intervening effect of employee engagement on the relationship between high-performance work practices and employee job performance. Their study is related to the managerial level employees in the Sri Lankan public listed banks. The study conducted by Sewwandi and Perera in 2022 endeavours to examine the influence of Big Five Personality (BFP) traits on employee job performance among the managerial employees in a selected apparel firm in Sri Lanka. Meanwhile Iddagoda et al. (2022) studied religiosity as a predictor of employee job performance. Their study concerns the Sri Lankan military officers.

Continuous research is essential to explore unidentified and unresearched areas and aspects. It is now possible to analyse and forecast research trends in certain fields using bibliometric analysis, a tool for mapping identified published records and a well-known alternative approach in library and information science to examine academically detailed concerns. There are six research objectives of this bibliometric study: (1) To identify the trend of publications related to employee job performance; (2) To identify the most dominating journals in the employee job performance research area; (3) To ascertain the pioneer who has the highest number of citations in the subject of employee job performance; (4) To identify the total number of articles, increasing tendency, and international distribution in the subject of employee job performance; (5) To identify the publications and papers on employee job performance that have the most significant citation impact; (6) To recognise the employee job performance author keywords.

Methodology

Due to the wealth of information it provides on a given subject, bibliometric analysis is becoming increasingly important (White & McCain, 1998; van Eck & Waltman, 2017). This approach, in the words of statistician and math-

ematician Garfield (1955), "combines many mathematical tools and statistical approaches to analyse and scan publications such as articles and different books." To analyse scientific data and find patterns within a field, statistical methods are applied (De Bakker, Groenewegen & Den Hond, 2005; Bouyssou & Marchant, 2011a; Bouyssou & Marchant, 2011b). Bibliometric analyses shed light on current developments in the area and opened new paths of inquiry, as opposed to supplying readers with information about past trends in the literature (Durieux & Gevenois, Pierre, 2010).

The subject of this bibliometric study is research concerning employee job performance in military context. The papers connected to the fields of military context are included in our study. The research conducted in languages other than English is excluded from our review.

A total of 421 publications related to employee job performance in military context were found in the SCOPUS database, including 327 (77.6%) original research articles, 48 (11.4%) review papers, 20 (4.75%) conference proceedings, 9 (2.14%) book chapters, and the remaining included other types of publications. There are 816 author keywords and 2,856 keywords-plus identified by the system. The SCOPUS database was selected for this study as it provides the most comprehensive perspective of the world's research output in the domains of science, technology, medicine, social science, and the arts and humanities, with more than 87 million documents from more than 7,000 foreign publishers (Elsevier, 2022).

Results

Figure 1 depicts the publication trend in the field of related employee job performance in military context from 1950 to 2022. The findings indicate a steady upward trend in the military context of employee job performance. The year 2005 marks the highest number of publications and higher publication growth rate; after 2015, there were 15 publications at the average but in 2022 it amounted to 11, which was a significant decrease compared to 21 works published in the year 2022.

Figure 1. Publication trend in the field of related employee job performance.
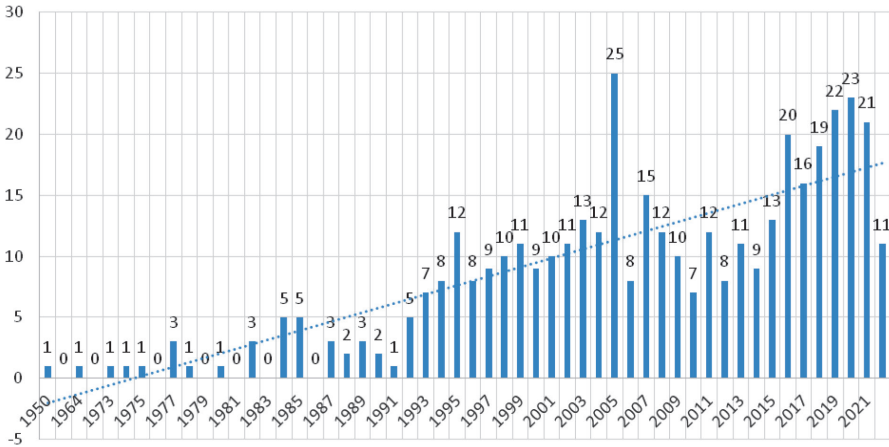
Source: Developed with the use of the Biblioshiny Software

Table 1 shows the most productive and impactful countries in employee job performance in military context. 40 countries and regions have made essential contributions in the last few decades. Based on military employee job performance, the publications from developed economies related to EJP are more abundant than those from developing economies.

Table 1 *Articles and their Citations – arranged by countries*

Country	NP	TC	Average Article Citations
USA	953	5,811	26.41
Canada	35	248	16.53
Spain	22	191	31.83
Australia	60	190	11.88
Denmark	11	177	88.50
United Kingdom	39	170	14.17
Israel	51	133	11.08
Germany	18	128	25.60
Georgia		109	54.50
China	24	82	13.67

Source: Developed with the use of the Biblioshiny Software

Table 1 reveals that the United States, Canada, Spain, Australia, and Denmark are the top five countries with high citations. Only three emerging economies (Israel, Georgia and China) can be found in the top 10 list of highly cited countries. As the most productive country in this sector, the United States comes first with 953 articles with 5,811 citations.

Table 2 highlights the journals with the highest number of citations. In this table NP stands for number of publications and TC means total citations. The database contains 421 documents that were published in 212 sources. Out of total publications, 24% of the publications were published in these journals. The 'Military Medicine' has the most cited publications, with 846 citations for fifty seven documents.

Table 2 *Publications – arranged by journals*

Element	h_index	g_index	m_index	TC	NP	PY_start
Military Medicine	17	26	0.436	846	57	1984
Aviation Space and Environmental Medicine	16	24	0.516	686	43	1992
Human Factors	6	7	0.14	464	7	1980
Journal of Applied Psychology	5	8	0.068	362	8	1950
Human Performance	3	3	0.12	347	3	1998
American Journal of Preventive Medicine	2	2	0.143	337	2	2009
Personnel Psychology	4	5	0.103	313	5	1984
Clinical Psychology Review	1	1	0.071	286	1	2009
Journal of Trauma	1	1	0.048	190	1	2002
Scandinavian Journal of Work, Environment and Health	2	2	0.1	168	2	2003

Source: Developed with the use of the Biblioshiny Software

Table 3 *Most influential authors*

Authors	h_index	g_index	m_index	TC	NP	PY_start
Campbell JP	2	2	0.061	352	2	1990
Bovin MJ	1	1	0.071	286	1	2009
Lunney CA	1	1	0.071	286	1	2009
Marx BP	1	1	0.071	286	1	2009
Schnurr PP	1	1	0.071	286	1	2009
Hauret KG	2	2	0.154	264	2	2010
Jones BH	2	2	0.154	264	2	2010
Parasuraman R	2	2	0.111	258	2	2005
Mchenry JJ	1	1	0.03	232	1	1990
Wise LI	1	1	0.03	232	1	1990

Source: Developed with the use of the Biblioshiny Software

The authors who are the most cited are listed in Table 3. In this table NP stands for number of publications; TC means total citations and 'PY start' stands for the year of first publication. Table 3 reveals that 'Campbell JP' is the author of the works that have received the most citations on this subject. He has written two papers, both of which have received 352 citations. Bovin MJ, Lunney CA, Marx BP and Schnurr PP are the four most influential authors who wrote "Posttraumatic stress disorder and quality of life: Extension of findings to veterans of the wars in Iraq and Afghanistan". The papers they published are also influential, with each work receiving an average of more than 200 citations per publication.

Table 4 *Most frequently used keywords*

Words	Occurrences
military	38
job performance	19
performance	19
military personnel	8
personality	8
stress	8
aviation	6

deployment	5
epidemiology	5
exercise	5
police	5
posttraumatic stress disorder	5
safety	5
training	5
cognition	4
health	4
mental health	4
personnel selection	4
quality of life	4
sleep	4

Source: Developed with the use of the Biblioshiny Software

Figure 2. Word cloud

The frequency of occurrence of keywords is shown in Table 4 and Figure 2. The researchers of the study used 'term' and keyword co-occurrence analysis to find the most common themes in military employee job performance. The most frequently appearing keywords in this area are military job performance,

performance, military personnel, personality and stress which have been used more than eight times. Word cloud illustrates that scholars have considered psychological aspects in military job performance such as stress, posttraumatic disorder, epidemiology, sleep deprivation, fatigue, etc. in addition to such issues as exercise, quality of life, etc.

Thematic maps are divided into four quadrants, each representing a distinct type of topic based on its centrality and density. Centrality refers to the theme's relevance in the overall study, while density refers to the theme's progression. The presence of themes in the upper-right quadrant indicates that they are highly centralised and dense. Accordingly, aviation, safety, sleep, military, performance, epidemiology are considered motor themes. The upper-left quadrant represents highly developed, isolated, or niche themes with a high density and low centrality. The issues of cognition and traumatic brain injury are identified as niche themes. Emerging or fading concepts are displayed in the lower-left quadrant with low density and centrality. As it appears in the word cloud military personnel veterans, work performance are considered declining themes. Basic and transversal notions are depicted in the lower-right quadrant, with high centrality and low density. According to Figure 3, job performance, survey, deployment, personality and psychometric disorders are basic themes.

Figure 3. Thematic map
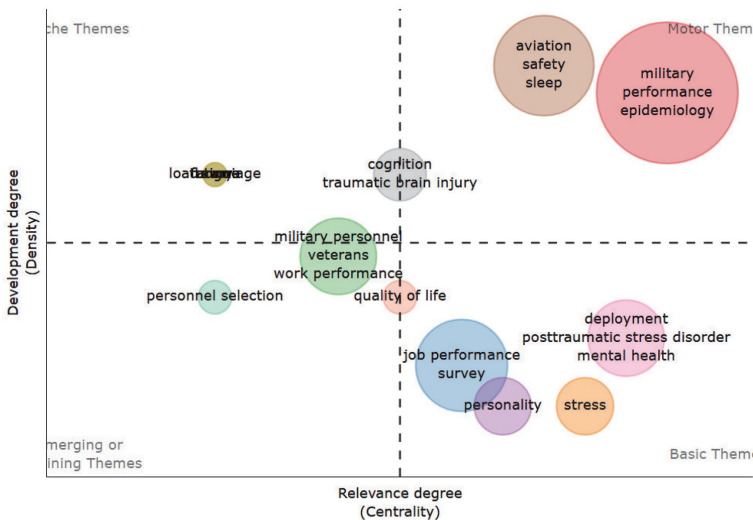
Cluster analysis in bibliometrics uses statistical methods to compress the complicated keyword network into numerous smaller groupings based on the frequency of simultaneous occurrence of two keywords. This study makes use of the multi-dimensional scaling method (MDS). Military employee job performance can be described using Figure 4.

Figure 4. Conceptual structure map-MCA
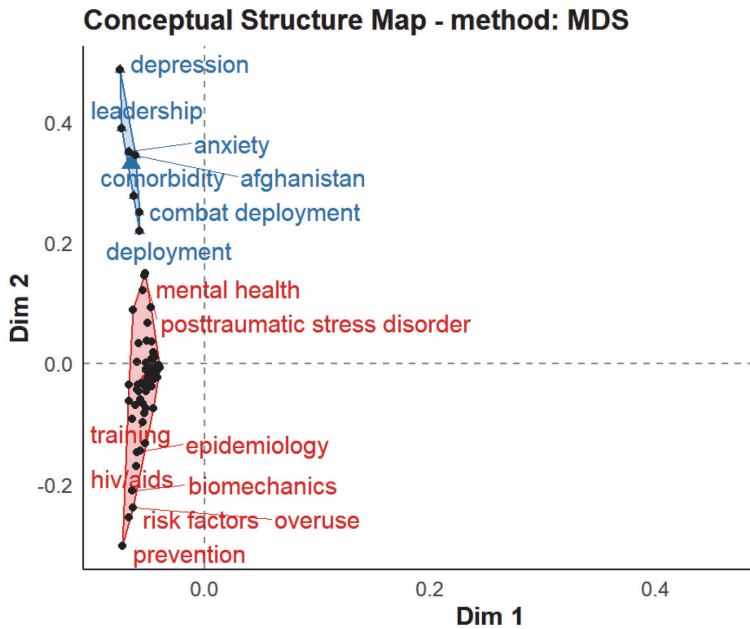
The first cluster considers depression, leadership, anxiety, comorbidity, Afghanization, combat deployment and deployment. Second cluster includes mental health, posttraumatic stress disorder, training, HIV, aids, biomechanics, training and prevention.

Employee Job Performance: A Review of the Most Cited Articles in the Global Perspective

According to Schnurr et al. (2009), the conflicts in Iraq and Afghanistan – Operations Iraqi Freedom and Enduring Freedom – have generated special circumstances that can encourage the emergence of psychological issues such as post-traumatic stress disorder (PTSD). The view of Schnurr et al. (2009) is that PTSD is a significant result, because it can harm psychosocial and occupational functioning as well as general well-being and quality of life. The Army Selection and Classification Project has produced a comprehensive examination of job performance in 19 entry-level army jobs (Military Occupational Specialties) sampled from the existing population of entry-level positions (Campbell et al., 1990. p. 313).

In their study Pulakos et al. (2002) investigate the 8-dimension taxonomy of adaptive performance developed by Pulakos et al. (2000). The eight dimensions are: (1) Creative problem solving (2); Dealing with uncertain or unpredictable work situations (3); Learning new tasks, technologies, and procedures (4); Demonstrating interpersonal adaptability (5); Demonstrating cultural adaptability (6); Demonstrating physically oriented adaptability (7); Handling work stress (8); Handling emergencies or crisis situations (p. 301). The results of the study conducted by Pulakos et al. (2002) showed the 8-dimension model impact on adaptability. In addition, cognitive ability, personality, and the new adaptability predictors were shown to forecast adaptive performance.

Particularly in the context of the military, mental and physical health are vital. Hauret et al. (2010) state that, in the context of the military, injuries are considered as a major health issue. Hauret et al. (2010) further state that many of these entail physical harm brought on by micro-trauma (overuse) in recreational activities, sports, training, and worker performance. Holcomb et al. (2002) mention that during a 28-day rotation at a civilian trauma centre, ten three-person military resuscitation teams from community hospitals were evaluated. It served as a pilot study. A significant improvement in team performance after a 28-day trauma refresher course was found by the study of Holcomb et al. in 2002. Short sleep duration (SSD) is common among the soldiers who reported combat exposure, is the view of Luxton et al. as presented in 2011. Short sleep duration (SSD) was associated with symptoms of depression, posttraumatic stress disorder, panic syndrome, and with high-risk health be-

haviours such as abuse of tobacco and alcohol products, and suicide attempts (Luxton et al., 2011, p. 1189).

Pilot weariness is a serious, but frequently unreported issue in both civil and military aircraft operations, according to Caldwell (2005). Caldwell (2005) further mentions that the official statistics (2005) also show that fatigue is a factor in at least 4–8% of aircraft accidents. Metzger and Parasuraman (2005) state that the duties of air traffic controllers and pilots could change in the future due to a number of air traffic management (ATM) concepts. Metzger and Parasuraman (2005) further state that however, as with any form of automation, a thorough evaluation of the effects on human performance and other factors is required.

Burr et al. (2003) point out that Danish workers' working conditions improved between 1990 and 2000, with the exception of longer workdays and increased noise exposure. According to Burr et al. (2003), the jobs with decreasing prevalence were clerks, cleaners, textile workers, and military personnel. Cannon-Bowers et al. (1998) state that prior research by other researchers has demonstrated that cross-training team members enhances the effectiveness of the team. In their study Cannon-Bowers et al. examined 40 three-person teams performing a simulated radar task. The findings suggested that positional rotation was a useful cross-training technique for activities with a lot of interdependence.

Conclusion

This is the first study to focus on specific literature on employee job performance related to military context. The present study attempts to identify the trends, pioneering countries, journals with the most influential articles and citations, as well as trending topics, clustering of the research issues, etc., related to military job performance.

The findings reveal that the average growth rate of publications increased steadily from 1950. United States, Canada, Spain, Australia, and Denmark are the top five countries with high citations. The findings also disclose that the most cited papers in job performance in military context consider working conditions and psychological issues. Keyword analysis results disclose that most of papers related to job performance in military context present the issues in psychological view. Themes like training, safety, cognition, leadership

and psychological issues draw considerable attention from the authors in this area. Quality of life is considered to be one of the emerging themes that have the potential for future research. The findings are also helpful to the like military forces, and regulators in assessing the importance of psychological issues related to improve employee job performance.

Abstract: Employee job performance is how an employee performs his/her job and completes the necessary tasks. Employee job performance is the secret to success for any organisation. The aim of this bibliometric analysis is to identify primary topics and present the dynamic in the field of employee job performance and to make recommendations for future research directions. The bibliometric analysis was conducted with the use of 421 articles found in the Scopus index. The study excludes studies that were undertaken in languages other than English. In the context of the military, the majority of study on employees' job performance is concentrated on the connection between psychological factors and working conditions. Finally, this study suggests potential areas for further research undertaken by scholars.

Keywords: bibliometric analysis, employee job performance, military context

Streszczenie: Wydajność pracownika to sposób, w jaki zatrudniona osoba wykonuje swoją pracę i wypełnia wskazane zadania. Wydajność pracownika to sekret sukcesu każdej firmy. Celem niniejszej analizy bibliometrycznej jest zidentyfikowanie głównych tematów i przedstawienie dynamiki obszaru wydajności pracownika, a także wskazanie zalecanych kierunków przyszłych badań. Niniejszą analizę bibliometryczną przygotowano w oparciu o 421 artykułów skatalogowanych w bazie Scopus. Z analizy wyłączono badania przygotowane w językach innych niż angielski. W kontekście wojskowym większość badań dotyczących wydajności pracowników skoncentrowanych jest na związkach między czynnikami psychologicznymi i warunkami pracy. Badanie to sugeruje także potencjalne obszary dalszych badań naukowych.

Słowa kluczowe: analiza bibliometryczna, wydajność pracy pracownika, kontekst wojskowy

References

Bouyssou, D., & Marchant, T. (2011 a). Ranking scientists and departments in a consistent manner. *Journal of the American Society for Information Science and Technology*, 62(9), 1761–1769.

Bouyssou, D., & Marchant, T. (2011 b). Bibliometric rankings of journals based on impact factors: An axiomatic approach. *Journal of Informetrics*, 5(1), 75–86.

Burr, H., Bjorner, J. B., Kristensen, T. S., Tüchsen, F., & Bach, E. (2003). Trends in the Danish work environment in 1990-2000 and their associations with labor-force changes. *Scandinavian Journal of Work, Environment & Health,* 29(4), 270–279.

Caldwell, J. A. (2005). Fatigue in aviation. *Travel Medicine and Infectious Disease,* 3(2), 85–96.

Campbell, J. P., McHenry, J. J., & Wise, L. L. (1990). Modeling job performance in a population of jobs. *Personnel Psychology,* 43(2), 313–575.

Cannon-Bowers, J. A., Salas, E., Blickensderfer, E., & Bowers, C. A. (1998). The impact of cross-training and workload on team functioning: A replication and extension of initial findings. *Human Factors,* 40(1), 92–101.

De Bakker, F. G., Groenewegen, P., & Den Hond, F. (2005). A bibliometric analysis of 30 years of research and theory on corporate social responsibility and corporate social performance. *Business & Society*, 44(3), 283–317.

Durieux, V., & Gevenois, P. A. (2010). Bibliometric indicators: quality measurements of scientific publication. *Radiology*, 255(2), 342–351.

Elsevier, (2022). Retrieved from: https://www.elsevier.com/solutions/scopus/content (last accesses: 10.12.2022).

Garfield, E. (1955). Citation indexes for science: A new dimension in documentation through association of ideas. *Science*, 122(3159), 108–111.

Hauret, K. G., Jones, B. H., Bullock, S. H., Canham-Chervak, M., & Canada, S. (2010). Musculoskeletal injuries: description of an under-recognized injury problem among military personnel. *American Journal of Preventive Medicine,* 38(1), 61–70.

Holcomb, J. B., Dumire, R. D., Crommett, J. W., Stamateris, C. E., Fagert, M. A., Cleveland, J. A., & Mattox, K. L. (2002). Evaluation of trauma team performance using an advanced human patient simulator for resuscitation training. *Journal of Trauma and Acute Care Surgery,* 52(6), 1078–1086.

Iddagoda, A., & Dissanayake, H. (2022). The intervening effect of employee engagement on the relationship between high performance work practices and employee job performance. *Three Seas Economic Journal*, 3(2), 13–20.

Iddagoda, A., Abraham, R., Abeysinghe, R., & Dissanayake, H. (2022). Religiosity as a predictor of job performance among Sri Lankan military officers: The mediating role of employee engagement. *JABE,* 22(1), 36–53.

Luxton, D. D., Greenburg, D., Ryan, J., Niven, A., Wheeler, G., & Mysliwiec, V. (2011). Prevalence and impact of short sleep duration in redeployed OIF soldiers. *Sleep,* 34(9), 1189–1195.

Metzger, U., & Parasuraman, R. (2005). Automation in future air traffic management: Effects of decision aid reliability on controller performance and mental workload. *Human Factors,* 47(1), 35–49.

Nowakowski P.T. (2005). Psychologiczno-pedagogiczne aspekty środowiska pracy. In M. Czapka (Ed.), *Psychospołeczne i pedagogiczne uwarunkowania pracy.* Bytom: Wyższa Szkoła Ekonomii i Administracji w Bytomiu s. 39–58.

Pulakos, E. D., Arad, S., Donovan, M. A., & Plamondon, K. E. (2000). Adaptability in the work place: Development of a taxonomy of adaptive performance. *Journal of Applied Psychology,* 85(4), 612–624.

Pulakos, E. D., Schmitt, N., Dorsey, D. W., Arad, S., Borman, W. C., & Hedge, J. W. (2002). Predicting adaptive performance: Further tests of a model of adaptability. *Human Performance,* 15(4), 299–323.

Van Eck, N. J., & Waltman, L. (2017). Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics*, 111, 1053–1070.

Schnurr, P. P., Lunney, C. A., Bovin, M. J., & Marx, B. P. (2009). Posttraumatic stress disorder and quality of life: Extension of findings to veterans of the wars in Iraq and Afghanistan. *Clinical Psychology Review,* 29(8), 727–735.

Sewwandi, H. M. U., & Perera, G. D. N. (2022). The impact of big five personalities on job performance of executive employees in a selected apparel firm in Kurunegala District, Sri Lanka. *Proceedings of Undergraduate Research Symposium – 2022*.

White, H. D., & McCain, K. W. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972–1995. *Journal of the American Society for Information Science*, 49(4), 327–355.