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HR Process Automation: A Bibliometric Analysis

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ABSTRACT

Automation is interpreted as the replacement of manual operations by electronics and computer-controlled systems. Human resource management is an indispensable part of every firm be it the space of retail, healthcare, education or any other sector. Activities such as hiring new workers, training, or making sure that local labour laws are obeyed with HR processes and are a crucial part of every organisation. HR has typically been believed of as an extremely manual department procedure. Employees are accustomed to doing this manually and getting the job done themselves. But everything around the HR processes are changing rapidly. HR Automation is a tool for increasing the efficiency of an employment organisation by freeing employees from tedious repetitive tasks and allowing them to focus on more complex assignments such as decision-making and strategy creation. Automation is interpreted as the replacement of manual operations by electronics and computer-controlled systems. By automating regular and routine HR tasks, organisations may lead to significant savings and resources they expend on manual HR processing and preparation. The HR space is being invaded by automation, and any automation that can be implemented will be implemented very quickly. This article is written with the help of Scopus, Web of Science, Google Scholar and Crossref databases. This article will be useful for upcoming researchers, students and managers in the field of HRM across the world.

Keywords: HR, human resources, analytics, process automation, machine learning, AI

INTRODUCTION

HR Automation allows businesses increase their productivity by utilizing its resources to complete projects without hindering the standard of business jobs. It manages a variety of crucial daily responsibilities, such as choosing individuals with certain abilities, filing papers, presenting information, generating and exchanging files, etc. These activities can take many hours if they are completed mechanically. Instead of losing time and detaining staff, HR process management allows businesses to be more agile by encouraging workers to concentrate on clients and potential market prospects. Processing employee records and answering questions takes up more than half of an HR department's time. Furthermore, HR professionals devote about 40% of their time to routine tasks such as data entry from one device to another. Since this uneven workload allocation is such a drag on energy, 80 percent of business process owners agree that optimising customer-facing document processes will boost sales by more than 10%. Most businesses look to the cloud to help them become more efficient but these days just being in the cloud on earth, digitizing routine workflows such as employee onboarding, vacation requests, and other everyday tasks eliminates many of the inefficiencies that bog down HR departments and consume valuable business resources. Automation minions comment items with manual systems such as shortage of analytics and unnecessary repetition. Cloud-based HR process automation has many benefits for businesses including improved visibility and control with process automation software. Business has gained the ability to electronically track document flows, search for information, and audit important records. Business agility

digitized processes lets you quickly take advantage of new opportunities. Predictive analytics learn what you should be doing before you need mobile enablement forms and workflows can be easily viewed on mobile devices. These features empower businesses to improve their customer focus and remove process redundancies allowing you to free up valuable resources and letting employees focus on improving service to customers.

RELATED WORK

In this field of research, many experts have already worked over the years to fill all the previous research gaps. In this section, we are going to discuss some of the recent works related to our topic of HR automation. Let's try to understand basic overview of earlier studies.

Competition for talent has become a significant path among companies in the current market competition. The department of human resources does not recognize the departure of workers in a timely and reliable manner and providing business executives with a decision-making basis has become an important issue to be addressed by the department of human resources. This article suggests a unique method in which a Machine Learning-based model can be used to predict the dismissal of an employee in this regard. The prediction model is realised using logistic regression with the cross-entropy formula as the optimization problem and Newton's approach and regularisation to simplify the system. Through a series of comparative experiments, the precision of the final prediction model hit 85.5 percent, demonstrating the reliability of the prediction model, which offers a new solution to the Employee Resignation Prediction (Dai, Weihuang, Zhu, Zijiang, 2020)

In the era of digitalization, the article clarifies the need to use IT technology in personnel management. The fundamental causes of embedding in the staff management platform are investigated, as well as the fundamental consequences of strengthening administrative procedures, such as the automation of headroom workspace, the development of a standardized framework for the study of alternates of traditional administrative decisions in real-time mode, the use of artificial intelligence to create reference work standards and train processes. In the implementation of technology, focused on best practices. (Kozhukhova, N. V., Veselova, J. V., Chekuldova, S. V.2020)

A key issue for organizations is the perceived fairness of decision-making processes particularly when assessing workers and evaluating staff performance. By overcoming prejudices typically exhibited by human decision makers, algorithms have provided opportunities for increasing justice. However, while HR algorithms may reduce human bias in decision-making, we argue that the method may be viewed as reductionist by those being evaluated, leading them to conclude that such qualitative knowledge or contextualization is not considered. We argue that this may contradict their views on the procedural fairness of using HR algorithms to assess output by supporting the belief that algorithm-driven decisions are based on less detailed knowledge than human-made equivalent choices. Theoretical and practical implications are explored for companies that use algorithms and data analytics. (Newman, Fast, Nathanael J., Harmon, Derek J, 2020).

Nowadays for organizations, human capital is very important. In fierce competition, companies with more exceptional talents will often gain a foothold. The competency model also plays a critical role in recognizing and assessing talent as a method for measuring the success of talent. Traditionally, a lot of manpower and time needs to be spent in the process of building the capability model. It also lacks, to some degree, objectivity. Meanwhile the original knowledge

in the organizations' human resource (HR) database is also not completely utilized. In order to transform original data in the database to more useful knowledge for determining talent, this paper proposes a data-driven approach to construct a competency model. Firstly, in subsequent research, a data pre-processing system is designed to allow the use of HR data. Nine techniques are then developed to create a collection of features that can objectively represent the situation and skills of employees. In order to construct and validate the competency model, data analytics and deep learning are primarily used. The validation framework built in this paper also verifies this competency model. (Li et. al, 2020)

The Fourth Industrial Revolution (4IR) has offered companies disrupted by technological developments such as Human Resource Analytics (HRA), Machine Learning (ML) and Artificial Intelligence a new future for work (AI). With the advent of the global marketplace and the work-from-home situation, it has become much more difficult for HR managers to engage their employees in generating market outcomes. This paper aims to research how companies are using technical resources to fundamentally change HR and business leaders' use of people's data. This study used both primary and secondary data to analyse the impact of HR analytics on employee retention, employee confidence in performance evaluation, and employee perception. A sample size of 100 was collected to verify the hypothesis. A review of the data revealed a close correlation between the impact of HR analytics on employee confidence in performance evaluations and employee experience. Based on a literature review and data collection, an HR Analytics tool to improve employee interest in the company is proposed. This research would be used by organisations to increase employee productivity by using technology to improve insights into employee job lives using employee data. Human Resource Analytics is only used successfully by a few organisations due to insufficient data analysis, analytical abilities, and operational adaptability. (Gaur, Bhawna,2020)

A sophisticated analytics technology is explored that can be used in practical scenarios to assist HR hiring managers in making better hiring and selection decisions. The proposed framework is divided into two phases: a local prediction system for recruiting success at the level of the individual work placement, and a statistical model that provides the organisation with a leading recruitment optimization technique, keeping multidimensional factors into account. The explainable artificial intelligence (AI) or the interpretability of the machine learning (ML) algorithm, which is achieved in this case by implementing the Variable-Order Bayesian Network (VOBN) method to recruitment results, is an important factor of the suggested prediction method. The research indicates that the VOBN model will provide HR practitioners with both high precision and interpretability insights. Furthermore, it is shown that using the interpretable VOBN will lead to surprising and sometimes counter-intuitive observations that conventional recruiting approaches would otherwise miss. It is possible to forecast a candidate's progress in a job at the pre-hire point and use those forecasts to create a global optimization framework. The findings indicate that, considering the inherent trade-off between the two, the devised system can deliver a balanced recruitment strategy in relation to real recruitment decisions, thus enhancing both diversity and recruitment success rates. (Pessach et. Al,2020)

Nikhil Kumar.2014 in his paper published in 2014 has defined the basic process of HR automation and its uses. Essentially, it is the method of converting your time-consuming and inefficient traditional paperwork-based HR systems into a simplified, web-based framework. He mainly focused on employee and manager self-service aspect of it. Under employee self-service he had mentioned "activities like viewing pay slips, managing leave, planning for travel, updating their personal information etc." And under manager self-service comes resource allocation, leave application. Managers may also use it to develop, monitor, and

maintain a range of employee qualities like appraisals, knowledge and skills, and learning and development.

According to Michael DiClaudio 2019, workers and employees' experiences are the greatest competitive advantage for the businesses facing uncertainty and chaos that are creating dramatic shifts in today's workplace. Embedded in this is the growing expectation that the position of Human Resources will be able to understand how labour analysis informs business and drives efficiency. And showed the evolution of HR automation methodology how process relies on "Predictive and Prescriptive" analysis instead of descriptive analytics.

Broderick and Boudreau,1990 presented the results of a report that considered to be the first step in the CAHRS long-term research program to resolve sponsorship concerns. One of the objectives of this program was to recognize the organizational aspects which predicted the success or failure of HR computer systems. The second objective was to identify a model to improve value added decisions on HR investment in the computer system and to direct the planning and implementation of HR technology strategy.

ANALYSIS OF PUBLISHED RESEARCH PAPERS

1. Web of Science Database

Analysis based on publications per year

The total number of records published was 23. From the below table we can see that the number of records published in 2018 was 4, then we can see there is an increase in 2019 and again the records published significantly decreased in 2020. The highest number of research papers published was 16 in 2019 and the least was 3 in 2020.

Publication Years	Publication records	% of Publication records
2018	4	17.3%
2019	16	69.5%
2020	3	13.0%

Table 1: Shows the number and percentage of publication records year-wise in the Web of Science Database

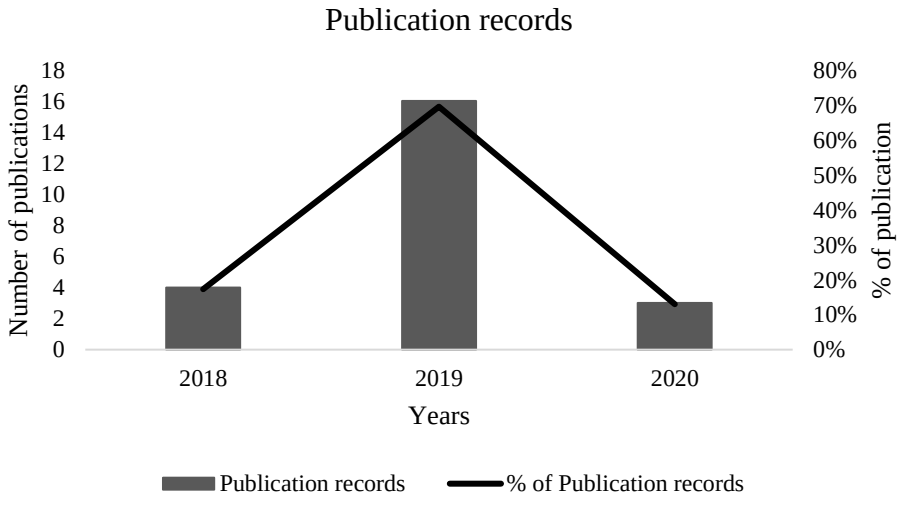

Fig 1: Shows the number of publication records year-wise in a graphical presentation. Here it is clearly visible that the number of publication records in the year 2019 significantly greater when compared to the publication records in 2018 and 2020 in the Web of Science database.

A research area is what a research topic is placed into but is much broader than the scope of the topic. For example, a research area can be business economics, computer science etc. (as mentioned below). From the below data, we would analyse that most of the research on this topic comes from Business economics accounts almost 57%, computer science and engineering also hold significant number of records.

Analysis based on Research areas

Research Areas	Records	Percentage of publication (%)
Business economics	13	57%
Computer science	12	52%
Engineering	5	22%
Automation systems Mathematical biology Mathematics	4 each	17%
Education research Environmental ecology Health services Information science Science topics Social topics	3 each	13%
Communication Geography Psychology Public administration Social issues Telecommunications	2 each	9%
Agriculture Behavioural sciences Biochemistry biology Biodiversity conservation Chemistry Development studies Emergency medicine	1 each	4%

Table 2: Shows the number and percentage of publication records on the basis of research areas in the Web of Science Database

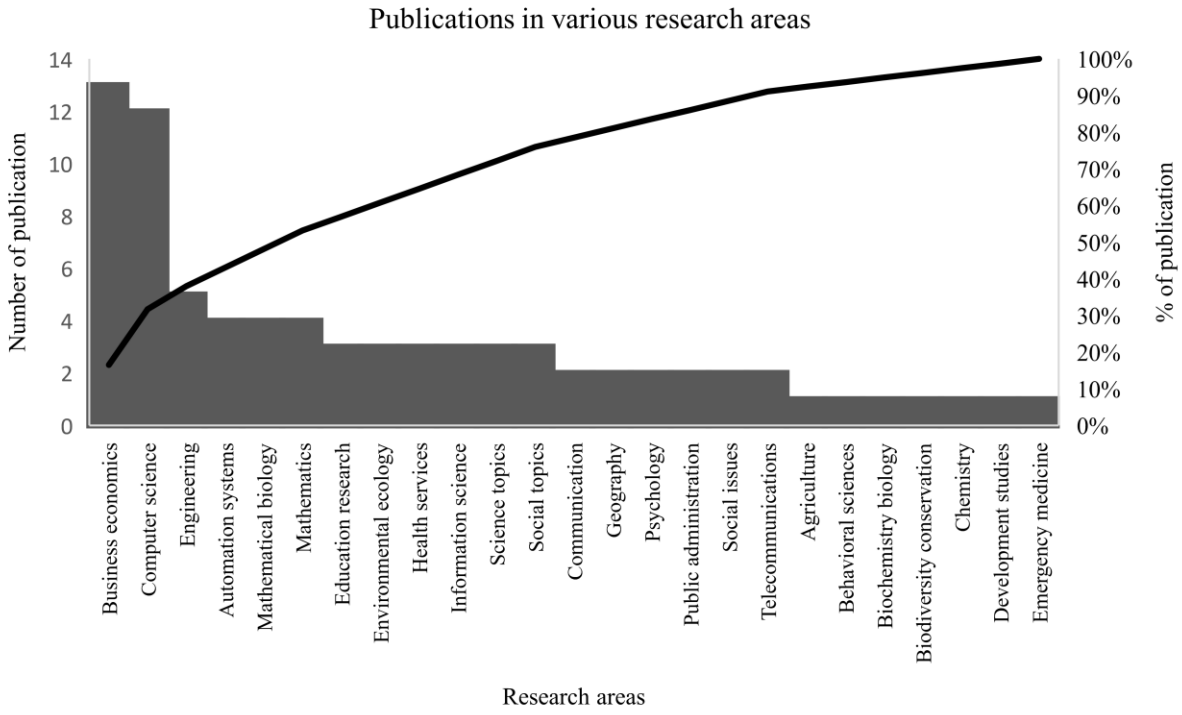

Fig 2: Shows the number of publication records on the basis of research areas in an area chart presentation. Here it is clearly visible that the number of publication records in the field of Business Economics and Computer Science is significantly greater when compared to the publication records in in the field of Development studies and Emergency medicine in the Web of Science database.

2. Scopus Database:

Analysis based on Publications per year

The data presented here ranges from 2016 to 2020, it has been observed that there has been a constant increase in number of papers published in last 5 years. From the data we can see that while from 2016 to 2018 there has been a gradual increase, but in 2019 there has been a sharp increase of more than 12 % in publication papers, whereas the year 2020 saw an increase of 9%.

Year	Publications per year	Percentage of total publication (%)
2021	8	14.55%
2020	21	38.18%
2019	13	23.64%
2018	9	16.36%
2017	2	3.64%
2016	1	1.82%
2009	1	2%

Table 3: Shows the number and percentage of publication records year-wise in the Scopus Database

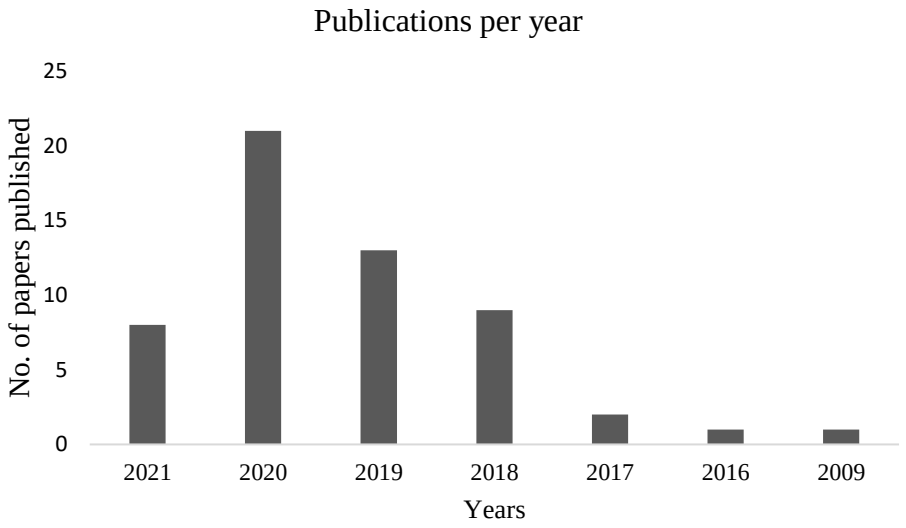

Fig 3: Shows the number of publication records year-wise in a line chart presentation. Here it is clearly visible that the number of publication records is rising steadily from the year 2016 to 2020 in the Scopus database.

This data when plotted on a bar graph clearly demonstrates that the number of publications has increased at a rapid pace in recent past. This is a perfect example of right skewed data where the tail of the distribution elongates towards the right. This can be better understood with the help of a radar chart where each year has its own axis and the graph tends to move towards a dominating factor (year in this case).

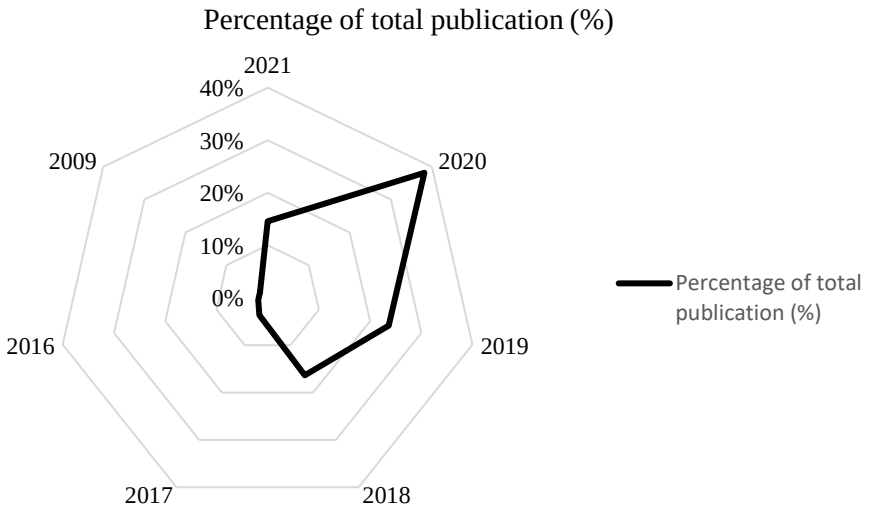

Fig 4: Shows the percentage of publications year-wise in a radar chart presentation. Here it is clearly visible that the number of publication records are the highest in last two years (2020, 2021) in the Scopus database.

Analysis based on Research areas

As in Web of Science Database, Scopus Database shows similar trends of subject area under this research publications.

Research areas	Records	Percentage of publications (%)
Business, Management and Accounting	21	25%
Computer Science	17	20%
Engineering	16	19%
Social Sciences	9	11%
Psychology	5	6%
Agricultural and Biological Sciences	3	4%
Energy	3	4%
Arts and Humanities	2	2%
Decision Sciences	2	2%
Mathematics	2	2%
Medicine	2	2%
Economics, Econometrics and Finance	1	1%
Environmental Science	1	1%
Physics and Astronomy	1	1%

Table 4: Shows the number and percentage of publication records on the basis of research areas in the Scopus Database

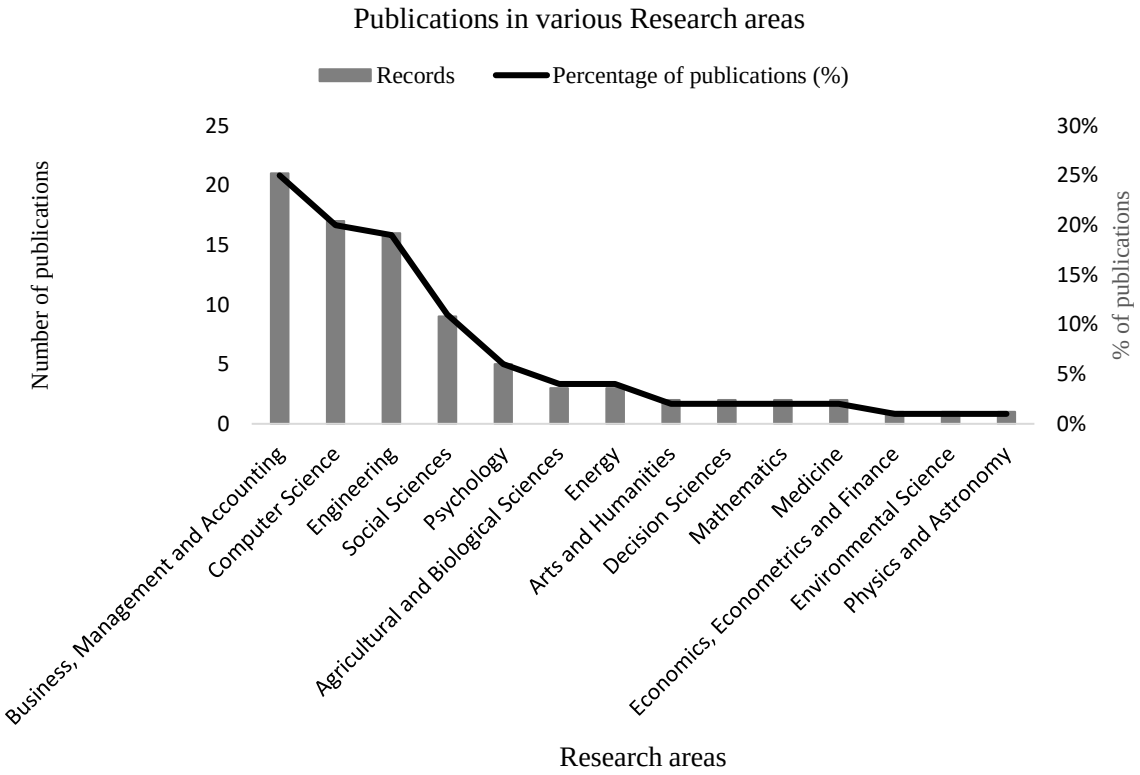

Fig 5: Shows the number of publication records on the basis of research areas in dual chart presentation. Here it is clearly visible that the number of publication records in the field of Business Management & Accounting and Computer Science is significantly greater when compared to the publication records in in the field of Mathematics and Medicine in the Scopus database.

Analysis based on Document type

Document type	No. of documents	Percentage of each document type (%)
Article	47	85%
Review	7	13%
Note	1	2%

Table 5: Shows the number and percentage of publication records on the basis of Document type in the Scopus Database

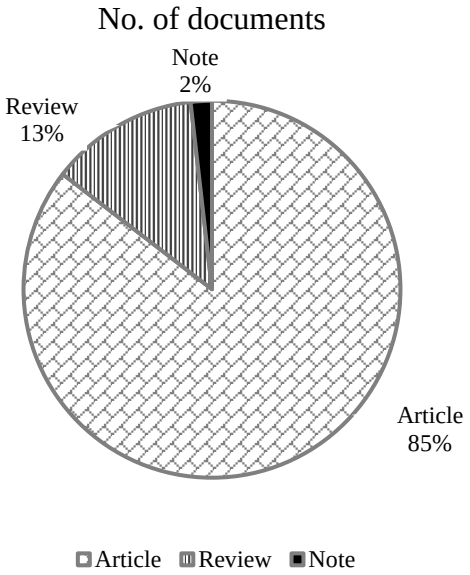

Fig 6: Shows the contribution of each type of documents to the total research publications in the field of HR automation.

Analysis based on publications by geography

Countries where research has been conducted on HR automation, fetched on 04 December 2020 constructed on iMapBuilder. Yellow icon indicates data from Web of Science while pink icon indicates data from the Scopus (Super Imposed)

Here we observe that most of the research work published on HR Automation in the Scopus and Web of Science databases as on 04 December 2020 have originated fron the European researchers which include developed countries like UK, France, Germany, Italy where there is more focus on automating the manual and repetitive tasks as much as possible.

- Data from Scopus

- Data from Web of Science

Fig 7: Shows the world map marked with the places from where the researchers have contributed their research works and publications records in the Scopus and Web of Science databases.

PRISMA CHART FLOW DIAGRAM:

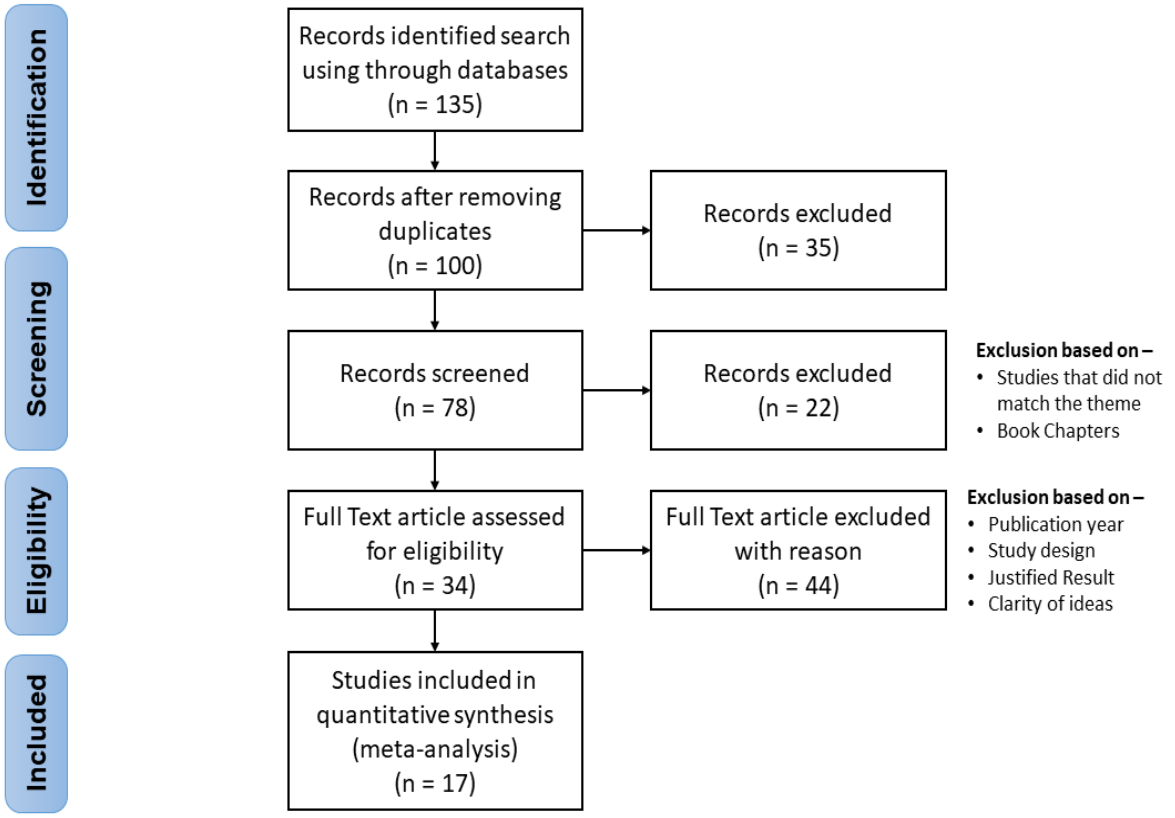

Fig 8: The flow Prisma diagram depicts the flow of information through the different phases of a Systematic Review. It maps out the number of records identified, screened, eligible, included and excluded, and the reasons for exclusions

SEARCH QUERY

TITLE-ABS-KEY ("Human Resources" AND "Analytics" AND "automation" OR "Machine Learning" OR "Artificial Intelligence" OR "People Analytics" OR "process automation") AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE, "j"))

CONCLUSIVE SUMMARY

To summarise we have done an in-depth study of Scopus and web of science database on the subject on the topic of HR Automation. The analysis of which has led to some interesting results. The survey covers papers from 2016 to 2020 on Scopus and 23 publications on web of science from various fields. Although over these periods we saw constant increase and decrease in the number of research and Business Economics being the major contributor, contributing 57% of the majority research. We also conducted our research survey through IMAP builder as well and as of latest December 2020 we could clearly make out from our research that majority of the research have from European countries.

As a future course of action, we should look into an in-depth analysis of major compensation and benefits policies in action now and how they can be improved and modified for the future workforce.

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