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Mapping the research collaboration networks in computer science: The case of central, eastern and southern African Countries. .

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Mapping the research collaboration networks in computer science: The case of central, eastern and southern African Countries.
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Abstract
Purpose: We conducted a scientometric analysis to determine the research collaboration networks in the field of computer science in central, eastern and South African countries. The study covered publications published from 1980 to 2016. The study analyzed publication growth trends and impact, global share and rank, collaboration levels within and outside of selected countries, top-ranking countries, institutions and individuals in the region, most preferred journals in the region, and a text-based research topic trend.

Methods: We used SCOPUS to retrieve data on publications of all computer scientists from 16 countries covering the UbuntuNet alliance by using a pre-determined search strategy. We used Gephi software program to show co-authorship networks, because of its great analytical power to construct and visualize large networks. Results: A total of 22,083 publications were recorded from 1990 to 2016. The study shows that there has been an increase of publication from 78 in 1990 to 2395 publications published in 2016. Most scholars had published journal articles (n= 13734, 62.2%), followed by conference papers (n= 7106, 32.2%) and review articles (n= 1243, 5.6%). The top five countries with high number of publications across these UbuntuNet alliance countries were South Africa (n=16936, 77.64%), followed by Kenya (n= 1525, 6.9%), Ethiopia (n= 848, 3.8%), Tanzania (n= 733, 3.32%) and Uganda (n= 695, 3.14%). Scholars mainly published in the field of computer science (n= 5822, 26.4 %), which was followed by engineering (n=5579, 25.6 %), and medicine (n=4334, 19.6 %).Network analysis revealed strong ties between ubuntuNet researchers with hubs of computer sciences in the USA, China and European Institutions such as CERN. Intra-collaboration between institutions in the selected countries was low. The results are correlated with other demographic and economic indicators of the selected countries. . The most top five authors and contributors come from the following universities; university of Cape Town (n= 100, 0.45%), universiteite Pretoria (n=88, 0.4%), universiteite Stellenbosch (n=85, 0.4%), university of KwaZulu-Natal (n=83, 0.38%) and university of Witwatersrand (n=79, 0.36%).
Originality: This is a comprehensive empirical study that visualizes research productivity and collaborative networks among institutions and countries in the east, central and South Africa region. The study findings provide useful findings for determining funding patterns and policy formulation for scientific research in the computer science domain.
Policy and practical implications: The study findings suggest the following: a need for African journals to adopt open access publishing approaches to enhance their online visibility, since they were ranked low in this study; institutions to consider various metrics when evaluating the research productivity of individuals; institutions and ministries dealing with science and technology to develop and publish scientometric national/institutional reports in order to promote research productivity and collaborative research. The emphasis should be made to encourage ubuntuNet alliances to promote collaborative research network since collaboration between ubuntuNet countries is low.

Summary

This is a comprehensive empirical study that visualizes research productivity and collaborative networks among institutions and countries in the east, central and South Africa region. The study findings provide useful findings for determining funding patterns and policy formulation for scientific research in the computer science domain.

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