

APRIL 2024 Building Smarter Nations:

How Governments Are Harnessing Artificial Intelligence for Global Advancement

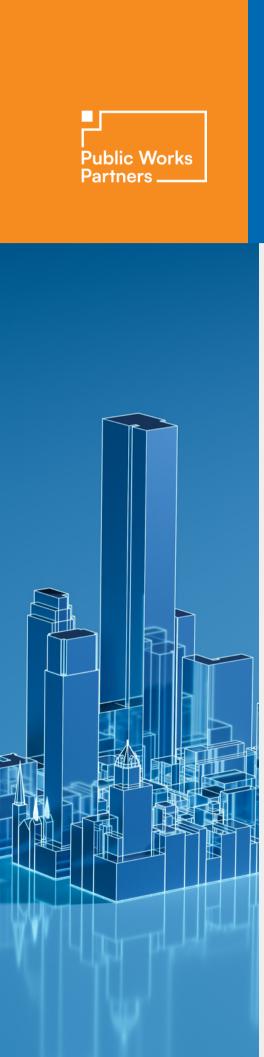
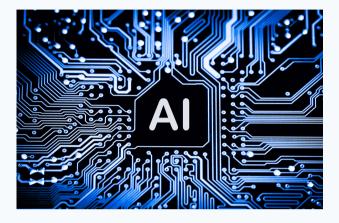


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01 Introduction



Artificial Intelligence (AI) has emerged as a transformative force in recent years, encompassing a wide range of technologies that enable machines to perform tasks that typically require human-like intelligence. From machine learning algorithms that can learn from data and make predictions to natural language processing systems that understand and generate human language, AI is reshaping the world as we know it.

Al's impact extends beyond technological advancements, revolutionizing industries, transforming societal structures, and leaving an indelible mark on economic sectors and governments worldwide.

According to Grand View Research, the global artificial intelligence market reached USD **196.63 billion** in 2023, and forecasts indicate that it will experience a remarkable compound annual growth rate (CAGR) of **37.3%** from 2023 to 2030. The ability to collect and process vast amounts of data, coupled with predictive automation capabilities and task functionalities. allows us to apply Al solutions to some of our most complex problems. Al-driven predictive analytics serve as a cornerstone for government agencies seeking to anticipate future events and trends, empowering proactive problemsolving and decision-making across critical domains such as finance, healthcare, and climate science. By analyzing what AI offers and the risks, nations can develop strategic initiatives to mitigate risks, optimize resource allocation, and drive sustainable growth.

As countries embrace AI technologies, they are one step closer to creating smarter, more resilient societies. By investing in AI research, nations position themselves at the forefront of innovation, driving progress and shaping the future of our interconnected world. Through strategic collaboration and concerted efforts, countries can use AI to address pressing global challenges, foster inclusive growth, and improve the quality of life for their citizens.

This growth is fueled by ongoing research and innovation spearheaded by tech giants. It can be observed in the widespread adoption of AI solutions across automotive, healthcare, retail, finance, and manufacturing industries

02 Al Case Studies Shaping Societies For A Smarter Future

This section explores six compelling case studies, each highlighting specific interventions where AI significantly impacts addressing societal challenges and enhancing well-being. From overall Singapore's National AI Strategy to California's innovative wildfire detection system and Barcelona's Al integration in biomedicine to London's air quality monitoring initiatives, these case studies exemplify the transformative power of AI across various sectors.

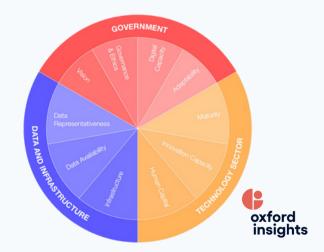
By focusing on the highlighted interventions within each case study, such as action plans, disaster preparedness, healthcare initiatives, and environmental monitoring, gain valuable insights into we how government agencies at different levels effectively leverage AI to drive progress and create positive outcomes for their citizens. Additionally, we explore the United Arab Emirates' AI healthcare plans and initiatives, underscoring their commitment to utilizing Al for national development. Through these case studies, we gain valuable insights into how government agencies at local and national levels harness AI to drive progress and create a brighter future for their citizens.

The Government AI Readiness Index, conducted by Oxford Insights, evaluates

194 countries and territories' preparedness for implementing AI in public services and internal operations. It assesses them based on 11 input metrics across four clusters: governance, infrastructure and data, skills and education, and government and public services.

The rankings highlight the dominance of countries with strong economies, ample data resources, and visionary governance. The 2023 Global AI Index ranks the United States of America first in the index, followed by Singapore second and the United Kingdom third. This marks a shift from 2019 when Singapore held the first position in the index.

The Pillars of the Government Al Readiness Index



CASE STUDY #1 Singapore City, Singapore

In 2019, Singapore introduced its first National AI Strategy, outlining plans to improve the use of AI and transform its economy. Their investment in AI led to the establishment of about 150 teams working on research and development and 900 startups exploring new ideas with Al. In 2023, they launched the Singapore National Al Strategy 2.0 (NAIS 2.0) to continuously empower individuals, businesses, and communities to utilize AI with confidence, discernment, and trust. The objective is to position AI as a powerful equalizing force, providing people and businesses with the necessary capabilities and resources to flourish in a future enabled by Al.

In his foreword to the Singapore National AI Strategy, the Prime Minister of Singapore acknowledges that despite the country's small size and limited resources, Singapore can still become a leader in Al. He emphasizes the importance of focusing on Al research and development, fostering collaboration between the government, industry, and research institutions, and deploying AI solutions in key sectors while anticipating and addressing the social challenges posed by Al. The Prime Minister expresses confidence that by following this Singapore will succeed approach, in becoming a leading country in Al and a Smart Nation for its citizens.

In 2019, Singapore promised to lead five National AI Projects to achieve significant social and economic benefits for Singapore and its citizens. These initiatives will drive investments in AI research, create demand to attract and retain talent and expertise within Singapore and shape the development of the country's digital infrastructure to support these endeavors.

Singapore's Current AI Projects

- Intelligent Freight Planning: Optimize freight movement to improve business productivity and traffic efficiency.
- Seamless and Efficient Municipal Services: Make municipal services more responsive, reliable, and timely.
- Chronic Disease Prediction and Management: Prevent and better manage chronic diseases.
- Personalized Education through Adaptive Learning and Assessment: Aide teachers to better customize and improve the learning experience for every student.
- Border Clearance Operations: Strengthen border security while improving traveler experience.

These National AI Projects will catalyze the advancement of AI deployment and showcase its tangible benefits. To ensure the enduring advantages of AI, efforts will be intensified to bolster the ecosystem enablers that stimulate innovation and widespread adoption of AI across various sectors of the economy.



Their strategy outlines five pivotal ecosystem enablers:

- 1. Triple Helix Partnership between the Research Community, Industry, and Government: Will enable the rapid commercialization of fundamental Al research and deployment of Al solutions
- AI Talent and Education: Address the shortfall in the quantity and quality of talent across the entire range of Alrelated job roles.
- 3. Data Architecture: Enable quick and secure access to high-quality, cross-sectoral datasets.
- 4. Progressive and Trusted Environment: Strengthen trust in AI technologies to enable an environment for test-bedding, developing, and deploying AI solutions.
- 5. International Collaboration: Work with international partners

According to the Singapore National Al Strategy 2.0 (NAIS 2.0), Singapore's visions and goals involve attracting more top-tier researchers and engineers to collaborate within and from Singapore. Additionally, they aim to expand their technology workforce to effectively scale innovative AI solutions, which will serve as essential tools for enterprises and workers. In July 2023, of Communications the Ministry and Information (MCI), Digital Industry Singapore (DISG), Smart Nation and Digital Government Office (SNDGO), in collaboration with Google Cloud, introduced Al Trailblazers.

This pioneering rapid prototyping endeavor marked a global first, granting businesses and government agencies access to Google Cloud's AI tool sets for up to three months. The initiative aimed to cultivate 100 Generative AI use cases spanning both private and public sectors. Josephine Teo, Singapore's Minister for Communications and Information, introduced the AI Trailblazers initiative during a launch event hosted at the Google Asia Pacific campus. By partnering with industry leaders to establish an innovation sandbox for Al development, Singapore not only ignited increased experimentation but also instilled confidence in numerous business owners to invest resources further, having witnessed the potential of AI in achieving their business objectives. Not only that, Deputy Prime Minister Lawrence Wong recently stated in his budget speech that Singapore will invest more than 1 billion Singapore dollars over the next five years to boost the country's AI capabilities further.

Singapore's steadfast commitment to advancing artificial intelligence through initiatives like the National AI Strategy underscores its dedication to understanding the potential of AI for the benefit of its citizens and economy. By leading in the development of AI projects across key sectors such as freight planning, municipal services, healthcare, education, and border security, Singapore aims to enhance productivity, efficiency, and overall societal well-being.

CASE STUDY #2 California, USA

The State of California is susceptible to various disasters, with notable occurrences stemming from heavy rainfall leading to flooding and storm damage, wildfires, and earthquakes. For instance, between 1950 and 2017, the Governor issued 309 State of Emergency declarations, with approximately 40 percent attributed to floods and about 30 percent linked to wildfires.

California has been plagued by devastating obliterating wildfires thousands of residences and commercial properties and tragically taking the lives of hundreds. In 2020, the wildfire season resulted in 31 fatalities and the scorching of a staggering 4.1 million acres. The North Complex fire alone accounted for more than 300,000 acres of burned land, claiming the lives of 16 individuals. The severity of the fires is evident not only in the number of fires, as reported by Cal Fire with nearly 10,000 incidents recorded, but also in their unprecedented scale.

In 2023, to address these challenges, <u>ALERTCalifornia</u>, based at the University of California San Diego, collaborated with CAL FIRE and industry partner Digital Path to develop an innovative AI system designed for wildfire detection.

This AI technology can assist firefighters, alleviate watchstander fatigue, reduce false alarms, and confirm fire incidents during their initial stages. When the AI system detects a potential fire within ALERTCalifornia's extensive network of over 1,050 cameras, it promptly alerts firefighters while providing a percentage of certainty and estimated location for the incident.



ALERTCalifornia Camera Feeds Image source: alertcalifornia.org

ALERTCalifornia cameras can perform 360degree sweeps approximately every two minutes and can view as far as 60 miles on a clear day and 120 miles on a clear night. Once trained watchstanders validate the incident, firefighters swiftly respond to extinguish the fire during its early stages. The camera network provides actionable real-time data to allocate fire resources efficiently, aid in evacuations, and monitor fire behaviors. In September 2023, the AI tool was made accessible to all 21 CAL FIRE 911 Dispatch Centers, identifying over 1,200 fires throughout California, surpassing 911 call reporting by more than 30% of the time. It excels in detecting anomalies in remote areas and has demonstrated effectiveness during nighttime operations. The foundation of the ALERTCalifornia network rests on over two decades of research conducted at UC San Diego. The AI platform empowers data-driven decision-making, thereby saving lives and infrastructure.



embers light up hillsides as the Dixie Fire burns near Milford in Lassen County, California, U.S., Aug. 17, 2021. Image source: Associated Press

Recently, February 15, 2024, on the California Council on Science and Technology (CSST) hosted a panel titled "Leveraging AI for a Disaster Resilient California" during Science and Technology Week 2024. This event brought together a diverse group of experts to explore the potential of artificial intelligence (AI) in of mitigating the impact disasters. particularly within California's environmental challenges and the escalating effects of climate change. The panelists explored how Al could transform disaster preparedness, response, and recovery efforts, aiming to enhance the safety of Californians in the face of various natural and human-made disasters. Amy Tong, California's Secretary for Government Operations, referred to Governor Gavin Newsom's Executive Order,

which outlined a strategic approach to developing and utilizing generative AI, acknowledging the excitement and apprehension surrounding this emerging technology. Tong emphasized the state's commitment to piloting AI initiatives with the goal of fully understanding its potential. She noted, "With 35 of the 50 generative AI companies headquartered in California, we wanted to create an environment where innovation and creativity are celebrated...while at the same time providina necessarv quardrails to responsibly use this technology."

This discussion signifies a pivotal moment in rethinking disaster management strategies and reflects California's proactive approach to leveraging advanced technologies in pursuit of resilience.

As California continues to grapple with the escalating effects of climate change and increasingly severe natural disasters, its embrace of advanced technologies exemplifies a forward-thinking approach aimed at safeguarding the well-being of its residents and fostering resilience in the face of adversity.



ALERTCalifornia Installations Image source: alertcalifornia.org

CASE STUDY #3 New York City, USA

In an effort to respond to the growing use of Al, New York City Mayor Eric Adams, alongside Chief Technology Officer Matthew Fraser, unveiled the "New York City Artificial Intelligence Action Plan" in 2023. This comprehensive plan, the first of its kind for a major U.S. city, aims to establish a framework for city agencies to meticulously assess AI tools and associated risks. It also seeks to enhance the AI knowledge and skills of city government employees and promote the responsible deployment of these technologies to enhance the quality of life for New Yorkers.

The plan integrates efforts to embrace responsible AI tools into the MyCity portal. In collaboration with New York City Department of Small Business Services (SBS) Commissioner Kevin D. Kim, Mayor Adams launched the MyCity Business site, featuring the city's first citywide AI chatbot pilot.

This initiative aims to connect business owners and aspiring entrepreneurs with resources to start, operate, and grow businesses in New York City more efficiently. With the AI chatbot, business owners will gain easier access to trusted information from **over 2,000 NYC Business web pages.**

The New York City Artificial Intelligence Action Plan introduces a series of steps that the city will take to assist agencies in evaluating risks associated with Al tools and determining their suitability for improving outcomes for New Yorkers. Developed with input from 50 city employees from 18 agencies, as well as insights from industry, academia, and civil society, this plan underscores a collaborative effort to ensure responsible Al integration.

The plan outlines **37 key actions**, with **29** slated for initiation or completion within the next year.

NYC ANNOUNCES NEW MYCITY BUSINESS PORTAL

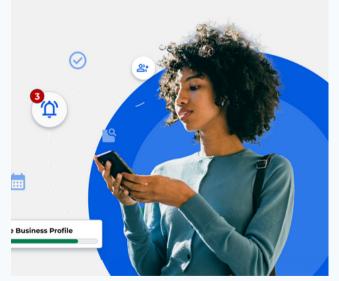


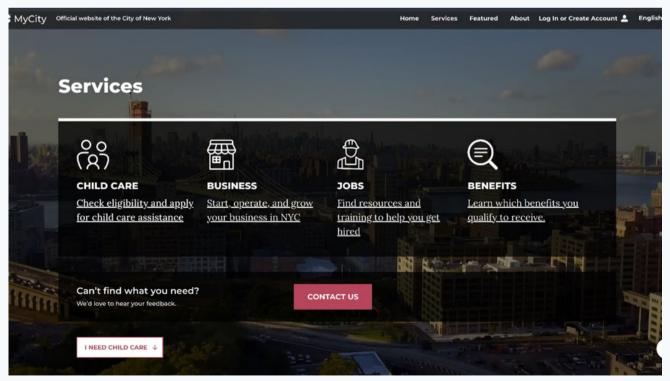
Image source: SoHo Broadway Initiative

Notable initiatives include establishing a governance framework for AI that addresses risks such as bias, creating an external advisory network to engage stakeholders on AI opportunities and challenges, enhancing AI skills among city promoting responsible personnel, AI procurement practices, and issuing an annual AI progress report to keep stakeholders informed about the city's advancements.

Despite the commendable efforts outlined in the New York City Artificial Intelligence Action Plan, the city still has much ground to cover, particularly in leveraging AI for transportation and human rights causes. While initiatives like the MyCity Business site showcase promising steps forward, actionable AI plans targeting transportation needs remain imperative. In cities like NYC, where the MTA faces daily challenges, AI presents a promising avenue for solutions. By continuing to develop actionable plans and leveraging AI technologies effectively, the city can unlock greater benefits and further enhance the quality of life for its residents



Mayor Adams launches first phase of MyCity Portal Image source: nyc.gov



MyCity Business site Image source: nyc.gov

CASE STUDY #4 Barcelona, Spain

City Council Barcelona The of has spearheaded a comprehensive municipal technical strategy to bolster ethics and reliability within the city's technological framework. With a primary focus on fostering scientific progress and ensuring the digital rights of its residents, this strategy prioritizes the integration of AI into public services. The Council is dedicated to ensuring a just digital transition that upholds citizens' rights while promoting the city's advancement. An important principle in the strategy is technological humanism. This should be understood as a human-centered development technological model that social reduces inequalities, safeguards human rights, and puts technology at the service of the people and general interests. Barcelona is also one of the initiators of the Coalition of Cities for Digital Rights, a network of cities that promotes and defends digital rights in the urban context.

Housed in the Barcelona SuperComputing Center (BSC), MareNostrum is one of the most powerful computers in Europe. Its work consists of generating knowledge through a number of scientific disciplines, such as astrophysics and biomedicine. The BSC is a research center that provides supercomputing services to the entire scientific community. Research into climate change and radiation therapies for cancer are just some examples.

<u>The Barcelona Supercomputing Center</u> has created AI algorithms for evaluating medical pictures, while the Valencia Institute of Biomechanics is working on Al-powered prosthetic devices. Moreover, The Spanish Ministry of Health has also developed a number of projects to promote the use of artificial intelligence (Al) in healthcare, including the Al Strategy in Health programme and the Al Observatory in Health

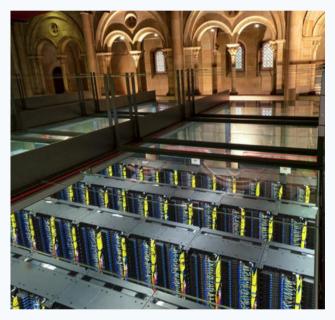


Image source: Barcelona Supercomputing Center - National Supercomputing Center (BSC-CNS)/Creative Commons

Additionally, <u>Almirall,</u> global а pharmaceutical company specializing in medical dermatology, has a partnership with the Barcelona Supercomputing Center and Nostrum Biodiscovery. The collaboration, ARTIBAND, aims to utilize artificial intelligence and machine learning generative techniques to design innovative protein-protein modulators for treating dermatological diseases.

By leveraging AI, Almirall seeks to advance the protein-protein modulator design process, thereby addressing dermatological therapy challenges. The collaboration spans three years, starting with developing and training AI models using publicly available data. Subsequently, the technology will be optimized and applied to identify new protein-protein modulators.

Furthermore, UIC Barcelona's Observatory on Artificial Intelligence and New Technologies (OIANT) aims to prepare students for the future by teaching them about AI and other emerging technologies and ensuring this knowledge benefits society. These technologies affect various aspects of life, including work, personal, and social interactions.

The OIANT also focuses on providing interdisciplinary education to undergraduate students, ensuring they have the necessary AI. robotics, and 3D printing skills. Furthermore, it promotes discussions on the ethical and social impacts of these technologies through like events conferences, seminars, and expert sessions, fostering awareness and understanding among the public.

Moreover, Barcelona continues empowering all its citizens to thrive in the digital age.

This effort is exemplified by hosting the <u>Women in Data Science (WiDS) Barcelona</u> <u>Biomedicine Conference</u> in 2022 and 2023. The Women in Data Science (WiDS) initiative seeks to motivate and educate data scientists globally, regardless of gender, while assisting women in the field. WiDS Barcelona Biomedicine emphasizes gender diversity by showcasing the achievements of notable female scientists in biology, biomedicine, and digital health

By prioritizing technological humanism and actively participating in initiatives like the Coalition of Cities for Digital Rights, Barcelona demonstrates a clear dedication to ensuring that technology serves the best interests of its residents while upholding their rights. Moreover, the city's investment in cutting-edge research, exemplified by institutions such as the Barcelona Supercomputing Center, showcases а technological innovation approach that encompasses scientific progress and social responsibility.

As Barcelona continues to empower its citizens and pave the way for ethical and inclusive technological development, it sets a standard for cities worldwide to follow in fostering a digital future that benefits all.



Case Study #5 London, United Kingdom

The urgent issue of pollution in London, affecting the lives of over 9,000 Londoners annually due to poor air quality, is a wellknown concern. To tackle this issue, the <u>Alan Turing Institute</u>, Britain's national data science and artificial intelligence institute, has launched a thorough solution. They're implementing citywide sensors with advanced algorithms and data analytics to monitor pollution levels effectively.

This groundbreaking research aims to not only inform government policies but also to alleviate London's air quality challenges significantly. While there have been notable improvements in air quality over recent years, particularly attributable to emission reduction policies, the severity of the issue persists, especially in areas exceeding NO2 EU Limit Values. Consequently, further enhancements are imperative for public safeguarding health. Moreover. according to the Alan Turing Institute, there is a *paradigm shift* in air quality monitoring with the proliferation of affordable sensors, enabling monitoring at numerous locations across the city.



Image source: Photo by Mario Rio La Pergola on Unsplash

This project endeavors to leverage these advancements by developing machine learning algorithms, data science platforms, and statistical methodologies to integrate data from diverse sources and accurately forecast air pollution levels across London. Recent events, such as Dr. Theo Damoulas's presentation at the **BCS-IET Turing Talk** 2020 and the inclusion of Juan Maronas into the project team, highlight the ongoing commitment to innovation and collaboration in this crucial endeavor.

Additionally, the project aims to develop APIs and mobile apps to provide accessible air quality data and forecasts for Londoners, alongside graph optimization algorithms to identify less polluted routes for pedestrians and cyclists. These initiatives showcase a multifaceted approach aimed at improving London's residents' air quality and overall well-being.

The initiatives undertaken by the Alan Turing Institute represent a significant step forward in addressing London's air quality crisis. By using the power of advanced algorithms and data analytics, coupled with the proliferation of affordable sensors, this comprehensive approach holds promise for substantial improvements in public health and environmental sustainability. With dedication ongoing to research, development, and responsible deployment, London is leading the way in leveraging Al to improve urban life and well-being.

CASE STUDY #7 The United Arab Emirates

According to AI Business magazine, the United Arab Emirates (UAE) stands at the forefront of the AI movement. In 2017, the UAE introduced a national AI plan with the aim of establishing itself as a global AI hub by 2031. This comprehensive strategy involves the integration of AI across various sectors, including healthcare for enhanced diagnostics, transportation for the advancement of autonomous vehicles, and education for personalized learning experiences.

The UAE government is embracing Al technology, with a particular focus on **ATRC's Falcon Gen Al.** Their latest endeavor, Al71, stands out for its provision of access to local companies' private data, facilitating the development of Al models using detailed information from sectors such as healthcare, oil and gas, and aviation.

Not only that, the UAE Council for Artificial Intelligence and Blockchain has been established to propose policies aimed at fostering an Al-friendly ecosystem, advancing research in the field, and facilitating collaboration between the public and private sectors, as well as international institutions, to expedite the adoption of Al.

Al is also impacting healthcare practices in the UAE. By analyzing extensive patient data, Al enables the identification of population health patterns and offers insights that enhance patient care and overall outcomes. Naser Al Riyami, the Chief Operating Officer at Burjeel Medical City in Abu Dhabi, highlights the significant impact of digitalization and Al on the healthcare sector in the UAE. Since 2021, Burjeel Medical City has been leading innovative healthcare practices by integrating holographic technology into surgical planning.

This revolutionary approach involves generating replicated 3D images of a patient's organs, enabling surgeons to gain a deeper understanding of the patient's before anatomy performing surgery. Holographic surgery represents а significant advancement in precision and patient safety.



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Holographic surgery represents a significant advancement in precision and patient safety. Al algorithms can identify patients at risk of developing specific conditions, enabling early intervention and personalized treatment strategies. For example, Prime Hospital in the UAE utilizes an Al-powered healthcare technology platform global called Heaps to monitor patients with chronic conditions, track deviations in their care, and predict potential issues leading to hospitalization. This proactive approach aims to minimize avoidable hospital admissions and enhance patient care.

Through strategic investments and collaborative frameworks such as the UAE Council for Artificial Intelligence and Blockchain. the UAE is laying the groundwork for а future where AI contributes significantly economic to societal well-being, growth, and technological advancement. As evidenced by the applications in healthcare, like holographic surgery and predictive analytics, the UAE's embrace of AI promises to revolutionize patient care.



Simulation of surgeons using hologram during surgery Image source: ARC Centre of Excellence for Transformative Meta-Optical Systems

03 Diversity and Collaboration Define the Future of Al Readiness

The latest global findings from the Oxford Insights Government AI Readiness Index reveal a notable shift in AI readiness, signaling a future marked by diversity and collaboration. While the overall number of AI strategies released annually is on a downward trend, there's a discernible increase in diversity, with half of the AI strategies unveiled in 2023 originating from low and lower-middle-income countries. This shift indicates a more inclusive approach to AI adoption worldwide.

Moreover, 2023 witnessed a surge in international cooperation, particularly concerning AI governance and ethics. This trend reflects a growing recognition of the importance of global collaboration in navigating the ethical and regulatory complexities of AI.

Richard Stirling, CEO of Oxford Insights, remarked, "In a year characterized by numerous high-profile AI summits, the rise in international collaboration, especially on AI governance, is noteworthy, alongside the broader adoption of national AI strategies by a more diverse range of countries. However, significant digital disparities persist, posing challenges exacerbated by varying levels of infrastructure and technological development among nations." This evolving landscape hints at a future where AI readiness is not only more inclusive but also guided by concerted efforts to address ethical and regulatory considerations on a global scale



04 Conclusion

All 6 of these case studies showcase how Al is shaping the landscape of various governments across the globe, from Singapore to the United Arab Emirates. The growth of the global Al market portrays the significance of this technology in addressing diverse obstacles.

Through case studies examining AI Singapore's National Strategy, California's wildfire detection system, New York City's Artificial Intelligence Action Plan, Barcelona's integration of AI in medical science, London's efforts to combat air pollution, and the United Arab Emirates' healthcare practices, we witness the diverse applications of Al.

These case studies highlight how countries are leveraging AI to improve governance, enhance public services, mitigate disasters, and promote sustainability. From predicting chronic diseases to monitoring air quality and detecting wildfires, AI is improving how governments and societies approach critical issues.

Moreover, these case studies highlight the importance of responsible AI deployment, ethical considerations, and the need for collaboration between governments, industries, academia, and civil society to maximize the benefits of AI while minimizing risks.

As governments continue to invest in Al research, it is imperative to prioritize inclusivity, transparency, and accountability to ensure that AI serves the best interests of all citizens. By deepening our understanding of AI while upholding ethical standards and safeguarding human rights, countries can create a more equitable, resilient, and sustainable future for generations to come. These examples serve as inspiration for nations worldwide to leverage AI for the benefit of humanity.



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