Journal of Autonomous Intelligence (2024) Volume 7 Issue 5
doi: 10.32629/jai.v7i5.1258

ORIGINAL RESEARCH ARTICLE

The implications of Artificial Intelligence on international development management

Bongs Lainjo

Cybermatic International Inc., Montréal QC H4W1S8, Canada; bsuiru@iclud.com

ABSTRACT

Artificial Intelligence (AI) has emerged as a powerful tool revolutionizing various sectors globally, including international development management. This research aims to explore the current landscape of AI implementation in global development management, assess the benefits and challenges associated with its adoption, and propose relevant policies and practices. A mixed research design, comprising qualitative and quantitative methods, was utilized to gather data from secondary sources. The qualitative section of the study draws upon case studies from diverse operational sectors to examine the impact of AI adoption. These case studies highlight how AI contributes to improved performance in various industries and the potential positive effects on individuals' lives. The quantitative part of the research utilizes data from renowned databases such as World Bank Open Data, United Nations Development Programme, International Monetary Fund (IMF), OECD Stat, and Global Open Data Index. Integrating qualitative and quantitative data allows for a comprehensive understanding of AI implementation's economic growth and development across different organizations worldwide. The findings reveal that AI adoption in international development management holds significant promise for enhancing organizational efficiency and individuals' well-being. However, the research also identifies various challenges associated with AI implementation, such as ethical considerations and potential job displacement. To address these issues, the study proposes policy recommendations and best practices that can guide organizations and policymakers in effectively harnessing the transformative potential of AI. This research contributes to international development management by providing a deep understanding of the importance of AI in the current context. The study offers insights for organizations adopting AI and assists policymakers in identifying and resolving pertinent challenges. By completing this study, organizations and policymakers can proactively address the existing problems and develop strategies to maximize the benefits of AI while minimizing potential risks. In summary, this research underscores the immense potential of AI in driving development and improving lives, laying a foundation for future advancements in international development management.

Keywords: Artificial Intelligence; international development management; AI adoption; benefits; challenges; policy recommendations; case studies; quantitative research; qualitative research

ARTICLE INFO

Received: 20 September 2023
Accepted: 13 November 2023
Available online: 6 March 2024

1. Introduction

Artificial Intelligence (AI) has rapidly emerged as a transformative technology with the potential to revolutionize various sectors, including international development management. The integration of AI in development programs holds promises of improved efficiency, enhanced decision-making, and increased effectiveness in addressing complex development challenges. Contextually, international development signifies the quest for reaching a level where people can work on creating a better world by completely removing the issues of poverty, injustice, and discrimination. United Nations has set up specific sustainable development goals, the proper attainment of which can contribute to

managing the prospect of international development[1]. Some of the most common goals that can be accomplished by adopting Artificial Intelligence (AI) are partnerships, development of sustainable cities, communities, innovation, industry, and infrastructure[1]. The significance of understanding the implications of AI on international development management lies in the potential to leverage AI's capabilities to address persistent development challenges. With the United Nations' Sustainable Development Goals (SDGs) as a guiding framework, AI offers opportunities to enhance data-driven decision-making, optimize resource allocation, and facilitate targeted interventions in various sectors, such as healthcare, agriculture, education, and governance[2]. Therefore, understanding international development management can help determine AI's impact on this arena precisely. However, the implications of AI adoption in international development management are multifaceted, encompassing both opportunities and challenges. This mixed-method study aims to comprehensively explore the impact of AI on global development management, providing insights into its potential benefits, ethical considerations, and associated risks.

The advancement of AI contributes largely to transforming the world as a whole in a manner in which one can interrelate with machines. It further works on developing computer systems to perform with the support of human-like intelligence for learning, decision-making, and problem-solving in the long run. Its rapid advancement considers revolutionizing individuals' lifestyles and professional elements without limiting future advancement-related potentials[3]. Enhanced monitoring and evaluation AI-powered tools can facilitate real-time development project monitoring and evaluation (M&E), improving accountability and transparency. These tools can analyze vast amounts of data from multiple sources, enabling timely identification of project progress, challenges, and potential risks. By automating M&E processes, AI can enhance data accuracy, minimize human error, and provide stakeholders with reliable and up-to-date information for evidence-based decision-making[4].

Furthermore, it is the international development program that helps in obtaining knowledge and resources for helping communities and governments across the globe. These initiatives contribute primarily to eliminating the issue of extreme poverty, thereby promoting democratic and resilient societies and assisting in human rights advancement so that global security and overall prosperity can be attained in the long run[5]. International development management thus attempts to improve the quality of life on earth, where the most common challenges faced are inequality, climate change, conflict, and quality of life[5]. However, the integration of AI in development initiatives must be carefully examined to ensure that it aligns with ethical principles, respects human rights, and mitigates potential risks and biases. The implementation of AI can bring about a profound change in the management of international development, and this is the main reason behind the selection of this particular subject matter for conducting this study.

To date, research on the implications of AI in international development management has primarily focused on specific sectors or case studies, needing a holistic understanding of the broader implications across various contexts. This study aims to address this research gap by employing a mixed-methods approach that combines quantitative and qualitative data collection and analysis. By integrating both data types, the study seeks to provide a comprehensive and nuanced understanding of the implications of AI on international development management. The purpose of this study can be aptly inferred from the complete attainment of the following research aims:

- To examine the current landscape of AI implementation in international development management.
- To assess the impacts and benefits of AI adoption in international development management.
- To explore challenges and risks associated with AI implementation in international development management.
- To inform policy and practice in the field of AI implementation in international development management.

The findings of this study will contribute to understanding the implications of AI on international

development management by providing insights into its potential benefits and challenges. It will shed light on the ethical considerations associated with AI adoption, including bias, privacy, and the impact on employment and workforce dynamics. Moreover, the research will inform policymakers, practitioners, and researchers about best practices, guidelines, and ethical frameworks for harnessing AI's potential in international development programs. Ultimately, this mixed-method study aims to provide evidence-based recommendations to maximize the benefits of AI integration while mitigating potential risks and ensuring that AI adoption aligns with sustainable development principles. By understanding the implications of AI on international development management, stakeholders can harness the full potential of AI to accelerate progress toward achieving the SDGs and promoting inclusive and sustainable development. For the attainment of the aims, the following research questions need to be adequately addressed:

- What are AI's current applications and utilization in international development management across various sectors?
- What are the benefits and challenges of implementing AI in international development management?
- How does adopting AI in international development management relate to development outcomes, such as efficiency gains, program effectiveness, and scalability?
- What are the ethical considerations and potential risks associated with AI integration in international development management?
- What are the stakeholders' perspectives, experiences, and concerns regarding the implications of AI adoption in international development management?
- How can AI be effectively leveraged to address complex development challenges and promote sustainable development?
- What best practices, guidelines, and ethical frameworks can be recommended for integrating AI into international development management?

In the quantitative phase of the study, surveys will be administered to a representative sample of development practitioners and policymakers involved in AI-enabled development initiatives. The surveys will gather data on the extent of AI implementation, the sectors and application areas, and the perceived benefits and challenges of AI integration. Quantitative analysis techniques, such as regression and correlation, will examine the relationship between AI adoption and development outcomes, considering efficiency gains, program effectiveness, and scalability. Ideally, complementing the qualitative phase of the study will involve in-depth interviews and focus groups with key stakeholders, including development practitioners, policymakers, and AI experts. These qualitative data collection methods will enable a deeper exploration of stakeholder perspectives, experiences, and concerns related to AI adoption in international development management. Thematic analysis techniques will be employed to identify common themes, patterns, and divergent viewpoints. Due to limited funding and logistics complexities, achieving this strategy will be unlikely and needs to be flagged as one of the study's limitations. Other proxy options will be considered and included accordingly.

2. Literature review

2.1. Current state of AI implementation in international development management

According to Bjola[6], AI plays a dominant role in enabling nations to work for the attainment of the goals of sustainable development so that the challenges associated with the unambiguous development areas, such as human rights, poverty, environment, and global health among others can be addressed and overcome with time. In all these areas, AI considers working radically on the overall transformation of the development theories and practices by rethinking how algorithms and data are integrated for generating in-depth insights into techniques of identifying, studying, and, most importantly, managing development challenges[6]. Serban and Lytras[7]stated that smart cities and communities are developed through AI adoption by overcoming the

challenges associated with optimization, sophisticated computational techniques, and smart customizable network provision. As far as the impact of AI is considered, it reflects upon the fresh norms of organizing activities so that the new and innovative requisites can be adequately met and responded to. The energy infrastructure's design, deployment, and production of energy resources can be effectively improved over time, thereby posing a considerable impact on the resilience and growth of the sector. Education is another sector of international development management for improvement, and AI is considered significant.

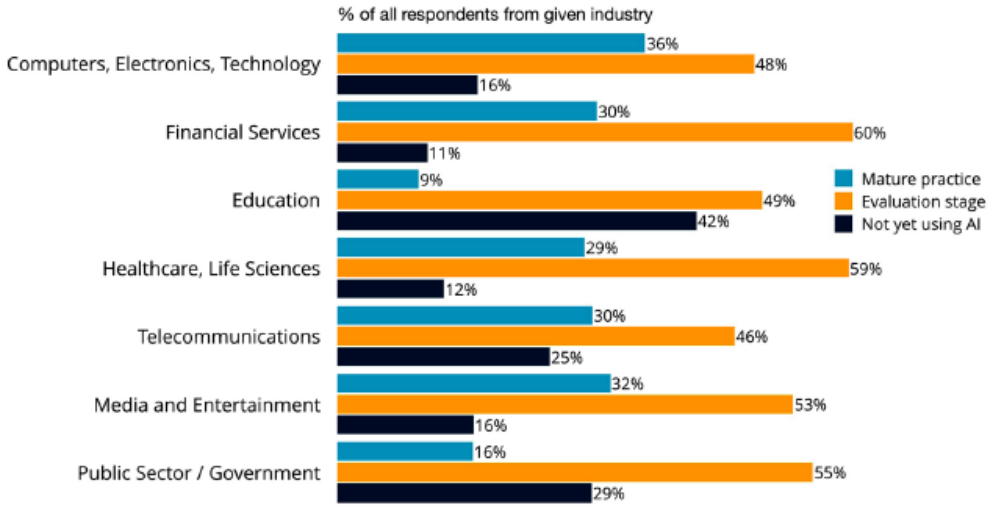

Figure 1. AI adoption dimensions in organizations[8].

Figure 1 provides a clear idea of the different dimensions of a developed organization, which considers AI adoption in the true sense. Knox[9] mentioned that educational AI is "a part of a broader political economy of education technology that is foundationally aligned with political orientations and deeply implicated in corporate strategies, focusing attention on issues of production and consumption in an educational marketplace." Therefore, it can be stated that the different international development sectors operate effectively and even improve their performance with AI adoption. Furthermore, Jiang and Wen[10] noted that hospitality is a common sector of international development management and that hotels are a significant part. It has been found that with the adoption of autonomous devices and the use of robots, innumerable hotels in this contemporary world consider providing contactless services. The implementation of AI also works on the anticipation of robot receptionists, robot delivery, facial scan check-ins, robot concierge assistants, and voice guest control, among others. The threats of varied types, such as terrorist attacks, epidemics, and natural disasters, can be averted, and people can be safeguarded from these at the right time[9]. It can further be stated that the latest landscape associated with International Development Management considers AI to be adequately implemented in operational proceedings.

2.2. Impacts and benefits of AI implementation in international development management

According to Furman and Seamans[11], the implementation and rapid advancements in AI have contributed mainly to using digitization for connecting robotics with sensors. It has further led to manifesting varied applications, such as attaining victory over humans through multifaceted strategy games and creating virtual assistants and chatbots. Some examples of the beneficial impact of AI implementation comprise Siri Alexa, as well as automated grocery stores of Amazon, among others. The results further consist of boosting economic growth and improving productivity levels. The innovations in AI consider working on occupational transformations so that the workforce can learn new skills, thereby shifting to more unique channels of employment and enabling continued employment[11]. Duan et al.[12] further stated that considering the operations associated with international development management, the AI systems' new wave has mainly contributed to improving the organization's potential. It also considers using the required data to make

predictions and substantially reduce the cost. Implementing AI enhances decision-making, remakes customer experience, and reinvents business models and ecosystems, driving digital initiatives-related payoff through 2025[12]. As mentioned earlier, these impacts outline the benefits of AI adoption concerning the management of international development.

2.3. Challenges and risks of AI implementation in international development management

Ghallab[13] mentioned that the challenges of AI implementation are primarily of two types, i.e., incentives and integrative research. In the incentive category, the most common challenges are the unavailability of initial investments and research funding for bringing about socially beneficial progress, specifically in the riskiest phases. The challenge in the category of integrative research is the need for more opportunities for academically researching disciplinary targets and respective analytical methods. The challenges are noteworthy indeed because these "promote investigations within the useful but often narrow assumptions of each community to bring further in-depth and well-formalized knowledge"[13]. **Figure 2** provides a better idea of the challenges associated with AI adoption. Considerably, Davenport and Ronanki[14] highlighted that besides the expenses incurred by implementing expertise and technology in the organizational proceedings, integrating cognitive projects with existing systems can be considered a significant challenge of AI implementation. The failure of the managers to effectively assess cognitive technologies, unavailability of adequate individuals with expertise in using the technologies, and introduction, as well as overselling immature technologies in the marketplace, act as some of the challenges of AI adoption. Thus, wealth management and investment firms in the present era consider offering the capabilities of AI-supported 'robo-advice' so that the clients' routine financial issues can be identified concerning the follow-up of cost-effective guidance[14]. Dwivedi et al.[15] outlined the legal challenges associated with AI implementation, one of which effectively meets all the problems connected to the occurrences of errors through the usage of AI systems. This is followed by another legal challenge of using AI systems, which might lead to copyright issues. Therefore, the current legal framework needs to be changed in varied instances so that human-generated work can be effectively protected and incentivized with time. Besides, the concept of AI law and its regulations must be efficiently assessed and wholly understood so that governance-related aspects can be adequately controlled, including autonomous intelligence systems, accountability, responsibility, and privacy/safety.

Figure 2. Challenges in AI Adoption[8].

2.4. Policy and practice associated with AI adoption in international development

According to Jobin et al.[16], AI-related ad hoc expert committees have been developed and commissioned with the policy documents' drafting procedures so that national and international organizations can adequately respond to societal fears. The identified committees, in this case, entail the "High-level expert group on Artificial Intelligence appointed by the European Commission, the expert group on AI in society of the organisation for economic co-operation and development (OECD), the advisory council on the ethical use of Artificial Intelligence and data in Singapore, and the select committee on Artificial Intelligence of the United

Kingdom (UK) House of Lords"[16]. Besides, the principles and guidelines of AI were publicly released in the year 2018 by varied companies, such as SAP and Google, while Access Now, the Association of Computing Machinery (ACM), and Amnesty International act as some of the non-profit organizations and professional associations for issuing respective recommendations and declarations over time[16]. Mehr et al.[17] further defined the point that varied strategies have been considered by the government offices for implementing AI into the work proceedings, thereby making it a part of the citizen-centric and goals-based program. It also finds working on attaining citizen input, being data-prepared, treading cautiously with privacy, alleviating ethical risks, developing existing resources, averting AI-related decision-making, and improving the employees' potential instead of just replacing them. The functional areas of an organization, which comply with the policies of AI adoption, have been demonstrated in **Figure 3**.

Figure 3. Functional areas for AI adoption[8].

Zuiderwijk et al.[18] also mentioned that AI and its increasing usage, especially by government agencies, is continuously triggering the respective opportunities in the global domain. The changes in the procedures of policymaking, service provision, and enforcement are taking place rapidly through the shifts from traditional environments to AI technologies being introduced in the public-sector ecosystems and government practices. Furthermore, the public service quality needs to be improvised with the application of AI technologies by the government so that citizens' trust is adequately fostered and the service delivery's efficiency and effectiveness are accordingly augmented[18]. Munoko et al.[19] stated that the AI system's current governance structures are overtly amorphous, as an alarm has been raised regarding its increasing usage in outpacing controls and governance, thereby guiding their organizational adoption. The professions adopting an AI-enabled audit environment consider the design of reporting controls and appropriate monitoring of the AI-enabled audit environment. The overall human responsibility can be affected by the shifting performances of task audits, which consider the implementation of automation in the true sense.

3. Methodology

This research conducted with a mixed method approach considers the integration of both quantitative and qualitative data for collection and analysis. It further implies the combination of purposeful data to enable the researchers to look for an enhanced view of the landscape, thereby viewing the same through diversified research lenses and viewpoints[20]. Including a mixed-method approach, the study contributed largely to providing evidence-based recommendations of policies and practices for maximizing the positive impacts of AI integration and mitigating potential risks. These can further result in ascertaining the alignment of AI adoption with the principles of sustainable development. The mixed approach emphasizes obtaining in-depth insights into the implications of adopting AI within the operations of international development management so that the stakeholders can adequately harness its complete potential. The integration of the analytical approach of quantitative research and the review procedures of qualitative research accelerates growth in

attaining the SDGs and promoting inclusive and sustainable development.

When considering using a mixed approach, the main reason was to comprehensively identify the implications of adopting AI in international development management, thereby attaining in-depth insights into its potential benefits, associated risks, and others. Secondary data for conducting the qualitative analysis on the implementation of AI in international development management emphasizes the case studies on its varied sectors for effectively attaining holistic inference of the implications. Furthermore, the quantitative analysis demonstrated the collection of numeric and statistical data from various databases, such as World Bank Open Data, International Monetary Fund (IMF), Global Open Data Index, United Nations Development Programme, and OECD Stat. The reason behind selecting these databases considered retrieving detailed knowledge to support understanding the implications of AI being adopted in international development management. It further considers allowing the individuals to analyze and showcase the potential impacts posed on the varied ranges of development-related aspects. The proper integration of the mixed-approach research considered informing the policymakers, researchers, and practitioners about the ethical frameworks, guidelines, and detailed information on best practices associated with harnessing AI's capabilities in the respective program. This analytical approach considered examining the relationship shared by the factors of AI adoption with development outcomes, such as efficiency gains, scalability, and program effectiveness.

4. Results and findings

4.1. Quantitative findings

The valuation of the global AI market will be USD 142.3 billion by the year 2023 and continues to develop with the influence of the received investment influx. The increment in the start-ups' corporate global investment by USD 5 billion from 2020 to 2022 was found to be double the investments made previously just because of the amounts being acquired from U.S. companies in the form of private capital. The funding of most AI businesses in large amounts encompasses chatbot and machine learning companies emphasizing the interface between humans and machines. Contextually, it had been found that the AI market globally in the year 2021 amounted to USD 327.5 billion, with the largest patent-owner being Baidu, and start-up funding for the second quarter of 2022 was USD 12.1 billion[21]. **Table 1** helps infer that the increasing rate of AI investment results in the rising need for talent in the same field.

Table 1. Key insights into the AI Market.

Global AI market in 2021	327.5bn USD
Largest AI patent owner in the world	Baidu
AI startup funding worldwide Q2 2022	12.1bn USD

Based on the outcomes reported by Next Move Strategy Consulting, it can be expected that the AI market will demonstrate more robust growth in the upcoming years. Contextually, "its value of nearly 100 billion U.S. dollars is expected to grow twentyfold by 2030, up to nearly two trillion U.S. dollars", intending to maintain the AI market coverage of innumerable industries[22]. Adopting AI within business structures considers the fields of supply chains, analysis, marketing, research, and product making, along with the improvement of AI over the years, encompassing image-generating AI, chatbots, and mobile applications. **Figure 4** of the forecast of the global AI market size until the year 2030, along with the actual one of 2021, is as follows:

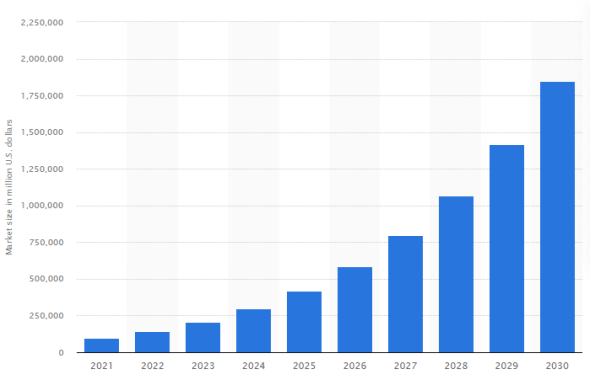

Figure 4. AI market size in 2021 and forecast till 2030[22].

The Digital Adoption Index (DAI) refers to a worldwide index that enables analysts to measure the rate of digital adoption considered by countries throughout the world based on three economic dimensions, i.e., the people, government, and business. International development can further be depicted from the average scoring of the sub-index constituting technologies implemented by the respective agents in the promotion of development made globally in this era of utmost digitization. The factors covered under the umbrella of the DAI are "increasing productivity and accelerating broad-based growth for business, expanding opportunities and improving welfare for people, and increasing the efficiency and accountability of service delivery for government"[23]. When assessed globally, the DAI trend can provide an in-depth inference of varied indices for 2014 and 2016. The DAI for the year 2014 (refer to Appendix—**Figure A1**) depicts the highest DAI to be of Singapore and Korea, Rep, i.e., 0.868270159 and 0.841717064 respectively, with the lowest DAI being 0.13855499 and 0.155283138of the Central African Republic and Niger correspondingly. The trend remains similar in the year 2016, with the highest DAIs being 0.870592058 and 0.857824147 for Singapore and Korea, Rep, respectively, while the lowest being the Central African Republic and Niger, with the figures reaching 0.147106558 and 0.159881338 correspondingly (refer to Appendix—**Figure A2**). The changing trend of DAI creating a similar level of impact on the development of the nations as a whole can be inferred from **Figure 5** below.

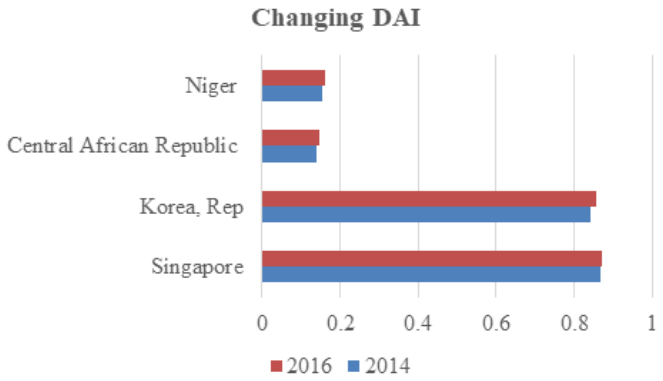

Figure 5. Increasing DAI for the selected Countries between 2014 and 2016.

Based on the same data, **Tables 2** and **3** show the comparison between the descriptive analysis findings for the Central African Republic and Singapore for 2014 and 2016. This clearly demonstrates the reliability of the dataset selected, thereby emphasizing the responsiveness of DAI towards the measuring of the country's development. This measurement can further help the policymakers in understanding the progressiveness of the nation and its economic stability for designing the most feasible digital strategy integrating customized policies so that the different user groups can work on the effective promotion of digital adoption as and when required. In this case, the first table describes the standard deviation as 0.112662 for 2014 and 0.152664 for 2016, demonstrating that the smaller the value, the more clustered the data around the mean would be. This implies

that AI details show SD values lower than the mean value. Similar outcomes for the standard deviation of the other selected countries of Singapore in 2014 and 2016 were 0.06891 and 0.034849, respectively (refer to **Table 3**).

Table 2. Central African Republic. (Descriptive Analysis for 2014 and 2016).

Particulars	**Central African Republic**	
	2014	**2016**
Mean	0.138555	0.160031
Standard Error	0.056331	0.088141
Median	0.130006	0.147107
Mode	N.A.	N.A.
Standard Deviation	0.112662	0.152664
Sample Variance	0.012693	0.023306
Kurtosis	1.5	N.A.
Skewness	0.448308	0.378236
Range	0.274371	0.304506
Minimum	0.009919	0.01424
Maximum	0.28429	0.318746
Sum	0.55422	0.480093
Count	4	3

Table 3. Descriptive Analysis for 2014 and 2016 (Singapore).

Particulars	**Singapore**	
	2014	**2016**
Mean	0.86827	0.841788
Standard Error	0.034455	0.02012
Median	0.852138	0.851721
Mode	N.A.	N.A.
Standard Deviation	0.06891	0.034849
Sample Variance	0.004749	0.001214
Kurtosis	1.499998	N.A.
Skewness	0.199339	−1.178444
Range	0.159276	0.067541
Minimum	0.804764	0.803051
Maximum	0.96404	0.870592
Sum	3.473081	2.525365
Count	4	3

4.2. Qualitative findings

The first case study published by Schut[24] demonstrates the outcomes of AI adoption in internal development management through the face of Google. The company has incorporated AI into its work proceedings and enabled the other business units to develop a 'transforming AI capability' with the support of 'Google Cloud's AI adoption framework.' **Figure 6** below demonstrates the interconnected nature of the areas this framework covers in the table through varied themes, such as learn, scale, access, secure, and automate. With the help of AI, Google Cloud has worked on its evolution, thought leadership, and, most importantly, innovation to come up with this framework to help its cloud customer, starting from start-ups and ending with

enterprises existing in different industries for not only answering their questions but also providing a solution for their complex problems.

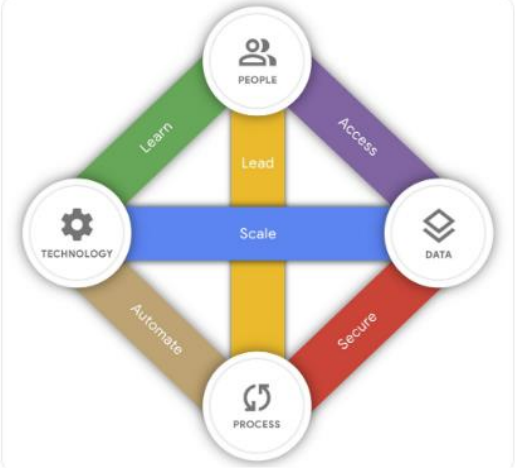

Figure 6. AI adoption framework of Google Cloud[24].

The case of IBM describes a different but positive impact of AI implementation on its operations, similar to that of many other sectors. It is the 'embeddable AI software portfolio,' considered a focal point of this case study, as it has helped the company design three newer libraries for the assistance of the IBM Ecosystem, which comprises its clients, partners, and developers. With the help of these libraries, the company can now proceed towards developing its AI-powered solutions cost-effectively and introduce them to the market quickly. Considering the expanded portfolio, the required access is offered to the AI libraries that, in turn, are known to power IBM's most popular Watson products. Designing these products primarily enabled the clients and partners to overcome the challenges of higher development costs and skills shortages by building AI models and machine languages from the initial stage[25]. The case study published by Microsoft[26] contributes to defining the technology of all times by integrating innovative and powerful AI technologies in the company's products and services. This can ascertain that the required assistance is provided to the customers. An example of the AI platform being used by this sector is Microsoft AI, which Azure has adequately powered for facilitating clients with intelligent experiences daily through the use of Windows, Microsoft Defender, Azure AI, Xbox, Dynamics 365, Microsoft 365, Power Platform, and teams[26]. It depicts that Microsoft is implementing the respective principles into the company's practice for developing and deploying AI so that it can positively impact society as a whole.

The following case study of Marr[27] demonstrates the Flywheel Approach used by Amazon for implementing AI into its operations. Amazon is one of the initial users of AI that not only ensures the business' productivity but also makes it the company's area for attaining competitive advantage. It is one such sector that does not segregate its departments for adopting AI in the work proceedings of every segment of Amazon. As a result, even the recommendation engine drives sales for the company by up to 35%. The smart speaker product of the company, Alexa, also works on the AI platform (conversational one) with automated intelligent robots for taking up and completing the duties in the warehouse. The term 'Flywheel' refers to the techniques used by companies for not only conserving energy but also for keeping up the momentum of their work. Through a similar approach, Amazon incorporates AI to maintain its momentum and conserve energy simultaneously. It further results in optimizing the issues of inconsistent performances and occurrences of errors to the best possible extent.

5. Discussion

5.1. AI's current applications and utilization

The impact of rapidly growing AI on international development considers working on effectively directing resources for influencing its ethical implementation. The usage of AI for making recommendations, as well as predictions, works on creating a considerable impact on the lives of individuals so that the factors of fairness, justice, and accountability can be adequately justified. The stakeholders and their overlapping influence-related layers must be considered in the international development domain. It further works on establishing accountability and transparency so that the data related to the issues of developing countries consider the exclusion of not only marginalized but also poor groups[28]. The studies by Bjola[6] and Serban and Lytras[7] provide a similar understanding of the importance of integrating algorithms, as well as data to get detailed inferences derived from the varied techniques of studying, identification, and the management of development challenges. When considering the factor of AI readiness, it can be stated that the reach of AI in the field of R&D is still limited in most low and middle-income countries (LMICs), with AI conference publications with the dominant sources being Europe, East, and Central Asia, as well as North America. In the year 2020, "East Asia and the Pacific accounted for 27% of all conference publications, North America 22%, and Europe and Central Asia 19%, but "sub-Saharan Africa accounted for just 0.03%"[29]. The assessment of the DAI of the different countries across the globe as demonstrated through the quantitative findings also provides a clear picture of the increasing trend in their digital adoption for the promotion of international development over the years. This, therefore, assists in addressing the research question, 'What are AI's current applications and utilization in international development management across various sectors?'

5.2. Perceived benefits and challenges of AI implementation

The transformational nature of technology considers a series of benefits associated with the digital revolution, which encompasses not only more accessible communication but also greater convenience, new leisure-related forms, and free digital products. A profound sense of global community, as well as social connectedness, had been created. Still, massive investments associated with information and communication technologies (ICTs) contributed mainly to faster growth, better services, and enhanced job opportunities. This can enable countries across the globe to garner substantial digital dividends[30]. Furman and Seamans[11] also provided similar inferences on the benefits of AI adoption, which demonstrated the integration of digitization with the connection of robotics and sensors. All these can be implemented in the banking sectors as well to attain the best possible results in the future. Furthermore, with the evolution of the concept of Digital Economy, the changes taking place in technology usage can be adequately reflected upon, thereby demonstrating the manner in which individuals' interaction can end up improving the overall nature of social welfare besides their interactions with businesses and vice versa[31]. All these can even be inferred from the primary findings where the DAI of the different countries have been compared to understand the increasing digital adoption over time. To address the question 'What are the perceived benefits and challenges of implementing AI in international development management?', the research conducted on LMICs can be considered. This is because it plays a significant role in international AI conversations, especially the ones organized in the United States, Europe, and Canada. A lower level of AI user readiness, especially in developing countries, considers how bilateral cooperation can improve the overall developing-country science-related productivity. The research question of 'how can AI be effectively leveraged to address complex development challenges and promote sustainable development?' also gets addressed herein. The factors associated with international development management can further be justified based on the discussions made in the article of Duan et al.[12]. It can further be noted that science could be strengthened in the developing world, with the broadening of research agendas globally considering the multilateral and bilateral development cooperation. Contextually, this cooperation gets familiarized with the benefits of AI-enabled science so that the problems associated with poor countries can contribute to ultimately making global efforts so that Sustainable Development Goals can be adequately[29]. A similar understanding of the challenges faced by the organization in the adoption of AI has been presented in the articles of Ghallab[13], Davenport and Ronanki[14], as well as Dwivedi et al.[15] along

with the primary findings showed lower DAI for the slowing developing countries, such as Niger and Central African Republic as compared to that of Korea, Rep, and Singapore. The discussions herein, thus, describe in detail the perceived challenges and the benefits of AI adoption.

5.3. AI implementation influencing development outcomes

To address the research question, 'How does adopting AI in international development management relate to development outcomes, such as efficiency gains, program effectiveness, and scalability?', the expectation of taking the AI market to $190 billion by 2025 has been duly considered. The omnipresence of this platform in the lives of every individual can be inferred from the point that even a simple Google search with the integration of AI might lead to the attainment of the most accurate results. The world's GDP is expected to be boosted by 14% by the year 2030, thereby adding to it a sum of 15.7 billion dollars because of the prevalence of AI. Using AI-driven tools can enable enterprises to assess learning without the assistance of any human effort. This is because it helps in not only gathering information, providing accurate results, and evaluating performance but also checking answer sheets so that instant feedback can be provided to the employees on their performances. The delivery of digital assessment to the employees can be adequately handled using AI, which can further contribute to developing a more comprehensive range of associated techniques. Besides, it can even assist in personalizing assessments by developing most quizzes and tests to meet the requisites of a 'one-size-fits-all' approach without considering the skill, IQs, or other factors. Considerably, by making use of the AI platform, tests can be taken by the employees on the characteristics of skills, capabilities, and level of learning, which can further be ascertained through the creation of a highly accurate performance evaluation procedure, as well as the elimination of the situations[32]. The areas, in which AI can be implemented for attaining better results and for ensuring improved performances have been effectively discussed in the studies published by Jiang and Wen[10], Knox[9], and Zuiderwijk et al.[18]. Therefore, international development outcomes can be influenced mainly by AI implementation.

5.4. Ethical considerations and potential risks associated with AI integration

Ethics associated with the implementation of AI considers not only questioning and persistently investigating the factors but also considering that the technologies imposed on the lives of individuals are never taken for granted. Besides, it must be noted that the size of the AI systems is increasing tremendously with the computation of the required power and the consumption of respective data. The assumptions for camouflaging the incidence of computing in the prevailing era of PC and Internet usage can also be witnessed considering the scales of responsibility and deployment. Similarly, it can be noted that "increasing scale means many aspects of the technology, especially in its deep learning form, escape the comprehension of even the most experienced practitioners"[33]. The policy standards for AI adoption and the associated strategies have been adequately highlighted in the studies of Jobin et al.[16], and Mehr et al.[17].The findings of the quantitative analysis, as conducted in this study in addressing the research question, i.e., 'What are the ethical considerations and potential risks associated with AI integration in international development management?', it can be stated that the AI platform, when ethically implemented, can help find solutions for the world's biggest problems. Societies across the globe are confronted mainly by ethical and legal issues because of AI integration, which entails the factors of discrimination/bias along with surveillance and privacy so that philosophical challenges related to human judgment can be adequately addressed. It further considers that the issues associated with implementing innovative digital technologies can act as fresh sources of data breaches and inaccuracy and can be resolved from the roots"[34]. The primary research finding also provides similar results as the policymakers consider the assessment of the DAI and its changing trends for determining the needs of the countries and for designing the most feasible policies to enable them to develop in the era of utmost digitization. The measures taken by the governments for the implementation of AI to understand the legal factors have been presented in the studies published by Zuiderwijk et al.[18] and Munoko et al.[19]. Through

adequate adherence to the issues associated with the need for algorithmic transparency, protection, and privacy of the involved beneficiaries, along with cybersecurity, the positive impact of AI on international development management can be aptly ensured in the long run. This further addresses the research question of 'What best practices, guidelines, and ethical frameworks can be recommended for integrating AI into international development management?'

5.5. Stakeholders' perspectives on implications of AI adoption

The management of stakeholder experience in AI integration is a tough nut to crack, as leaders consider developing the trust of not only the employees and partners but also the investors along with the other impacted stakeholders with competing aims and ideologies. Contextually, it needs to be noted that in "an increasingly automated age where AI and other technologies integrate into workflows, the usual ways of winning trust must adapt and evolve"[35]. The two primary implications of AI systems comprise shifting the power of decision-making and accelerating change, which makes stakeholder management complicated in the true sense. Considering the design of stakeholder engagement, the performance of the systems in augmenting the traditionally human-handled tasks considers the human superiority's assumed strongholds not only in the field of strategy but of arts as well. However, this case scenario does not cover the issue of the removal of authority or input-related human decision-making. The economic analysts and the policymakers also form part of the stakeholders, and hence, the assessment of the DAI index for all the countries across the globe must also be duly considered for understanding the impact of AI adoption on overall development. As described herein, the complexities associated with the AI system answer the question of 'What are the stakeholders' perspectives, experiences, and concerns regarding the implications of AI adoption in international development management?'. Besides, implementing a thoughtful design process is required to ascertain the significance of the input made by the stakeholders in decision-making. The creation of a powerful momentum by the AI systems for businesses, but the impact of initial input on a system can be either positive or negative. The example of ChatGPT's designers describes using Reinforcement Learning from Human Feedback (RLHF) to get the agents trained to incorporate user feedback into the behavior of the individuals[35]. This proves that the shareholders' concerns, experiences, and perspectives on AI adoption consider effective handling of international development management.

6. Conclusion

6.1. Summary of key findings

Conclusively, based on the discussions in the above chapters, AI adoption plays a major role in bringing about a considerable transformation in contemporary societies and attaining improved performances in international development management. The case study analysis, as well as the quantitative findings of the study, helps in understanding that AI implementation influences organizations' performances across the globe. The second objective of this study, i.e., 'To assess the impacts and benefits of AI adoption in international development management' can be attained with the discussions of the benefits of AI adoption. It also helps in understanding the importance of assessing the DAI, based on which the overall development of the nation can be measured concerning the technological advancement of digitization. This is because the adoption of AI largely results in leading the nations towards overall development, which even entails the factor of economic growth. However, the over-expensive nature and overselling of immature technologies in the marketplace are major challenges to AI adoption. On the other hand, its benefits entail boosting economic growth, shifting to newer employment channels, improving productivity, learning new skills associated with workforce management, and ascertaining continued employment. Complying with the ethical considerations and stakeholders' experiences helps prove AI implementation in international development management. Compliance with the ethical guidelines further assists in attaining the last objective, i.e., 'To inform policy and practice in the field of AI implementation in international development management'. The reason behind this

can be inferred from the point that policymakers consider the DAI of the nations both individually of the three different dimensions and on an average as well for measuring the growth of the nations concerning digital adoption. This can enable them to identify the gaps existing within the system, thereby working on designing the best possible policies to promote digital advancement and progress in the long run.

6.2. Recommendations for practitioners and policymakers

The practitioners and the policymakers implementing AI in global companies must consider the associated ethical guidelines effectively and the issues faced by top-notch companies while introducing the platform within their operations. This can then contribute mainly to developing the required strategies and policies for eliminating the problems identified from the roots. Besides, the assessment of the companies already using this platform can help the policymakers identify the existing gaps and work on bridging them as soon as possible. The study objective, i.e., 'To explore challenges and risks associated with AI implementation in international development management' can thus be effectively attained from the discussions made on the gaps existing within the current practices along with the associated recommendations made for the future. The DAI of 2014 and 2016 have been considered for conducting the primary research in this study. However, the most up-to-date DAIs must be selected by policymakers to understand the status of digital adoption across varied nations. This can enable them to design better policies based on the changing trend and improve the existing ones accordingly as well.

6.3. Final reflections on the study's contribution to the field

After completing this research, the findings can increase the knowledge of readers from all fields and streams on the importance of AI integration and the role played by this platform in the contemporary world. The current state of the organizations implementing AI is indeed a matter of due consideration as expressed in this study and thus contributes to the accomplishment of the foremost research objective, i.e., "To examine the current landscape of AI implementation in international development management". The continuously changing world of businesses and lifestyles of individuals can contribute mainly to enhancing people's knowledge so that they can also work effortlessly with technologies and lead them toward growth and progress. This study can also be of great help as a referral for upcoming researchers in conducting fresh research on a similar issue of concern. The policymakers and stakeholders of developing businesses operating across the globe can also benefit from the completion of this study on the impact of AI adoption on international development.

Conflict of interest

The author declares no conflict of interest.

References

1. The Salvation Army. What is international development? Available online:https://www.salvationarmy.org.au/international-development/learn/what-is-international-development/#:~:text=International%20Development%20is%20the%20pursuit,United%20Nations'%20Sustainable%20Development%20Goals (accessed on 12 August 2023).
2. United Nations. Transforming our world: The 2030 Agenda for Sustainable Development. Available online: https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (accessed on 12 August 2023).
3. Sinha A. Revolutionizing the Future: AI's rapid advancement creates intelligent machines. Available online:https://www.linkedin.com/pulse/revolutionizing-future-ais-rapid-advancement-creates-machines-sinha#:~:text=The%20progress%20in%20AI%20is,decisions%20based%20on%20that%20information (accessed on 12 August 2023).
4. Teo NCL. Digital Technology Application In Project Management. PhD diss., UTAR, 2021.
5. Nolan SN. International Development 101.Available online:https://www.interaction.org/aid-delivers/foreign-assistance-overview/international-development-101/#:~:text=International%20development%20programs%20bring%20knowledge,advancing%20global%20security%20and%20prosperity(accessed on 12 August 2023).

6. Bjola C. AI for development: implications for theory and practice. Oxford Development Studies. 2021, 50(1): 78-90. doi: 10.1080/13600818.2021.1960960
7. Serban AC, Lytras MD. Artificial Intelligence for Smart Renewable Energy Sector in Europe—Smart Energy Infrastructures for Next Generation Smart Cities. IEEE Access. 2020, 8: 77364-77377. doi: 10.1109/access.2020.2990123
8. Jorge. 5 Charts That Show Challenges of AI Adoption in the Enterprise. Available online: https://www.game-changer.net/2019/03/20/5-charts-that-show-challenges-of-ai-adoption-in-the-enterprise/ (accessed on 12 August 2023).
9. Knox J. Artificial intelligence and education in China. Learning, Media and Technology. 2020, 45(3): 298-311. doi: 10.1080/17439884.2020.1754236
10. Jiang Y, Wen J. Effects of COVID-19 on hotel marketing and management: a perspective article. International Journal of Contemporary Hospitality Management. 2020, 32(8): 2563-2573. doi: 10.1108/ijchm-03-2020-0237
11. Furman J, Seamans R. AI and the Economy. Innovation Policy and the Economy. 2019, 19: 161-191. doi: 10.1086/699936
12. Duan Y, Edwards JS, Dwivedi YK. Artificial intelligence for decision making in the era of Big Data – evolution, challenges and research agenda. International Journal of Information Management. 2019, 48: 63-71. doi: 10.1016/j.ijinfomgt.2019.01.021
13. Ghallab M. Responsible AI: requirements and challenges. AI Perspectives. 2019, 1(1). doi: 10.1186/s42467-019-0003-z
14. Davenport TH, Ronanki R. Artificial intelligence for the real world. Harvard Business Review. 2018, 96(1): 108-116.
15. Dwivedi YK, Hughes L, Ismagilova E, et al. Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management. 2021, 57: 101994. doi: 10.1016/j.ijinfomgt.2019.08.002
16. Jobin A, Ienca M, Vayena E. The global landscape of AI ethics guidelines. Nature Machine Intelligence. 2019, 1(9): 389-399. doi: 10.1038/s42256-019-0088-2
17. Mehr H, Ash H, Fellow D. Artificial intelligence for citizen services and government. Ash Cent. Democr. Gov. Innov. Harvard Kennedy Sch., (2017): 1-12.
18. Zuiderwijk A, Chen YC, Salem F. Implications of the use of artificial intelligence in public governance: A systematic literature review and a research agenda. Government Information Quarterly. 2021, 38(3): 101577. doi: 10.1016/j.giq.2021.101577
19. Munoko I, Brown-Liburd HL, Vasarhelyi M. The Ethical Implications of Using Artificial Intelligence in Auditing. Journal of Business Ethics. 2020, 167(2): 209-234. doi: 10.1007/s10551-019-04407-1
20. Shorten A, Smith J. Mixed methods research: expanding the evidence base. Evidence Based Nursing. 2017, 20(3): 74-75. doi: 10.1136/eb-2017-102699
21. Thormundsson B. Artificial Intelligence (AI) Worldwide-Statistics &Facts. Available online:https://www.statista.com/statistics/1365145/artificial-intelligence-market-size/ (accessed on 12 August 2023).
22. Thormundsson B. Global Artificial Intelligence Market Size 2021-2030. Available online:https://www.statista.com/statistics/1365145/artificial-intelligence-market-size/ (accessed on 12 August 2023).
23. The World Bank Group. Digital Adoption Index. Available online:https://www.worldbank.org/en/publication/wdr2016/Digital-Adoption-Index (accessed on 24 October 2023).
24. Schut D. Google Cloud's AI Adoption Framework: Helping you build a transformative AI capability. Available online:https://cloud.google.com/blog/products/ai-machine-learning/build-a-transformative-ai-capability-with-ai-adoption-framework (accessed on 12 August 2023).
25. Blake C, Murphy S. IBM helps ecosystem partners accelerate AI adoption by making it easier to embed and scale AI across their business. Available online:https://newsroom.ibm.com/2022-10-25-IBM-Helps-Ecosystem-Partners-Accelerate-AI-Adoption-by-Making-it-Easier-to-Embed-and-Scale-AI-Across-Their-Business (accessed on 12 August 2023).
26. Microsoft. What is Microsoft's approach to AI? Available online:https://news.microsoft.com/source/features/ai/microsoft-approach-to-ai/ (accessed on 12 August 2023).
27. Marr B. How Amazon uses Artificial Intelligence: The Flywheel Approach. Available online: https://bernardmarr.com/how-amazon-uses-artificial-intelligence-the-flywheel-approach/ (accessed on 12 August 2023).
28. Andersen L. Artificial intelligence in international development: Avoiding ethical pitfalls. Available online:https://jpia.princeton.edu/news/artificial-intelligence-international-development-avoiding-ethical-pitfalls (accessed on 12 August 2023).
29. Addo PM. Artificial intelligence, developing-country science and bilateral co-operation. Published online June 26, 2023. doi: 10.1787/4edb761e-en
30. The World Bank. Digital dividends. World Development Report (2016): 1-330.

31. Oloyede AA, Faruk N, Noma N, et al. Measuring the impact of the digital economy in developing countries: A systematic review and meta- analysis. Heliyon. 2023, 9(7): e17654. doi: 10.1016/j.heliyon.2023.e17654
32. Harve A. 7 roles of artificial intelligence in learning and development. Available online: https://www.hurix.com/role-of-artificial-intelligence-in-learning-and-development/ (accessed on 12 August 2023).
33. Ray T. Ethics of AI: Benefits and risks of artificial intelligence.Available online:https://www.zdnet.com/article/ethics-of-ai-the-benefits-and-risks-of-artificial-intelligence/ (accessed on 12 August 2023).
34. Naik N, Hameed BMZ, Shetty DK, et al. Legal and Ethical Consideration in Artificial Intelligence in Healthcare: Who Takes Responsibility? Frontiers in Surgery. 2022, 9. doi: 10.3389/fsurg.2022.862322
35. Gupta A, Mills S, Sampanthar K, Dardaman E. Getting stakeholder engagement right in responsible AI. Available online: https://venturebeat.com/ai/getting-stakeholder-engagement-right-in-responsible-ai/ (accessed on 12 August 2023).

Appendix

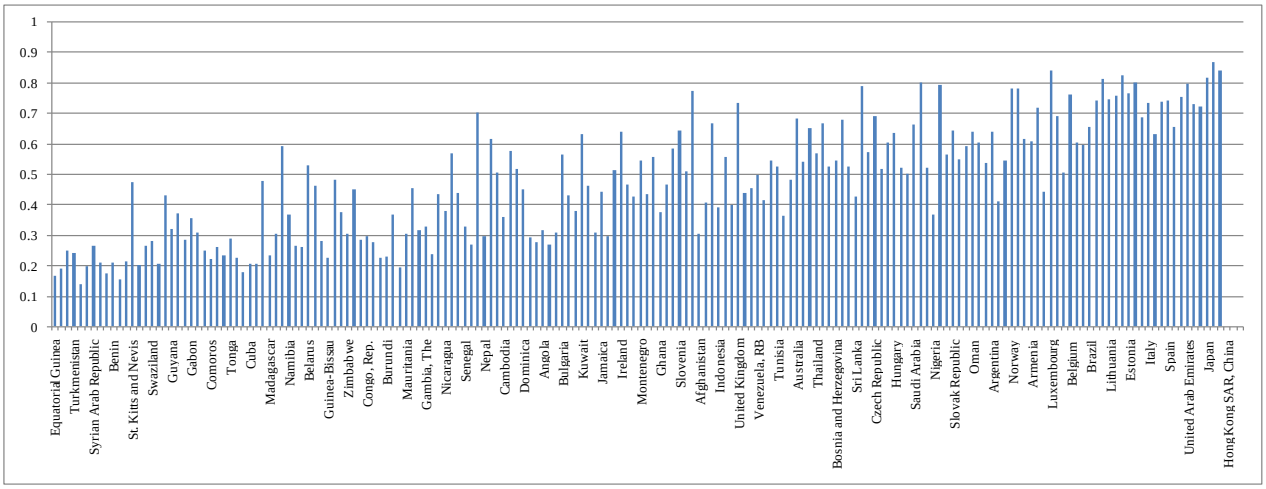

Figure A1. Graphical illustration of AI adoption index (2014).

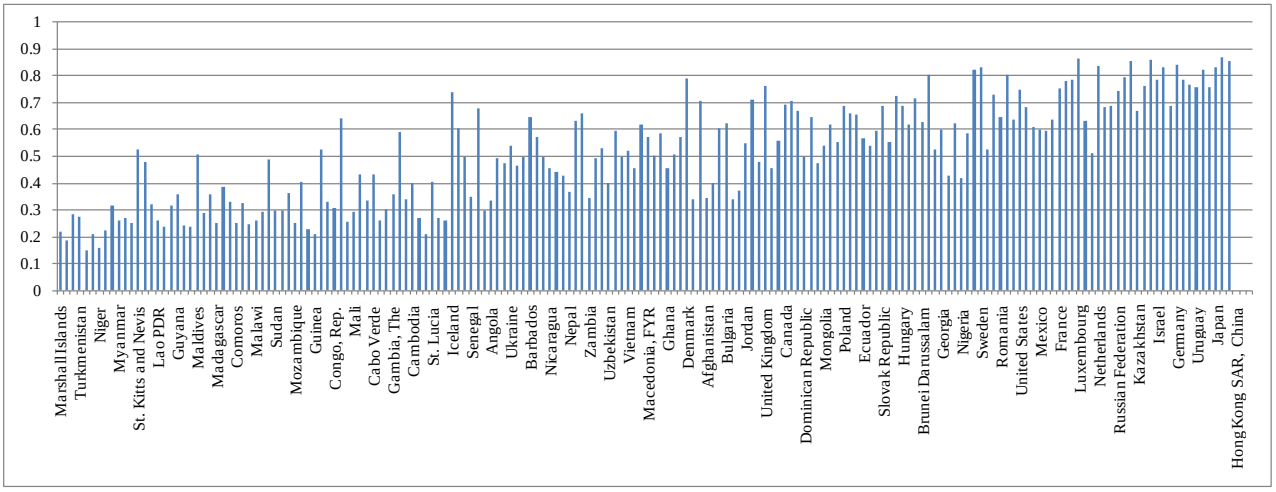

Figure A2. Graphical illustration of AI adoption index (2016).