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Artificial Intelligence Adoption in Business Management: A Systematic Analysis of Current Practices and Future Directions

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Abstract

AI has become a revolutionary technology that is changing the way business operates and making its impact felt in areas such as strategic decision-making and management practices. This study looks at the dynamic role played by artificial intelligence in business management through an examination of its basic concept, technological developments, and application in various organizations. The research analyses the development of AI starting from the basics to recent developments such as Artificial Neural Networks (ANN) and Deep Learning (DL). This paper focuses on how the use of ANN and DL can help increase business intelligence in the modern organization. In order to establish the trends associated with research on artificial intelligence in business management, a bibliometric analysis of relevant studies published between 1981 and 2022 will be undertaken. In addition, the study looks at how business academics perceive the incorporation of artificial intelligence in business management. Using the Theory of Planned Behavior, the study examines what influences the intent of business faculty to incorporate AI content in their courses.

Keywords: Artificial Intelligence, Business Management, Bibliometric Analysis, Business Education, AI Adoption, Theory of Planned Behavior, Deep Learning, Decision-Making. Search Trends, Knowledge Mapping, VOSviewer, Future Research Agenda.

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1. INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the most influential technological innovations of the twenty-first century, transforming the way organizations operate, compete, and create value. As a multidisciplinary field of computer science, AI focuses on developing intelligent systems capable of performing tasks that traditionally require human intelligence, including learning, reasoning, problem-solving, decision-making, and pattern recognition [1]. Recent advancements in machine learning, artificial neural networks, and deep learning have significantly enhanced the capabilities of AI systems, enabling their widespread adoption across industries. See Fig 1:

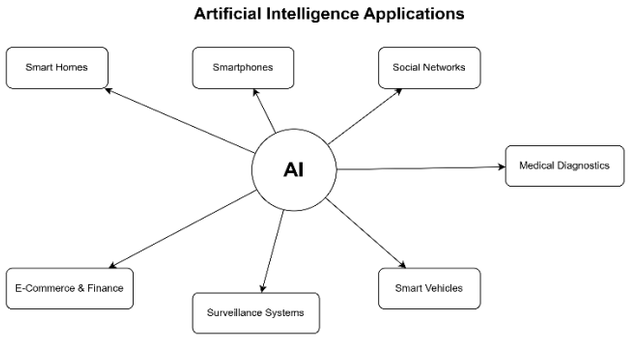

Fig 1: AI in our Daily Life

The concept of intelligent machines has evolved considerably over the past several decades. Early theoretical contributions from pioneers such as Alan Turing laid the foundation for modern AI research [2], while subsequent developments in computational intelligence accelerated the field's growth [3]. Milestones such as expert systems, neural networks, IBM's Deep Blue, and Google's AlphaGo have demonstrated the increasing ability of AI technologies to solve complex problems and outperform humans in specific domains. More recently, breakthroughs in generative AI, natural language processing, and large-scale data analytics [4] have further expanded the practical applications of AI.

The rapid advancement of AI has coincided with the emergence of Industry 4.0, characterized by the integration of intelligent technologies [5], the Internet of Things (IoT), cyber-physical systems, and advanced analytics see in Fig 2. Within this environment, AI serves as a key enabler of digital transformation by facilitating automation, predictive capabilities, and data-driven decision-making [6]. Organizations increasingly rely on AI-powered solutions to enhance operational efficiency, optimize resource allocation, improve customer experiences, and gain competitive advantages in dynamic business environments [7].

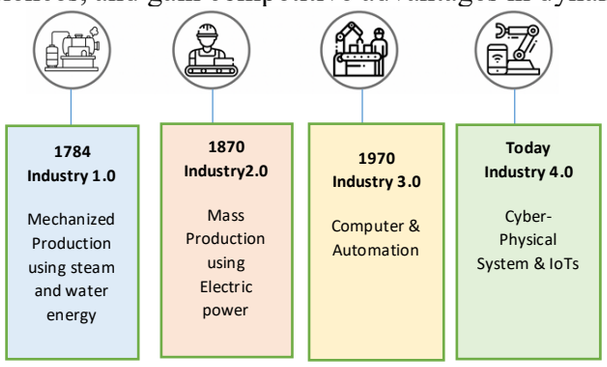

Fig 2: Industrial revolutions

AI applications have become pervasive across numerous sectors. In healthcare, AI supports disease diagnosis, medical imaging analysis, patient monitoring, and administrative automation [8]. In customer service, intelligent chatbots and virtual assistants provide real-time support and personalized interactions. The transportation sector uses AI for autonomous driving, route optimization, and mobility services. Similarly, virtual assistants such as Siri, Alexa, and other intelligent agents have become integrated into everyday life, assisting users with communication, scheduling, information retrieval, and smart-home management [9].

Table 1. Major Milestones in Artificial Intelligence Development (2010–2025)

Year	Innovation	Developer	Key Contribution
2010	Kinect	Microsoft	Motion sensing and gesture recognition
2011	Watson	IBM	Natural language question answering
2011	Siri	Apple	Voice-based virtual assistance
2012	Large Neural Network Training	Google	Large-scale image recognition
2013	NEIL	Carnegie Mellon University	Continuous image learning
2014	Cortana	Microsoft	Intelligent voice assistance
2014	Alexa	Amazon	Smart home automation
2015	AlphaGo	Google DeepMind	Advanced deep learning system
2016	Sophia	Hanson Robotics	Human-like robotic interaction
2016	Google Home	Google	AI-powered home assistant
2018	Bixby	Samsung	Device-integrated virtual assistant
2019	Detectron2	Facebook AI Research	Object detection framework
2020	GPT-3	OpenAI	Human-like text generation
2020	Curial AI	Oxford University	AI-assisted COVID-19 detection

2021	No-Electronics Robot	University of California	Soft robotics innovation
2021	DALL·E	OpenAI	Text-to-image generation
2022	ChatGPT	OpenAI	Conversational generative AI
2022	Stable Diffusion	Stability AI	Open-source image generation
2023	GPT-4	OpenAI	Multimodal AI capabilities
2023	Gemini	Google DeepMind	Multimodal reasoning system
2024	Sora	OpenAI	Text-to-video generation
2024	Claude 3	Anthropic	Advanced reasoning assistant
2025	Agentic AI Systems	Multiple Organizations	Autonomous task execution
2025	Enterprise Multimodal AI	Multiple Organizations	Integrated intelligent automation

In the context of business management, AI has attracted considerable attention due to its ability to enhance organizational performance and strategic decision-making. AI-driven systems enable firms to analyze large volumes of data, forecast market trends, automate repetitive tasks, optimize supply chains, and improve customer relationship management [10]. As organizations increasingly embrace digital transformation, AI is becoming a critical resource for innovation, agility, and sustainable growth.

Despite the growing body of literature on AI in business management, the field continues to evolve rapidly, resulting in fragmented research streams [12] and emerging areas that require further investigation. Understanding the intellectual development, research trends, and thematic evolution of AI-related studies is essential for both scholars and practitioners. Furthermore, as AI technologies become increasingly relevant to future workplaces, there is a growing need to examine how educational institutions and business programs prepare graduates for AI-driven environments.

Therefore, this study aims to provide a comprehensive examination of Artificial Intelligence in business management. Specifically, it investigates the evolution of AI research, identifies major thematic areas and emerging trends, and explores the implications of AI adoption for business organizations and educational institutions. By synthesizing existing knowledge and highlighting future research directions, this study contributes to a deeper understanding of the transformative role of AI in contemporary business management.

2. LITERATURE REVIEW

Artificial Intelligence (AI) is one of the groundbreaking technological advancements which have been changing the face of business organizations in terms of their operations and strategy making process. In the last couple of decades, companies have started utilizing the benefits of AI technology through automation of processes for improving efficiency in operation and strategic decision-making processes. The growing relevance of AI and its utilization in business administration practices has led to an increased volume of academic literature on the topic.

As per Donthu et al. (2021), bibliometric analysis generally involves two main methods which complement each other, namely performance analysis and science mapping. Performance analysis involves evaluating the performance of research elements such as authors, organizations, countries, and journals. Science mapping, on the other hand, is mainly concerned with establishing links and structures of knowledge in a particular research domain using co-authoring, co-citation, and keywords analysis [12].

The current state of Artificial Intelligence (AI) and other digital technologies was studied in recent scientific works. Specifically, the work by Dwivedi et al. (2022) focused on the rise of metaverses as next-generation digital ecosystems that unite AI, blockchain, VR, and AR technologies. In particular, the researchers outlined the opportunities created by metaverses for innovation, client engagement, and digital transformations in businesses while also highlighting the potential issues of governance, privacy concerns, ethical problems, and adoption difficulties. The scholars concluded that additional research in a multidisciplinary framework is needed to assess the consequences of those technologies [13].

Methodologically speaking, the importance of using different databases was shown in one work by Echchakoui (2020). In particular, the author used the Scopus and Web of Science database for a comparative analysis and revealed the positive effect of combining several databases on the results of bibliometric analysis. Namely, using more than one database increases the reliability and credibility of bibliometrics by reducing publication biases and ensuring better representation of literature within the field [14].

Specifically, focusing on practical aspects and considering business applications, Enholm et al. (2022) provided a systematic literature review on AI usage and business value creation. As a result, the study discovered that AI influences business and organizational performance in terms of improved decision-making abilities, process automation, increased operational efficiency, and enhanced innovation capability, yet the effective application of AI is conditioned by several factors including organizational readiness, data quality, and strategic alignment [15].

The growing popularity of generative AI has prompted researchers to discuss it further. For instance, Gordijn and Have (2023) analyzed the features of ChatGPT and determined its role as a tool of evolution in AI development and its possible significance as revolutionary AI application that will change knowledge creation, communication, and the functioning of professionals in all spheres [16].

The applications of AI for education purposes have also attracted researchers' attention. More specifically, Grunhut et al. (2022) analyzed the application possibilities for medical education and found that AI provides multiple ways for incorporating it into curricula in order to improve the results. Despite the identified opportunities, multiple issues still hinder the process of implementation of AI in medical training programs [17].

Table 2. Influential Studies Contributing to Artificial Intelligence and Business Management Research

Authors	Year	Research Focus	Key Findings / Contribution
Ravi & Ravi	2015	Opinion Mining and Sentiment Analysis	Provided a comprehensive survey of sentiment analysis techniques, tasks, and applications across multiple domains.
Das & Chen	2007	Web-Based Sentiment Analysis	Demonstrated how online customer discussions can be analyzed to extract market sentiment and support business decisions.
Lu et al.	2015	Transfer Learning	Reviewed transfer learning approaches and highlighted their importance for improving AI performance across different domains.

Dwivedi et al.	2021	Artificial Intelligence Applications	Identified opportunities, challenges, and future research directions for AI adoption across business and society.
Kaplan & Haenlein	2019	AI and Virtual Assistants	Discussed the implications of AI-powered assistants such as Siri and examined the broader impact of AI on organizations and consumers.
Warner & Wäger	2019	Digital Transformation	Proposed dynamic capabilities required by organizations to successfully achieve digital transformation.
Jarrahi	2018	Human–AI Collaboration	Explored the concept of human-AI symbiosis and its role in enhancing organizational decision-making processes.
Collopy & Adya	1998	Neural Networks for Forecasting	Evaluated the effectiveness of neural networks in prediction and forecasting applications.
Banerjee et al.	1987	Object-Oriented Data Models	Addressed data management challenges and proposed solutions for object-oriented applications.
Kiss & Bichler	2008	Influencer Identification	Developed methods for identifying influential actors in customer networks and social systems.

3. RESEARCH METHODOLOGY

The methodology adopted by the study entailed the use of bibliometric analysis to analyze the development and trends in the research on Artificial Intelligence.

3.1 Data Selection

(AI) in business management. Bibliographic information was obtained from two well-known bibliometric databases, Scopus and Web of Science (WoS), that have been shown to be reliable sources of peer-reviewed literature due to their large coverage of scientific output and suitability for bibliometric analysis (Adriaanse, 2013; Echchakoui, 2020). In order to collect relevant bibliographic information, a preliminary search was done to develop an effective search strategy involving suitable keywords. The final search was carried out on December 14, 2022, using a variety of keywords that were pertinent to the research topic, such as "artificial intelligence," "AI," "business," "management," and "application." Other parameters such as advanced settings for both databases were also incorporated in the searches to enhance the precision and relevance of the results. All the details of the searches carried out in each database have been included in Table 1.3.

Table 3. Search Strategy and Query Design

Database	Search Step	Search Terms	Search Scope	Refinement Criteria
Scopus	Step 1	"Artificial Intelligence" OR "AI"	Title, Abstract, Keywords	Limited to Business, Management, and Accounting subject areas
	Step 2	"Business" OR "Management"	Title, Abstract, Keywords	
	Step 3	"Application"	Abstract	
	Final Query	Step 1 AND Step 2 AND Step 3	Combined Search	Records restricted to the Business, Management, and Accounting category
Web of Science	Step 1	"Artificial Intelligence" OR "AI"	Topic Search	Limited to Business and Business Finance categories
	Step 2	"Business" OR "Management"	Abstract	
	Final Query	Step 1 AND Step 2	Combined Search	Records restricted to Business and Business Finance research areas

Scopus Search Query

(TITLE-ABS-KEY("artificial intelligence") OR TITLE-ABS-KEY("AI")) AND (TITLE-ABS-KEY("business") OR TITLE-ABS-KEY("management")) AND ABS("application") AND LIMIT-TO(SUBJAREA,"BUSI")

Web of Science Search Query

(TS=("artificial intelligence") OR TS=("AI")) AND (AB=("business") OR AB=("management")) AND (WC=("Business, Finance") OR WC=("Business"))

3.2 Search Results and Descriptive Overview

An exploratory search in the Scopus and Web of Science databases revealed 2,376 papers associated with the topic of Artificial Intelligence (AI) in business management during the period from 1981 to 2022. The obtained database was imported to RStudio for pre-processing purposes and removing duplicates. As a result of this operation, 129 duplicate papers were eliminated, and the final database included 2,247 documents. Next, after the document-type filtering process based on the Bibliometrix (v4.0.0) library, 1,169 papers were removed, leaving 1,078 papers from 408 different sources.

According to the findings of descriptive analysis, there is a continuous increase in the popularity of the studied subject in academia, with an average annual growth rate of 2.65%. Additionally, each publication included in the sample gained an average of 21.91 citations. The entire sample included 58,996 cited references by 2,825 authors. Specifically, among the 1,078 papers considered in this study, 164 of them represented single-author studies, which constituted 173 publications. Moreover, the average number of co-authors per article amounted to 2.99. Finally, international collaboration was identified in 18.37% of cases.

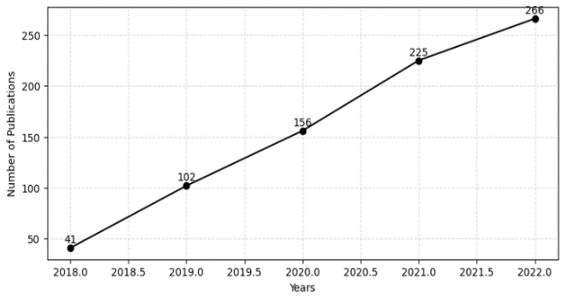

Fig 3 Annual scientific production

The data revealed an annual growth rate of 2.65% (see Fig 3) and an average of 21.91 citations per document.

3.3 Performance Analysis

Fig 4 presents the top journals based on their contribution to publication outputs. The Journal of Business Research took the first place with 44 publications, followed by Technological Forecasting and Social Change (39 publications). Decision Support Systems, Business Horizons, and Industrial Marketing Management made contributions to the research through 33, 31, and 27 publications, respectively.

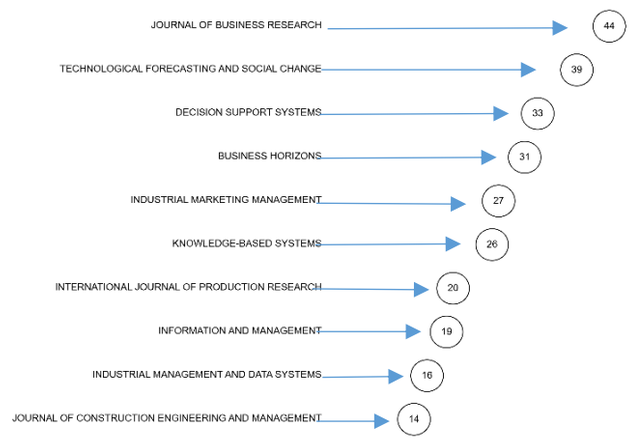

Fig 4. Top 10 sources in document publishing

The consolidated analysis of data carried out through Bibliometrix 4.0.0 reveals that Sheshadri Chatterjee has the highest number of articles published, which is ten in number. Following Sheshadri Chatterjee is Aishwarya Kumar, who has written eight articles. The next three rankings on the list go to Ranjan Chaudhuri, Suraksha Gupta, and Alexander Brem, Pawan Budhwar, Soumya Kanti Ghosh, Jan Kietzmann, Ash with all these articles.

Table 4 below outlines the top authors based on their output in the field of Artificial Intelligence and management. These scholars have made significant contributions towards the development of the field through their research outputs. The inclusion of the h-index allows for evaluation of not only research productivity but also research influence.

Table 4 (a). Most Productive Authors in Web of Science

Author Name	NP	h-index	TC
Chatterjee S.	6	18	137
Kumar A.	6	2	274
Wincent J.	5	42	89
Kietzmann J.	5	24	306
Gupta S.	5	22	109
Chaudhuri R.	5	15	103
Parida V.	5	7	113
Dwivedi Y.K.	4	75	57
Gruber T.	4	18	158
Van Esch P.	4	16	118

Table 4 (b). Most Productive Authors in Scopus

Author Name	NP	h-index	TC
Malik A.	6	23	64
Badhwar P.	5	50	64
Ho G.T.S.	4	34	152
Chatterjee S.	4	31	91
Gunasekaran A.	3	102	60
Dwivedi Y.K.	3	85	612
Glover F.W.	3	61	300
Choy K.L.	3	41	142
Fayek A.R.	3	27	102
Belhadi A.	3	22	57

3.4 Network Visualization

This sub-section is concerned with examining the intellectual structure of the body of literature using co-citation network analysis. As indicated on the map below, nodes denote the sources, and their sizes depend on the number of co-citations. Similarity among research themes among sources is reflected through cluster formation and assigning each of the clusters a color; gray lines, on the other hand, illustrate the linkages between the clusters. The co-citation network map of the 50 most cited sources is shown in Fig 5 below.

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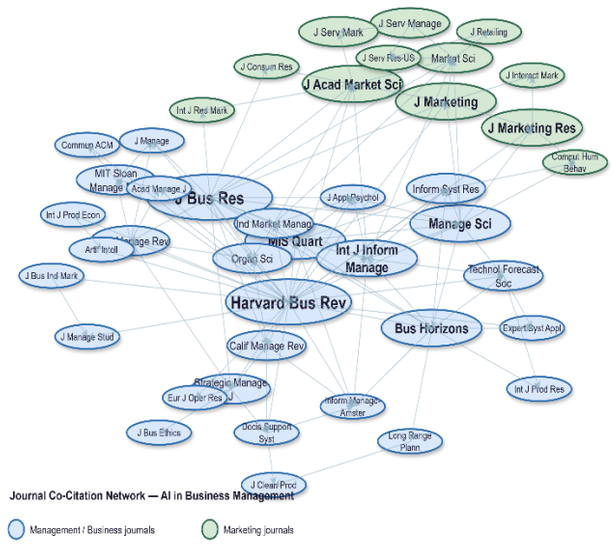

Fig 5. Co-citation Network

4. RESULTS & OUTCOMES

The outcomes suggest that education on artificial intelligence contributes towards the development of positive attitudes, subjective norms, and perceived behavior control among university professors when it comes to incorporating artificial intelligence in the business curriculum. Positive attitudes, organizational support, and confidence with the use of technology are known to contribute towards improving behavioral intention towards the integration of artificial intelligence. Besides, behavioral intention played a crucial role in the development of implementation intention, which suggests that respondents were willing to integrate AI in business studies.

Table 5. Construct Measurement of samples Data

Construct	Number of Items	Sample Measurement
Attitude	1	Importance of AI in business education
AI Self-Efficacy (PBC)	3	Knowledge and ability to teach AI-related topics
Subjective Norm	4	Perceived support from university stakeholders
Behavioral Intention	2	Intention to learn and teach AI
AI Education	2	Prior exposure to AI-related training and literature
Implementation Intention	2	Planning and preparation for AI integration

4.1 Respondent Demographics

A total of 36 participants responded to the survey administered among university professors from 15 April 2023 to 15 May 2023. Table 6 shows the complete demographic and AI expertise profile of respondents. About their fields of specialization in teaching, management (30.6%), finance (25.0%) and marketing (16.7%) represent the largest groups. Female respondents were dominant (63.9%), and the highest percentage (36.1%) belonged to the age group 41–50 years. Thus, the study utilized an experienced respondent group. Most of the respondents belong to private universities and business schools (88.9%), and the largest occupational title among respondents is part-time lecturer (44.4%). Teaching experience of more than 15 years accounts for 36.1%, demonstrating that the surveyed group comprises experienced teachers.

Table 6: Respondent Demographics and AI Expertise Profile (N = 36)
(N= Frequency)

Variable	Response Category	N	%
Field of teaching	Management	11	30.6
	Finance	9	25.0
	Marketing	6	16.7
	Logistics and production	4	11.1

	HR management	3	8.3
	Economics	3	8.3
Gender	Female	23	63.9
	Male	13	36.1
Age range	41–50 years	13	36.1
	61 years or older	8	22.2
	51–60 years	7	19.4
	31–40 years	5	13.9
	20–30 years	3	8.3
Institution type	Private business university/school	32	88.9
	Public university	4	11.1
Job title	Part-time lecturer	16	44.4
	Full-time lecturer (teaching only)	12	33.3
	Full-time lecturer (teaching & research)	8	22.2
Years of experience	More than 15 years	23	63.9
	5–10 years	9	25.0
	11–15 years	3	8.3
	Less than 5 years	1	2.8
Taught AI courses	No	25	69.4
	Yes	11	30.6
AI tools used	Automatic translators	23	63.9
	ChatGPT	16	44.4
	Chatbot	14	38.9

4.2 Key Findings

Important Findings on TPB Components

It was found out that AI education had a significant positive effect on the theory of planned behavior constructs – attitudes, subjective norms, and behavioral control among the university business professors. The more previous experience the participants had in terms of the education related to AI and reading the literature on the topic, the more favorable their attitude towards using this kind of education became. Subjective norms, which were measured by assessing institutional support, collegial support, management support, and student support, became an important component that influenced behavioral intention, thus emphasizing the importance of organizational culture and peer relationships in adopting AI. Perceived behavioral control, measured through measuring the degree of self-perceived knowledge of AI and confidence of the respondents in implementing such education, had a strong positive impact on behavioral intention showing that people willing to implement AI were better skilled in that respect. In addition, a strong positive correlation between behavioral intention and implementation intention has been observed meaning that the professors willing to use AI had started preparations for the implementation of the curriculum.

5. DISCUSSION

According to the paper, the need for embedding AI into business education is becoming increasingly necessary, owing to fast-paced technological developments, where the involvement of university lecturers becomes very crucial. By applying the partial least squares structural equation modeling (PLS-SEM) and Theory of Planned Behavior (TPB), the findings indicate that AI learning is positively linked to attitude and perceived behavioral control, which in turn positively affects behavioral and implementation intentions; meanwhile, subjective norm does not make a significant difference. The most significant factor in influencing AI adoption intention turned out to be perceived behavioral control. While lecturers demonstrate a generally positive attitude towards AI, concerns about knowledge gaps persist, although there is a clear willingness to engage in training programs. There is also no statistically significant correlation between AI adoption intention and control variables (age and previous experience with ChatGPT).

6. CONCLUSION

The main focus of this Paper is on the importance of artificial intelligence in business education and management studies from the point of view of evolution, literature review, and the attitude of university professors towards artificial intelligence implementation. The results have shown that artificial intelligence implementation in business education is highly accepted by lecturers, and positive attitude, AI education, and perception of behavioral control can be regarded as factors that significantly influence this decision. Nevertheless, the major barriers to AI implementation are associated with a lack of knowledge and some other issues. Bibliometric analysis conducted by the author reflects the increasing popularity of the subject and major authors contributing to the development of AI technology. Despite numerous advantages, this study may be limited due to some factors such as small sample and limited geographical distribution.

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