Digital Government Authority
هيئة الحكومة الرقمية

Generative AI in Digital Government

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Contents

1. Executive Summary

"GenAI in Digital Government" study aims to assess the current state of AI adoption, explore the economic impacts, analyze its integration within Saudi Arabia's digital governance, identify key challenges, and develop strategic recommendations for policymakers and stakeholders. The primary objective of this study is exploring the possibility of locally benefiting from GenAI technologies effectively, optimizing them to enhance government services. Presented below are key statistics highlighting the importance of GenAI:

- $135 Bn AI's projected contribution to GDP by 2030
- $40 Bn Investment in AI announced by the Saudi government
- $11.7 Bn Potential upside in Operating Profit for the technology, media and entertainment, telecom and healthcare sectors [1]
- 90% of experts believe Generative Artificial Intelligence can create new jobs

GenAI Benefits for Public Sector

Software Solution Development: Accelerates software development by generating reusable code snippets and automating debugging, reducing development time.

Reduce Operational Costs: Reduce operational costs by automating routine tasks, enabling resource reallocation, and reducing manual labor expenses.

Increased Productivity and Operational Efficiency: By automating routine tasks such as document and report preparation and providing quick access to relevant information across multiple datasets, the time spent on routine activities is reduced. This enables more efficient resource utilization, streamlining workflows.

Enhanced Decision-Making: Provide real-time access to critical data for legal teams and intelligence operations.

Providing Personalized Public Services: Simplifies and personalizes government services, making processes more accessible with tailored information and steps.

Streamlined Beneficiary Experiences: Delivers seamless experiences by automating real-time support, and ensuring 24/7 service availability for beneficiary.

Promotes Innovation: Provides environments and incubators for innovation by generating new ideas for public programs, analyzing extensive datasets to identify emerging trends, and suggesting innovative policies.

While the primary focus of this study is on the benefits of Generative AI for the public sector, it is important to note that GenAI solutions can be used in the private sector to achieve the same gains in enhancing operational efficiency, productivity, decision-making, and developing innovative solutions, in addition to addressing various challenges, Table 1 illustrates the use cases and transformative potential of GenAI across various government sectors.

Impact of Generative AI across Multiple Sectors

Table (1) highlights a diverse range of use cases for generative AI across multiple sectors, demonstrating its transformative potential to enhance operational efficiency, improve decision-making, and deliver innovative solutions. These use cases are categorized by sector and arranged along a gradient of impact, from high to low.

Sector	Use Cases				
Public Services	Enhancing public service delivery and operational efficiency through automation and continuous analysis	Enhancing the efficiency of central authorities through improved strategies and resource allocation	Policy Analysis & Program Design	Regulatory Monitoring & Compliance Automation	Administrative Streamlining & Support Automation
Technology	Accelerated Tech Solution Development through improving design, programming and performance testing.	Optimizing IT Infrastructure Management through smart planning and operation	Marketing Content Generation	Automated Lead Prioritization & Engagement	Customer Value management through preference analysis and personalized recommendations
Media & Entertainment	Creative Content Generation	Personalized Content Delivery	Targeted Advertising Campaigns	Automated Production Planning	Automated Content Editing
Telecom	Enhancing customer value through data analysis and personalized recommendations.	Optimized Network Management	Tailored Product Development that meet client needs through advanced data analysis	Conversational Customer Service AI	Creating and distributing Personalized Marketing Content to increase engagement and attract customers
Healthcare	AI-Assisted Medical Diagnosis	Accelerated Drug Discovery	Automated Medical Record Management	Virtual Assistants for Patient Interaction	Operational Planning & Resource Management
Energy & Resources	Exploration and Extraction Optimization	Predictive Maintenance Planning	Demand Forecasting	Risk Identification & Safety Management	Energy and Resources Infrastructure Smart Management through optimized planning and operation

High Impact ← **Low Impact**

Table (1): Generative AI Use Cases Across Government Sectors and Their Impact on Operational Efficiency and Cost Effectiveness

Sector	Use Cases				
Education	Assessment, Grading and Feedback	Educational Content Creation	Student Administrative Assistant	Improving Personal Productivity in Education through accelerating tasks and organizing operations	Personalized Tutor
Transport	Intelligent Traffic Management	Passenger Service and Support through smart chatbots	Data Analytics Self-Service	Maintenance Process Guidance	Synthetic Data for AI Training
Public Security	Regulatory and Grant Reports	FOI support for public safety	Nonemergency Incident chatbot	Public Safety Training	Enhance intelligence analysis through open-source solutions and smart analytics
Tourism	Enhanced Customer Service through providing continuous support and smart solutions.	Dynamic Pricing & Revenue Management	Personalized Travel Planning	Language Translation	Travel Content Creation
Housing	Improving Customer Support	Generating Property Descriptions	Creating images from property descriptions	Creating AI-Powered Visualizations	Generating Engaging Social Media Copy at Scale
Agriculture	Enhance Precision Agriculture through data analysis and drawing accurate field mapping	Autonomous Farm Equipment	Crop Yield Prediction	Pest and Disease Detection	Improve Livestock Management through data analysis to improve nutrition, health and productivity

Table 1: Generative AI Use Cases Across Government Sectors and Their Impact on Operational Efficiency and Cost Effectiveness

Detailed explanations and additional insights into these use cases are provided in the Appendix. This appendix offers an overview of how Generative AI aligns with sector-specific goals and opportunities.

Key findings from interviews with Experts & Leaders in the Field

94%

of leaders believe that GenAI plays a crucial role in supporting and facilitating ongoing digital transformations.

100%

There is a consensus among experts on the capacity of GenAI to stimulate economic growth, catalyze innovation, enhance productivity.

As Saudi Arabia advances its integration of GenAI across various sectors, it is important to address the ethical and legal considerations to align with both global standards and national regulations. Key ethical concerns include ensuring AI transparency, avoiding biased decision-making, and protecting privacy, particularly in handling personal data in accordance with Saudi Arabia's Personal Data Protection Law.

Ethical & Legal Considerations


Fair Use


Reliability & Safety


Transparency & Explainability


Accountability & Responsibility


Privacy & Security


Humanity


Social & Environmental Benefits

General Recommendations

Develop an Implementation Strategy: Establish a comprehensive GenAI implementation plan aligned with national priorities and Saudi Vision 2030.

Adopting A Collaborative Approach: Foster collaboration among government entities, stakeholders, academia, and professional associations for knowledge sharing and spreading the culture of artificial intelligence in a scientific and deliberate way.

Creating Dedicated Platforms: Create centralized platforms for government entities to collaborate, share insights, and address GenAI adoption challenges.

Developing Regulatory Frameworks: Develop frameworks to address ethical, legal, and societal implications, ensuring transparency, accountability and subjectivity.

Skills Development: Providing continuous development programs and training for government employees and invest in AI research and development.

Raising Public Awareness: Implement initiatives to raise public awareness about GenAI, emphasizing its benefits and addressing concerns to foster trust and acceptance.

2. Introduction

In a world increasingly driven by data, the ability to harness AI to generate insightful, actionable content from vast digital platforms is becoming indispensable. GenAI is a technological breakthrough which marks a possible pivotal shift in public administration, offering unprecedented opportunities to reshape how governments operates efficiently, makes decisions and delivers services.

GenAI has evolved from pattern recognition to a robust technology capable of generating unique content from large data sets. Defined by IBM as "deep-learning AI models that can take raw data and "learn" to generate statistically probable outputs when prompted, At a high level, generative models encode a simplified representation of their training data and draw from it to create a new work that's similar, but not identical, to the original data"[2], In this regard, the Digital Government Authority emphasized on GenAI's versatility across various outputs—including texts, images and videos—enabling countless applications and opportunities. Figure (1) presents an outline of the history of Generative Artificial Intelligence:

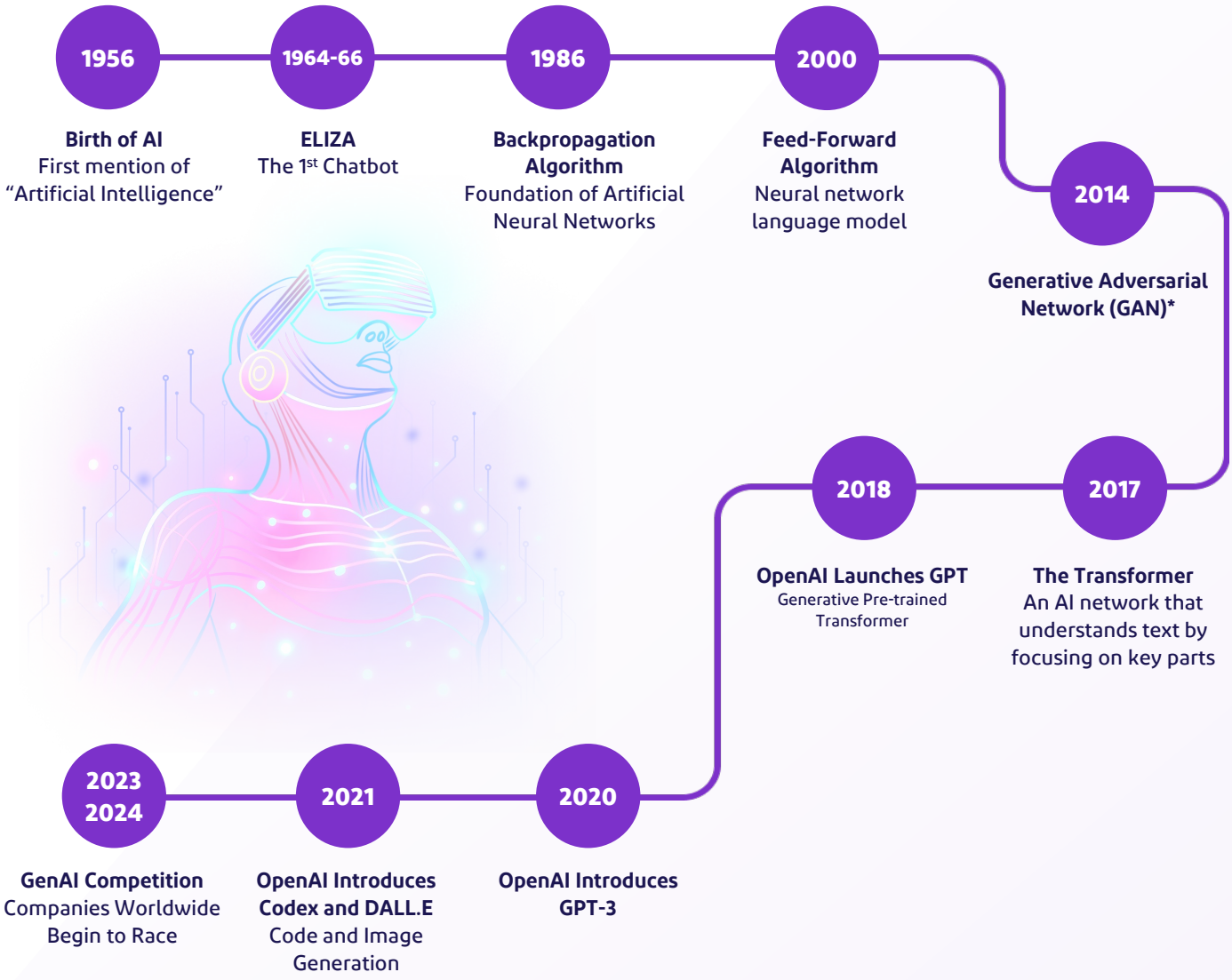

Figure (1): History of Generative Artificial Intelligence

* A Generative Adversarial Network (GAN) is a type of AI that has two parts: a generator that creates data, and a discriminator that judges its realism. They compete to improve the data's quality.

The Digital Government recognizes the importance of harnessing GenAI's potential, and this is notably underscored by Saudi Arabia's announcement to invest $40 billion in Artificial Intelligence, reflecting a significant commitment to become a leader in the digital landscape [3] By 2030, AI is projected to contribute up to USD 135 billion to Saudi Arabia's GDP, highlighting the importance of investing in this technology [4] The integration of GenAI in Saudi Arabia aligns closely with the fulfillment of the Digital Government Strategy pillars, particularly addressing pressing issues such as efficiency, accessibility, and innovation in government services.

Digital Government Strategy (DGS) Pillars:

Satisfied Citizen

Personalize digital services to Saudi citizens through life milestones, to ensure Saudi citizen satisfaction from the use of digital services and strengthen their engagement to increase trust in government.

Enabled Business

Improve ease of doing business in KSA through a digitally integrated business sector, and build a digital-first business ecosystem, by providing economic added value to the private sector and enhancing Saudi competitiveness of the local economy.

Effective Government

Operate as one government digitally to remove duplication, improve evidence-driven government decision making across government in KSA, reduce government expenditure and increase use of common shared services.

Efficient Investment

Channel KSA government investment to increase private sector participation, grow FDI and DDI inflows, extract more value from expenditure, and optimize local content development in KSA.

Regulated Ecosystem

Build a universal digital ID & trust ecosystem used by Saudi citizens, a future-proof harmonized, and adaptive digital regulatory regime to achieve universal uptake of a trusted national digital identity in KSA.

Expedited Transformation

Accelerate the digital transformation of KSA by working closely with the government entities and provide national leadership and guidance in innovation, cloud computing, open source, enterprise architecture, and the future of digital government.

This national strategic focus not only propels public sector towards becoming a digital-first nation—one of the key principles within the regulatory framework for digital government operations—but also reinforces its position as a leader in technological adoption in the Middle East and globally. Saudi Data & AI Authority (SDAIA) plays a pivotal role in this advancement, serving as a key driver of GenAI initiatives across the Kingdom.

The significance of this study stems from Saudi Arabia's commitment to its Vision 2030 and accelerated digital transformation, A key driver for this transformation is the exponential growth of the GenAI market both regionally and globally, The Digital Government aims to be a key player in the adoption of GenAI through their significant investments in the field.

This study is structured around six key objectives:

01

Assess the Current State of AI Adoption:

Studying the existing landscape of AI adoption within the digital economy of Saudi Arabia, emphasizing means of its integration in public services and digital governance structure.

02

Explore Economic Impacts:

Investigate the potential economic impacts of GenAI on job creation, innovation, and enhancing efficiency and productivity in the public sector.

03

Analyze Impact and Evolution:

Analyze the specific impacts of integrating GenAI into the digital government and assess its prospective evolution within this context.

04

Identify Key Challenges:

Examine the key challenges and barriers faced in adopting GenAI technologies within the public sector, focusing on technical, ethical, and operational hurdles.

05

Providing Recommendations & Suggestions:

Propose actionable strategies and guidelines for policymakers and stakeholders to facilitate the sustainable integration of GenAI technologies in the public sector.

06

Highlight Ethical & Legal Considerations:

Identifying the ethical and legal considerations when integrating this technology as per the guidelines provided by the Saudi Authority for Data and Artificial Intelligence (SDAIA).

The study aims to tackle these objectives using 3 main methods:

1. **Interviews and Literature Reviews:** Given that GenAI is an emerging technology, a combination of theoretical foundation and expert interviews was used as an exploratory and discovery-oriented approach. This methodology is shedding light on the potential ramifications of integrating GenAI into Saudi Arabia's digital economy.

2. **Desktop Research:** Comprehensive review of existing documents, reports, and statistics on GenAI and its applications in the public sector, in addition to analyzing global trends and lessons learned for all sectors from various practices..

3. **Operational Efficiency Impact Assessment (Appendix 1):** The impact of GenAI use cases on operational efficiency across various government sectors was evaluated through a bottom-up analysis. The assessment explores several use cases, highlighting their potential to drive cost reductions and productivity improvements.

3. Significance of Generative AI

The integration of Generative Artificial Intelligence (GenAI) into the public sector promises to bring substantial enhancements in efficiency, decision-making, and citizen engagement. This section will explore the significance of GenAI from three perspectives: a global perspective, a public sector focused perspective, and a local perspective covering benefits and specific applications. By examining these dimensions, it is possible to understand how GenAI can revolutionize public services provided through new innovative solutions. While current opportunities highlight substantial improvements in efficiency, decision-making, and beneficiary engagement, GenAI promises to provide a continuous development environment, further enhancing the public sector's ability to address emerging challenges and capitalize on future technological innovations on a consistent basis.

3.1 Global Perspective

The journey to leveraging GenAI does not necessitate substantial initial investments in technology. Instead, an adaptive approach, characterized by experimentation and continual development. By strategically deploying GenAI in targeted areas, public sector leaders can achieve significant improvements in service quality, operational efficiency, and beneficiary engagement. This strategy minimizes risks and builds the necessary skills and capabilities to expand these initiatives effectively.

Shown in figure 2 is a forecast of the GenAI revenue projected from studies conducted by the International Data Corporation (IDC) [5] and Bloomberg Intelligence [6].

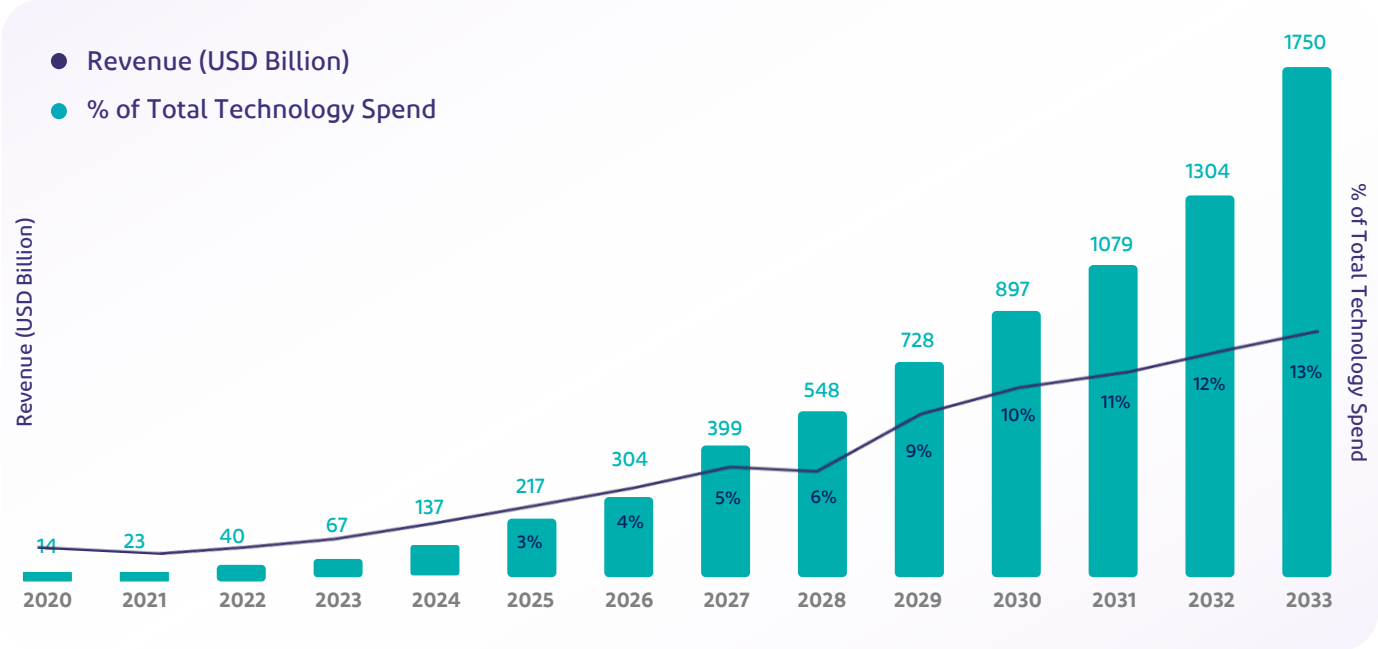

Figure (2): Forecast of the GenAI revenue

GenAI offers a transformative opportunity for government entities worldwide. By automating routine tasks, governments can reduce costs and reallocate resources to strategic initiatives. Predictive analytics will enable proactive responses to healthcare and disaster management challenges. This integration of GenAI across various domains will result in more efficient, responsive, and effective governance. Consequently, both beneficiaries and businesses will benefit from the innovative applications of GenAI.

According to Boston Consulting Group (BCG) and in line with the previous figure (3), the productivity gains of GenAI for the public sector will be valued at $1.75 trillion per year by 2033 [7]. Figure (3) reflects the productivity gains of countries across all domains such as legislative, administrative, courts, health care, education, transportation, and security.

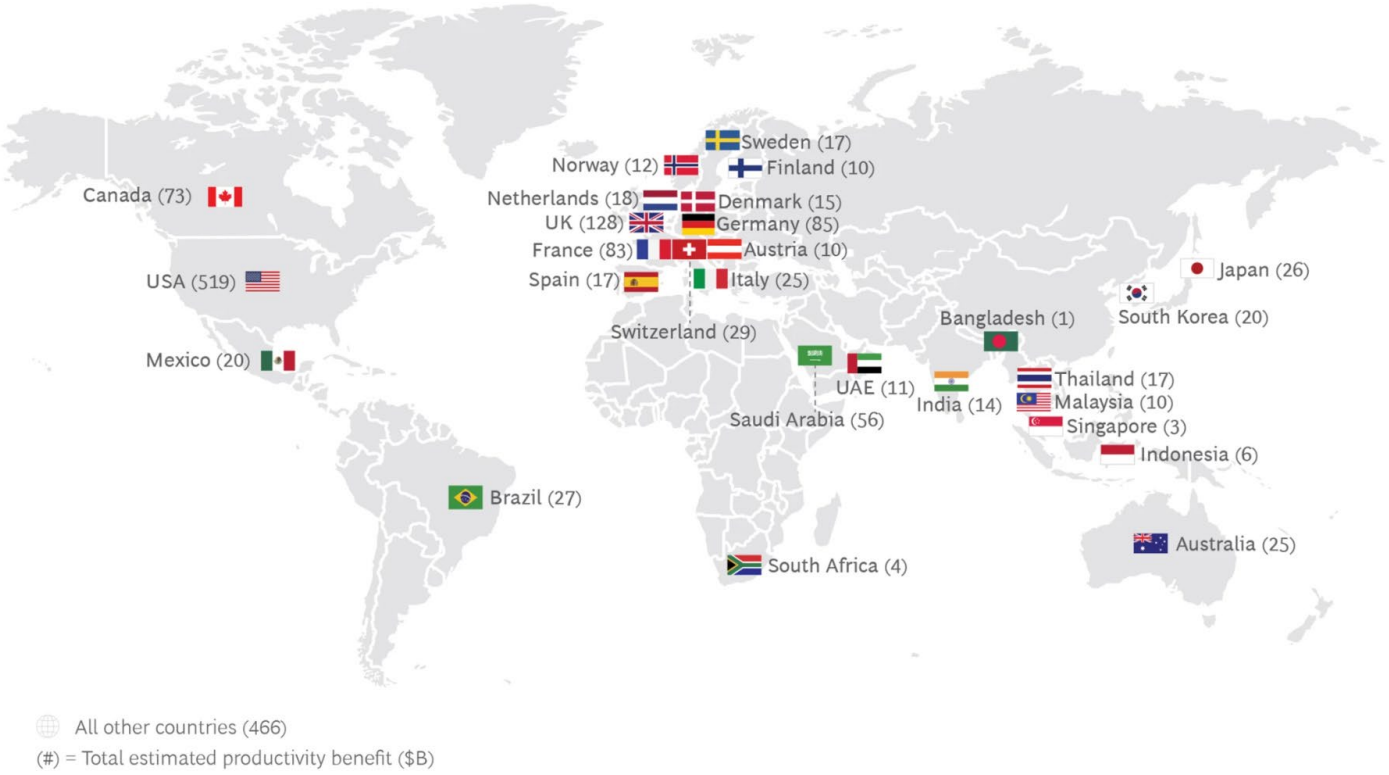

Figure (3): Breakdown of total estimated productivity benefit by country

Saudi Arabia is expected to gain $56 billion annually from GenAI use in the public sector, making it the highest in the Middle East region, while the United States are leading the race for GenAI use.

Given that the opportunities to employ GenAI vary across different areas of government, it is helpful to explore GenAI use cases across five distinct government functions as per Boston Consulting [7]:

Public Policy:

GenAI is likely to provide a powerful tool for analyzing and better understanding current public policy issues and challenges, as well as the current state and root causes, and to design more effective policy options, interventions, and programs; developing policy frameworks; and enhancing consultative processes.

Service & Operations:

By automating routine tasks and continuously analyzing operational data, GenAI can improve the quality and accessibility of public services to citizens and businesses, improve efficiency of operations, reduce risks, and continuously optimize allocation of resources to meet policy adopted goals and objectives.

Support Functions:

GenAI can streamline administrative and support functions within government by automating repetitive tasks and enhancing workflows, thus reducing costs, improving the employee experience, and freeing staff to focus on strategic tasks that drive productivity and service quality across different operations.

Regulatory Procedures:

GenAI can enhance regulatory efficiency by automating monitoring and compliance tasks, which lowers oversight costs, simplifies compliance processes, and upholds integrity, This helps citizens, businesses, and stakeholders better understand and fulfill their regulatory responsibilities.

Central Agencies:

Through data-driven insights, GenAI supports the development and implementation of whole-of-government strategies, priority setting, and standardized policy creation across central agencies. It optimizes funding and resource allocation, ensuring that government objectives are met efficiently, and resources are allocated based on agency performance and adopted policies impact.

3.2 Impact and Added Value of the Public Sector

As discussed, governments worldwide are recognizing the transformative potential GenAI has to revolutionize public sector operations. By integrating GenAI with strategic data management and search technologies, public sector entities can leverage their asset and data to enhance service delivery and operational efficiency in several keyways.

From a global perspective, according to BCG, the adoption of GenAI could lead to productivity improvements worth approximately $1.75 trillion per year by 2033 across all levels of government. This is primarily due to GenAI's ability to augment the tasks of public servants, reducing time spent on routine activities and enabling a focus on higher-value tasks [8].

The technologies associated with GenAI, such as natural language processing, image generation, and complex data analytics, allow public agencies to manage vast data sets more effectively, predict trends, and address citizen needs with enhanced precision. These capabilities are crucial for automating routine tasks and play a significant role in areas like public safety and healthcare, where they contribute to crime prediction and public health management in real time..

GenAI is being adopted across the world from automating administrative tasks to enhancing public safety, Here are some notable use cases:

United States

The US Department of Defense has developed an AI-powered contract-writing capability, called ‘Acqbot’, to speed up procurement [9].

Singapore

In 2023, the government of Singapore announced a version of ChatGPT was being developed for use within the Singapore civil service to assist in research and the crafting of speeches [10].

United Kingdom

The UK government uses GenAI to optimize healthcare services by predicting patient admissions and managing hospital resources more effectively [11].

Estonia

Estonia implemented 'Bürokratt' which enables citizens or users to use public and information services with virtual assistants through voice-based interaction [12].

Canada

The Canadian government is exploring the use of GenAI for language processing tasks in bilingual government services, helping translate documents and assist citizens in both English and French. This includes testing models like GPT to streamline communication and improve the quality of automated translations [13].

Australia

The Australian Government has started using GenAI to support citizen services through digital assistants that provide answers to frequently asked questions, freeing up human resources for more complex inquiries. This includes generating responses for inquiries on topics like taxes and social benefits [14].

Japan

Japan has piloted the use of GenAI to assist with drafting and summarizing documents in ministries, particularly to streamline administrative work. GenAI is used to help generate first drafts of routine reports and meeting summaries [15].

Denmark

Denmark has implemented GenAI models in its National Tax Agency to assist in identifying tax fraud by generating scenarios and questions for tax officers to probe inconsistencies in tax filings [16].

Finland

Finland uses GenAI to automatically generate initial drafts of policy briefs and legislative documents. This technology helps policymakers by providing comprehensive, data-informed drafts that can be fine-tuned by human experts [17].

United Arab Emirates

The UAE's Ministry of Health uses GenAI to create personalized health guidance for citizens, generating tailored wellness reports and preventive health recommendations based on anonymized data analysis [18].

3.2.1 Advantages of Integrating GenAI into the Public Sector

GenAI offers multiple advantages to the public sector, and its integration can lead to significant improvements in government operations and services:

01 Software Solution Development

GenAI accelerates software development by generating reusable code snippets, automating debugging, and suggesting improvements, reducing development time for faster application deployment. It also aids in developing innovative solutions to complex problems by analyzing data and generating insights, enhancing public sector organizations' ability to address challenges proactively and effectively.

Example: Many of PIF's portfolio and invested companies are integrating AI-powered, data-driven and data analysis systems so that they work smarter, have an increased competitive edge and operate at reduced costs [19].

02 Reduce Operating Costs

Lowers operational costs by automating repetitive tasks, enabling resource reallocation, and reducing manual labor expenses. GenAI helps government entities optimize resource usage by minimizing the time and workforce needed for routine processes, allowing for reallocation to more strategic functions. This approach not only reduces costs but also supports scalability in delivering public services efficiently.

Example: The development of the "Tawakkalna" application by SDAIA during the COVID-19 pandemic utilized GenAI to manage permits and monitor health statuses, reducing the administrative burden and associated costs.

03 Increased Productivity and Operational Efficiency

GenAI empowers government employees by providing quick access to relevant information across multiple datasets, reducing the time spent on manual searches and data integration. Additionally, automating routine tasks, such as preparing documents or legal briefs, enables more efficient resource utilization. As government entities enhance their skills in using generative AI, they can improve existing processes and innovate new workflows that significantly enhance task outcomes.

Example: The Ministry of Justice launched the "ICT Infrastructure Initiative" to explore how the ministry's data can be used to develop value-added services for various clients and entities. This includes deploying tools and providing machine learning and AI services to uncover new patterns[20].

04 Enhanced Decision-Making and Security

In sectors such as law enforcement and intelligence, GenAI can democratize access to critical data in real-time. This capability is crucial for accurate and quick decision-making, especially when multiple organizations collaborate. By enabling a unified query across diverse data sources, GenAI enhances the speed and accuracy of intelligence operations, leading to better-informed decisions and increased operational efficacy.

Example: The Saudi Data and Artificial Intelligence Authority (SDAIA) has issued a guide on generative artificial intelligence to raise awareness about these advanced technologies implementations [21].

05 Providing Personalized Public Services

GenAI can significantly simplify and personalize the interaction between citizens and government services. For example, in applying for public housing or responding to a jury summons, GenAI can provide citizens with personalized information and steps tailored to their specific circumstances. This not only improves accessibility but also enhances the citizen's experience by reducing the complexity traditionally associated with government services.

Example: The Ministry of Interior launched a personal assistance service on the 'Absher' platform for people with disabilities, allowing them to access services using advanced voice recognition and GenAI technologies [22]

06 Streamlined Citizen Experiences

By integrating GenAI, governments can offer more streamlined experiences to citizens. For instance, detailed and personalized information about legal requirements or court procedures can be instantly provided, improving satisfaction and trust in government processes.

Example: The Ministry of Health has launched AI-powered chatbots to assist citizens with accessing healthcare services. These chatbots provide information on medical facilities, appointment scheduling, making healthcare more accessible and efficient for the public [23].

07 Promote Innovation

Integrating GenAI into government services significantly enhances innovation by generating new ideas for public programs and improving service delivery. By analyzing extensive datasets, GenAI can identify emerging trends and suggest innovative policies that might not be immediately obvious to policymakers. Thus, accelerating the ideation phase.

Example: The GenAI accelerator program empowered by The Saudi Data & AI Authority (SDAIA) and the National Technology Development Program (NTDP) initiative aims to significantly improve the AI landscape in the Kingdom of Saudi Arabia and beyond by Saudi Arabia's Generative Artificial Intelligence Accelerator (GAIA) providing start-ups with the resources to convert their innovative ideas into practical solutions [24].

3.3 Local Perspective

The implementation of GenAI is strategically accompanied by with the objectives of developing a robust digital infrastructure and regulatory framework to support the adoption of AI technologies in accordance with best practices. This approach ensures that GenAI not only aligns with the Kingdom's technological ambitions but also with its socio-economic goals, enhancing transparency, efficiency, and citizen trust in government services.

The impact of GenAI on the Digital Government is profound. It contributes greatly to improving the process of providing public services, achieving economic gains, and ensuring the development of the digital infrastructure. Through the use of generative AI, national targets can be achieved in enhancing the quality of life, providing an innovative environment, and ensuring continuous development and improvement in providing national services and products aiming at the leadership in the scope of digital government.

Saudi Arabia Digital Achievements

1st in Mena for the third consecutive year in 2024

In the Maturity Index of E-Government and Mobile Services issued by the United Nations Economic and Social Commission for Western Asia (ESCWA), part of the United Nations.

1st Regionally & 3rd Globally

in the 2024 Digital Services Index, positioning the Kingdom among the world's leading countries.

6th globally

In the United Nations E-Government Development Index (EGDI) out of 193 countries, advancing 25 positions compared to the previous ranking.

Future Forecasts

Over 4.8 Trillion Saudi Riyals

The market value of GenAI is expected to exceed 4.8 trillion Saudi riyals by 2032 [25]

Over 80% of enterprises

Are expected to include GenAI capabilities into their applications by 2026 [25]

60% of websites and apps

Will be designed and automated using GenAI [26]

300 million jobs worldwide

Could potentially be automated as a result of GenAI [26]

The Digital Government's initiatives are critically supported by the strategic integration of GenAI, which is transforming public services and operations. As outlined in Vision 2030, Saudi Arabia aims not only to bolster its digital infrastructure but also to elevate its economic status globally. Currently holding the largest economy in the Middle East and ranking among the top twenty worldwide, the Kingdom is determined to leverage GenAI to climb even higher in global economic rankings.

GenAI has proven to be an indispensable asset, gaining significant attention for its ability to create tailored content, simulate complex real-world scenarios, and deliver innovative solutions efficiently. This capability has made it a cornerstone in Saudi Arabia's ambitious economic reform and transformation programs, and thanks to it, the goals of leading the digital landscape in the field of AI in the Middle East by 2030 can be achieved, as per PwC's expectations

Not only is Saudi Arabia committed to investing in and advancing AI adoption nationally, but Saudi Arabia also aims to become a global leader in this field.

The GenAI market within Saudi is projected to grow very rapidly over the next few years, as shown in figure (4) [27]

This growth is a key component of the country's digital transformation strategy.

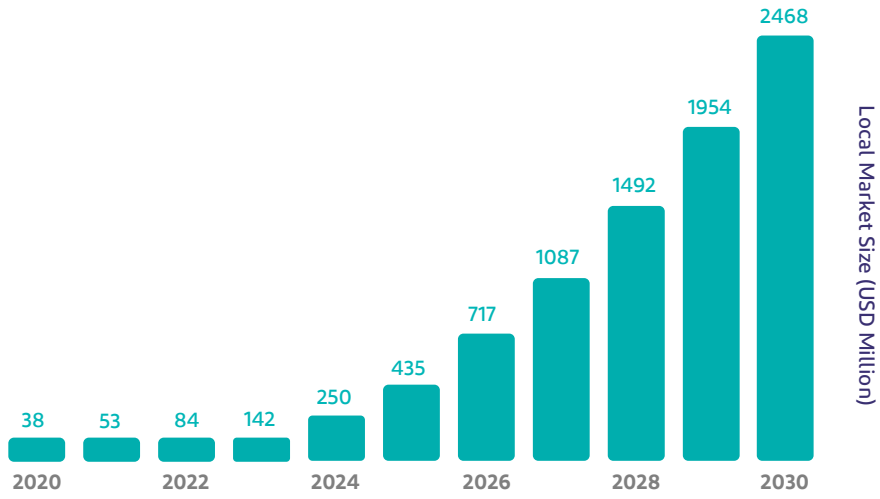

Figure (4): Generative AI Market in Saudi Arabia Forecast to 2030 (USD Million)

Shown in figure 5 below is a scenario analysis of the total addressable AI market in Saudi Arabia, given in three scenarios as shown in the legend: Conservative Scenario, Moderate Scenario, & Optimistic Scenario [27]. Refer to Appendix 1 for a more in-depth analysis of the "Impact of GenAI in Digital Government".

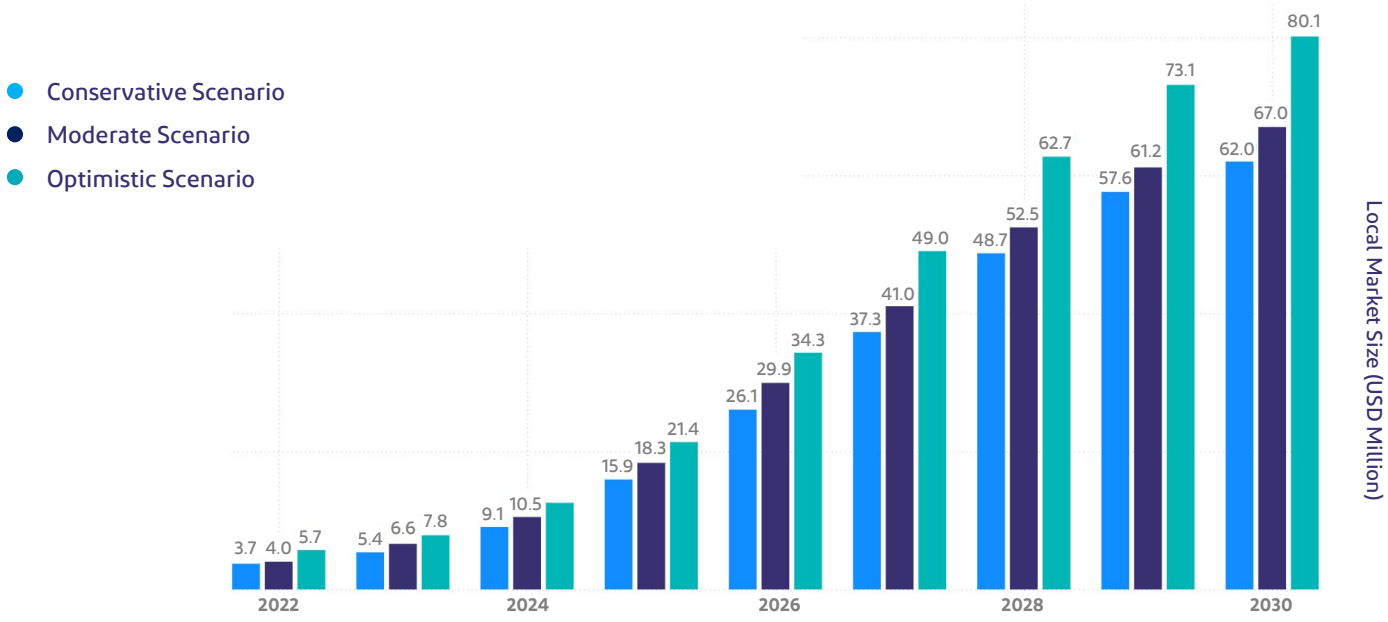

Figure 5: Scenario Analysis of the total addressable AI Market in Saudi Arabia

4. Interviews with Experts & Leaders in the Field

4.1 Criteria for Selecting Digital Transformation Leaders

Interviews were held with 22 experts in the field of IT and GenAI to gather deep and reliable insights. Specific eligibility criteria were established for selecting the experts involved in this study, as shown here.

These criteria were designed to identify individuals with extensive experience and expertise in the fields relevant to the research objectives.

Criteria for Selecting Digital Transformation Leaders

01. Extensive experience in digital government works

02. Practices and deep understanding of emerging technologies fields and their applications.

03. Substantial expertise with AI solutions in general

4.2 Interview Questions

The interview consisted of eight open-ended questions, organized into five thematic sections. This aims to capture the diverse perspectives and expert insights of the interviewed CIOs & is detailed below.

01

The current state of AI adoption in public services and digital government within Saudi Arabia:

- To what extent do you think AI has contributed to the significant transformations occurring in Saudi?
- In your opinion, what are the main factors that have driven the adoption of AI solutions within public services and digital government in Saudi Arabia?

02

The potential economic impact of GenAI on the Saudi digital economy:

- From an economic perspective, how do you perceive the potential impact of GenAI integration in Saudi Arabia's digital economy (on economic growth, job creation, innovation, creativity, and productivity)
- What specific sectors or industries are likely to experience the most significant transformation and growth through the GenAI implementation in Saudi Arabia?

03

How can the integration of GenAI enhance digital government services in Saudi Arabia, leading to improved efficiency, accessibility, and innovation?

- In your expert opinion, how can GenAI integration in the Saudi Arabian public sector, enhance efficiency, and promote digital transformation within government agencies and services?

04

The key challenges and barriers in implementing GenAI in the public sector of Saudi Arabia:

- In your opinion, what challenges or obstacles could be associated with the adoption of GenAI in the public sector of Saudi Arabia? (Technical Complexity, Data Availability and Quality, Legal Considerations, Integration and Compatibility, Cultural and Organizational Resistance)
- What ethical considerations and potential risks should be considered when integrating GenAI within the digital government of Saudi Arabia, from your perspective?

05

The strategies and specific procedures that policymakers, decisionmakers, and beneficiaries can employ to maximize the benefits of adopting GenAI in the digital government of Saudi Arabia:

- In your expert opinion, what strategies and specific procedures do you recommend to promote the responsible, effective, and inclusive adoption of GenAI in Saudi Arabia's digital government?

4.3 Results and Findings

The study reveals a strong consensus among experts that integrating GenAI into Saudi Arabia's public sector can significantly enhance digital governance through potential economic benefits, expedited transformation, operational improvements, and increased efficiency. Strategic recommendations aim to boost accessibility, innovation, and overall effectiveness in public services. The interviews also highlight positive impacts on various government sectors and anticipated implementation challenges.

The current state of AI adoption in public services and digital government within KSA

Experts unanimously affirm that AI has been instrumental in driving significant changes across various sectors in Saudi Arabia, reflecting its vital role in the nation's development. Here's a closer look at the key findings:

- **AI is a crucial component for the success of Saudi Arabia's ambitious reform and economic transformation program**

94%

Within the realm of government services in KSA, 94% of interviewees reported that AI has played a crucial role in facilitating ongoing transformations.

72%

72 percent of respondents, recognized the profound contribution of AI to the economic development and growth of the nation.

- **Saudi's Vision 2030 and Government Readiness and Support: Key Factors for Successful AI Implementation in Digital Government Services in Saudi Arabia**

56% Approximately 56% of interview participants highlighted the instrumental role of Vision 2030's innovative strategies in shaping the landscape of AI integration within the government sector.

80% About 80% of experts acknowledged the crucial influence of digital government initiatives, readiness, and supportive measures in advancing and facilitating the deployment of AI solutions across government services in Saudi Arabia.

60% About 60% of experts emphasized that a robust infrastructure, technological` advancements, and access to mature, advanced data have been fundamental in fostering the adoption of AI techniques within Saudi's public sector.

The integration of GenAI into Saudi Arabia's digital economy is set to bring significant economic benefits, transforming sectors and boosting global competitiveness. This section explores expert insights on the expected positive impacts and transformative potential of this technological advancement, providing an in-depth look at key findings.

- **The integration of GenAI in Saudi Arabia's digital economy is driving economic prosperity and fostering technological advancements**

100%

There is a consensus among experts on the capacity of GenAI to stimulate economic growth, catalyze innovation, enhance productivity, and improve overall business performance.

90%

About 90 percent of experts contend that the integration of GenAI is likely to generate new employment opportunities, especially within AI-centric companies and sectors.

- **The healthcare, finance, and transport and logistics sectors stand to gain the most from GenAI integration**

72% In the healthcare sector, 72% of experts recognize the potential for substantial transformation and growth that could be realized through the implementation of GenAI.

50% of experts believe that the financial sector in Saudi Arabia also stands on the cusp of significant transformation, with the adoption of GenAI poised to enhance both efficiency and service delivery.

50% The transportation and logistics sector is anticipated to experience a significant overhaul, with 50% of experts predicting that the integration of GenAI will inject increased dynamism into this sector.

How can the integration of GenAI enhance digital government services in Saudi Arabia, leading to improves efficiency, accessibility, and innovation?

The adoption of GenAI is set to revolutionize digital government services in Saudi Arabia, promising not only to enhance efficiency and accessibility, but also to foster innovation across public sectors. This section explores how GenAI is transforming government operations from digital to smart, emphasizing the substantial changes anticipated by experts in the delivery and management of public services. Here's a detailed exploration of the major insights gathered from the analysis:

- **GenAI adoption will enable the Saudi public sector to evolve from a digital government to a smart government.**

56%

Experts concur that the integration of GenAI within the Saudi public sector is expected to enhance operational effectiveness and accelerate digital transformation across government agencies and services.

67%

of experts believe that the adoption of GenAI technology in the Saudi public sector is poised to catalyze radical and transformative changes, significantly boosting the Kingdom's standing on the global stage.

- **The future of Saudi government services will be shaped by GenAI, enhancing efficiency and effectively addressing the needs of citizens and investors.**

94% There is a strong consensus among respondents about the pivotal role that GenAI is expected to play in shaping the future of government services.

94% Interviewees anticipate that the adoption of GenAI will lead to more personalized, efficient service delivery, enhanced citizen experiences, and the development of tailored and inclusive public services.

50% GenAI is expected to enable governments to adopt a more proactive and data-driven approach to their operations.

The key challenges and barriers in implementing GenAI in the public sector of Saudi Arabia

While the integration of GenAI promises transformative benefits for Saudi Arabia's public sector, it also presents distinct challenges and barriers that must be navigated. This section explores the key hurdles identified by experts, which must be addressed to facilitate the successful adoption of GenAI technologies. The analysis reveals significant concerns over the scarcity of expertise, the need for high-quality data, and ethical considerations, which collectively pose substantial challenges to the GenAI integration. Here's a detailed look at the major challenges as highlighted by the respondents:

- **The Scarcity of Expertise and Skills in GenAI, the Need for High-Quality Data, and Ethical Considerations: The Most Significant Challenges of Generative Integration in the Public Sector of Saudi Arabia.**

83%

A significant 83 percent of participants pinpointed the scarcity of expertise and skills in the field of GenAI as the most crucial challenge to its adoption in Saudi Arabia's public sector.

72%

72 percent of respondents emphasized the necessity for high-quality data as essential to ensure the efficient functioning of GenAI systems.

The strategies and specific procedures that policymakers, decision-makers, and beneficiaries can employ to maximize the benefits of adopting GenAI in the digital government of Saudi Arabia

In the journey to fully integrate GenAI into Saudi Arabia's digital government, leveraging expert insights is crucial for outlining effective strategies and specific procedures. This section presents a series of strategic recommendations identified by leading experts to ensure the successful and responsible adoption of GenAI technologies. These strategies, quantified by the percentage of experts advocating for each, range from skill development and legal frameworks to collaboration and data protection. By implementing these expert-recommended approaches, Saudi Arabia aims to maximize the benefits of GenAI, fostering a digital government that is innovative, secure, and citizen-centric.

94% Experts agree on equipping the workforce with the necessary skills through the promotion of skills development and training, investment in educational programs, and AI research and development.

78% Of experts recommend establishing a legal framework and providing a comprehensive guide that explains the proper use of the technology

80% Of experts recommend developing and promoting collaboration among government agencies, industry stakeholders, academia, and ethics and civil society organizations.

5. Ethical & Legal Considerations

Despite its potential, several challenges must be addressed. As the Digital Government advances its integration of GenAI across various sectors, it is important to address the ethical and legal considerations to align with both global standards and national regulations. Key ethical concerns include ensuring AI transparency, avoiding biased decision-making, and protecting privacy, particularly in handling personal data in accordance with Saudi Arabia's Personal Data Protection Law [28]. Legally, the development and deployment of AI technologies must comply with the evolving regulatory frameworks that govern technological innovation and data security. Adhering to these guidelines will not only foster public trust but also ensure that the deployment of AI technologies contributes positively to societal needs and respects the rights of all citizens. Therefore, It is important to consider the guidelines provided by the Saudi Authority for Data and Artificial Intelligence (SDAIA) which are briefly outlined below [29].

Fairness

Stakeholders must ensure GenAI systems are designed, developed, and deployed using bias-free, representative data to eliminate discrimination and promote fairness and inclusiveness.

Reliability and Safety

Ensuring GenAI systems adhere to specifications, providing consistent reliability and safety by incorporating mechanisms to prevent harm and ensure robust, intended behavior.

Transparency & Explainability

Transparency and explainability in GenAI systems build public trust by ensuring AI decisions are traceable, understandable, and clearly differentiated from human responses, promoting clear human-AI interactions.

Accountability and Responsibility

Designers, vendors, developers, and owners of GenAI systems must be ethically responsible and liable for any negative impacts, considering legal and ethical implications such as intellectual property rights, data privacy, and human rights violations.

Privacy and Security

GenAI systems must protect data privacy and employ best-practice security measures to prevent breaches and associated harms, as required by national authorities.

Humanity

GenAI systems should be ethically designed to respect human rights and cultural values, aiming to benefit individuals and communities, avoiding deceptive or manipulative practices, and focusing on human-centric design to empower and support human skills and choice.

Social and Environmental Benefits

GenAI systems should prioritize social and environmental benefits, focusing on sustainable goals, avoiding harm, and contributing to social progress and environmental sustainability.

6. Recommendations & Conclusion

6.1 Final Recommendations

Developing an implementation strategy

Establish a clear strategy for GenAI implementation that is endorsed by government leadership. This strategy should guide the development and deployment of GenAI technologies to ensure alignment with national priorities, such as those outlined in Vision 2030, and to foster technological advancements that contribute significantly to national goals.

Rationale for GenAI

A unified strategic framework ensures coherence and consistency across various AI initiatives, preventing fragmented efforts and resource wastage. It aligns AI projects with national goals, promoting synergy between technological advancements and socio-economic objectives.

Expected Impact

By having a clear and endorsed strategy, government entities can streamline efforts, reduce redundancy, and focus on high-impact projects. This drives significant progress towards Vision 2030, fostering innovation, enhancing public services, and strengthening Saudi Arabia's position as a leader in digital governance.

Adopting a collaborative approach

Adopt a multi-stakeholder approach by involving government agencies, industry leaders, academic institutions, and professional associations. This collaborative environment and interconnected ecosystem facilitates knowledge sharing, address potential concerns, and jointly develop strategies that ensure a responsible and beneficial implementation of GenAI across public sector operations.

Rationale for GenAI

Collaboration across sectors leverages a wide range of expertise and perspectives, fostering innovation and ensuring well-rounded, inclusive AI solutions. It helps build trust among stakeholders by addressing concerns related to data privacy, ethical use, and potential biases.

Expected Impact

Collaborative ecosystems will accelerate the development and deployment of AI technologies, driving economic growth and improving public service delivery. This ensures AI solutions are robust, ethical, and widely accepted, enhancing the overall effectiveness of public sector operations.

Create a Centralized Digital Platform

Establish a dedicated digital knowledge platform for government entities to collaborate on GenAI initiatives. This platform would serve as a central hub for sharing best practices, learning from successes and challenges, and co-creating solutions to overcome obstacles associated with GenAI adoption.

Rationale for GenAI

A centralized digital platform facilitates seamless communication and collaboration among government entities, enhancing the efficiency and effectiveness of AI initiatives. It centralizes resources, information, and tools, enabling government agencies to learn from each other's experiences and replicate successful models.

Expected Impact

This shared knowledge base accelerates the adoption of GenAI, reduces implementation costs, and fosters a culture of continuous improvement and innovation within the public sector. It enables more effective and coordinated AI initiatives, leading to better public services.

Develop Comprehensive Regulatory and Ethical Frameworks

Develop robust regulatory frameworks and ethical guidelines that address the full spectrum of implications brought about by GenAI. These frameworks should ensure that all deployments of GenAI are ethical, legal, and socially responsible, safeguarding citizen rights and aligning with the Kingdom's values.

Rationale for GenAI

Comprehensive regulatory and ethical frameworks protect citizens' rights, prevent misuse of AI, and ensure that AI deployments align with national values and societal norms - They establish clear regulations and guidelines for the responsible development and use of AI technologies.

Expected Impact

These frameworks foster public trust in AI technologies, encourage innovation within safe and acceptable boundaries and ensure that the benefits of AI are equitably distributed across society. They promote ethical, legal, and socially responsible AI deployments, enhancing overall public confidence in AI.

Raising Public Awareness

Provide clear, comprehensive guidelines for the responsible use of GenAI. These guidelines should ensure adherence to the highest ethical standards and legal boundaries, fostering trust and transparency in the application of AI technologies within public services.

Rationale for GenAI

Standardized guidelines provide a consistent framework for the deployment and use of GenAI across various government entities. They help mitigate risks associated with AI, such as biases, data privacy concerns, and ethical dilemma.

Expected Impact

Ensuring adherence to high ethical standards builds public confidence in AI technologies and promotes transparency and accountability in their use. This enhances the effectiveness and reliability of public services, leading to better outcomes for citizens.

Skills Development

Promote ongoing skills development and targeted training programs to build AI expertise among government employees. Simultaneously, invest in AI research and development to pioneer innovations that can specifically benefit the public sector, enhancing the capacity of government entities to leverage AI effectively.

Rationale for GenAI

Building a skilled workforce is essential for the successful implementation of GenAI. Continuous education and training equip government employees with the necessary skills to develop, deploy, and manage AI technologies effectively. Investing in AI research and development drives innovation and creates cutting-edge solutions tailored to public sector needs.

Expected Impact

Enhancing the government's capacity to leverage AI, positions KSA as a global leader in AI research and innovation. This contributes to long-term economic growth and societal advancement, improving public service delivery and fostering a culture of innovation within the public sector.

6.2. Conclusion

The study highlights a positive outlook on integrating Generative Artificial Intelligence (GenAI) into Saudi Arabia's government services. Experts agree this strategic implementation could boost productivity, create jobs, drive economic growth, attract foreign investments, and position Saudi Arabia as an innovation leader.

GenAI is expected to revolutionize digital governance, making the digital government more efficient, proactive, and data-driven. This transformation will redefine public service delivery and strengthen Saudi Arabia's global standing in digital governance. The integration of GenAI will also support Saudi's ambitious 2030 Vision as well as benefit several pillars of the National Digital Government Strategy (NDGS), specifically in satisfying citizens, enabling business, expediting transformation, and increasing investments efficiency and digital government effectiveness.

According to Strategy&, GenAI's impact extends beyond digital government to the broader economy, with significant profit margin increases anticipated in sectors like technology, media, telecom, and healthcare by 2028. For instance, the technology sector alone could see a profit margin increase of up to 15 percentage points, potentially gaining up to SAR 15 billion, aligning with Vision 2030 goals.

Also, according to BCG, GenAI is projected to boost public sector productivity by $1.75 trillion annually with Saudi Arabia expected to gain $56bn annually, making it a digital leader in the middle east and a strong contender globally closely following Germany, Canada and France. This rise is crucial for advancing Saudi Arabia's Vision 2030. BCG also identified five key GenAI use cases for government functions:

- **Policy and Programs:**
  Enhance understanding of policy issues, improving policy frameworks, and strengthen relevant processes.
- **Service Delivery and Operations:**
  Improve service quality, efficiency, and resource allocation.
- **Support Functions:**
  Increase efficiency in support and corporate services while reducing overheads.
- **Regulatory Bodies:**
  Enhance compliance, reduce monitoring costs, and streamline administration.
- **Central Agencies:**
  Develop and optimize government-wide strategies and resource allocation.

By leveraging strategic integration, the Kingdom can achieve significant economic and developmental gains, reinforcing its position as a global leader in innovation and digital transformation. This progress is a vital step toward realizing Vision 2030 and establishing a digital government that is flexible, efficient, innovative, and locally and globally competitive.

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Appendix 1

Impact of Generative AI on Operational and Cost Efficiency in KSA

This table highlights a diverse range of use cases for generative AI across multiple sectors, demonstrating its transformative potential to enhance operational efficiency, improve decision-making, and deliver innovative solutions. These use cases are categorized by sector and arranged along a gradient of impact, from high to low. The table provides insights into how generative AI can drive significant advancements in areas such as government service delivery, technology development, healthcare optimization, and more. By aligning each sector with specific applications, it underscores the strategic value of generative AI in addressing sector-specific challenges and opportunities.

Sector	Use Cases				
Public Services	Enhancing public service delivery and operational efficiency through automation and continuous analysis	Enhancing the efficiency of central authorities through improved strategies and resource allocation	Policy Analysis & Program Design	Regulatory Monitoring & Compliance Automation	Administrative Streamlining & Support Automation
Technology	Accelerated Tech Solution Development through improving design, programming and performance testing.	Optimizing IT Infrastructure Management through smart planning and operation	Marketing Content Generation	Automated Lead Prioritization & Engagement	Customer Value management through preference analysis and personalized recommendations
Media & Entertainment	Creative Content Generation	Personalized Content Delivery	Targeted Advertising Campaigns	Automated Production Planning	Automated Content Editing
Telecom	Enhancing customer value through data analysis and personalized recommendations.	Optimized Network Management	Tailored Product Development that meet client needs through advanced data analysis	Conversational Customer Service AI	Creating and distributing Personalized Marketing Content to increase engagement and attract customers.
Healthcare	AI-Assisted Medical Diagnosis	Accelerated Drug Discovery	Automated Medical Record Management	Virtual Assistants for Patient Interaction	Operational Planning & Resource Management
Energy & Resources	Exploration and Extraction Optimization	Predictive Maintenance Planning	Demand Forecasting	Risk Identification & Safety Management	Energy and Resources Infrastructure Smart Management through optimized planning and operation

High Impact ← → Low Impact

Table 1: Generative AI Use Cases Across Government Sectors and Their Impacts

Sector	Use Cases				
Education	Assessment, Grading and Feedback	Educational Content Creation	Student Administrative Assistant	Improving Personal Productivity in Education through accelerating tasks and organizing operations	Personalized Tutor
Transport	Intelligent Traffic Management	Passenger Service and Support through smart chatbots	Data Analytics Self-Service	Maintenance Process Guidance	Synthetic Data for AI Training
Public Security	Regulatory and Grant Reports	FOI support for public safety	Nonemergency Incident chatbot	Public Safety Training	Enhance intelligence analysis through open-source solutions and smart analytics
Tourism	Enhanced Customer Service through providing continuous support and smart solutions.	Dynamic Pricing & Revenue Management	Personalized Travel Planning	Language Translation	Travel Content Creation
Housing	Improving Customer Support	Generating Property Descriptions	Creating images from property descriptions	Creating AI-Powered Visualizations	Generating Engaging Social Media Copy at Scale
Agriculture	Enhance Precision Agriculture through data analysis and drawing accurate field mapping	Autonomous Farm Equipment	Crop Yield Prediction	Pest and Disease Detection	Improve Livestock Management through data analysis to improve nutrition, health and productivity

Table 1: Generative AI Use Cases Across Government Sectors and Their Impacts

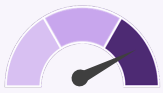
Detailed explanations and further insights into these use cases will follow, to outline their potential applications and benefits, providing an overview of how generative AI aligns with sector-specific goals and opportunities.

Technology

● High impact ● Medium impact ● Low impact

Operational Efficiency Impact

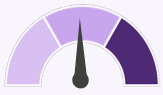
- **Tech Solution Development:** Enhance and accelerate solution development by generating design features, creating and optimizing encrypted code, detecting and resolving bugs, and producing test cases/data.



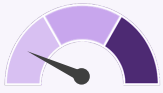
- **Infrastructure Management:** Optimize tech infrastructure planning, deployment, and operations via generation of deployment scenarios, definition of configuration recommendations, and detection and diagnosis of faults.

- **Marketing Content Generation:** Generate personalized content in different formats (e.g., text, pictures, audio, video) distributing across different channels (e.g., forums, social media, website) to maximize customer engagement and lead generation.

- **Lead Management:** Score and prioritize leads based on historical data, automatically qualify leads based on customer engagement data (e.g., website visits), nurture leads through automated follow ups and generate customized proposals to address opportunities.



- **Customer Value Management:** Analyze customer data to learn preferences, predict behavior, and generate hyper-personalized recommendations to maximize customer value (e.g., real-time cross-sell/up-sell product recommendations based on customer behavior).



The KSA tech sector is booming due to national digitization efforts, smart city projects, adoption of digital lifestyles, and increasingly sophisticated tech demands of businesses. KSA is leveraging this growth to transform its service-oriented tech sector into an innovation hub. It is investing heavily to develop local intellectual property (IP) and national tech champions in areas beyond services, such as software and infrastructure. GenAI can accelerate this transformation by creating growth opportunities for KSA tech companies and enhancing their capabilities.

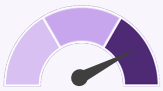
KSA tech firms can tap into the SAR ~3 Bn [30] GenAI market by developing and commercializing GenAI use cases and augmenting existing tech solutions with AI features. They can also cater to demand for advanced hardware and infrastructure needed for GenAI, including high-performance GPUs, supercomputers, AI-optimized cloud computing, fast/scalable storage solutions, energy-efficient data centers, and robust data security. Internally, GenAI can bolster R&D capabilities for tech companies and expedite solution design and development. For instance, Vodafone's tech unit boosted productivity of developers by 30-45% during pilot tests for GenAI assistants [31], GenAI also enables tech companies to enhance their marketing efforts by accelerating content creation and hyper-personalizing communications to customers based on their profiles. Additionally, GenAI can automate the internal lead-to-cash lifecycle, reducing costs by ~30% [32], For example, we're deploying a GenAI-powered proposal builder for a KSA-based tech company, with the aim to evolve it into an end-to-end commercial suite covering lead management, procurement, and project delivery.

Media & Entertainment

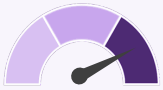
● High impact ● Medium impact ● Low impact

Operational Efficiency Impact

- **Content Generation:** Generate creative content including journal article drafts, music compositions, advertising videos, film storylines and scripts, and gaming characters and experiences.



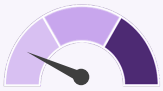
- **Customized Content Delivery:** Suggest hyper-personalized content to customers based on their profiles and preferences, and enable sophisticated search features (i.e., taking customer preferences and current mood into account).



- **Advertising Optimization:** Enable highly targeted, customized, dynamic, and interactive advertising campaigns based on the preferences and behaviors of customers.

- **Production Planning:** Automate content production and planning processes, including script/scene breakdown, production schedule creation, determining the actors needed per scene, creating AI-based pre-visualizations, etc.

- **Content Editing:** Automate post-production editing processes such as soundtrack quality enhancement, video trimming, and dubbing (e.g., editors update audio/video transcripts and AI translates them into audio/video changes).



The KSA media and entertainment market is expanding, driven by a digitally savvy population, high media consumption rates, and advanced digital infrastructure. KSA consumers spent an average of ~7.3 hours per day on the internet, ~3.8 hours watching TV, and ~3 hours on social media in 2023, surpassing many regional and global counterparts [33], Recent national efforts aim to transform KSA into a media and entertainment hub with highly localized content, unique experiences, diverse entertainment options, and a strong talent pool, GenAI can facilitate this transformation by enabling companies to accelerate local content creation, design personalized experiences, and enhance capabilities.

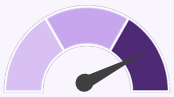
Media and entertainment firms can use GenAI to creatively and efficiently develop original Arabic content, including film storylines, scripts, musical compositions, and gaming experiences and characters. With Saudi audiences preferring localized content on TV and other platforms [33], there's a significant opportunity for companies. Post-production, GenAI-powered tools can aid in editing tasks like sound enhancement, video trimming, and dubbing. For example, Fremantle partnered with AI startup “Papercup” to dub and localize content such as “Idols” and “Got Talent” [34], To boost customer engagement on digital platforms, companies can employ GenAI to improve search features and hyper-personalize content recommendations based on user profile, even moods. Moreover, by leveraging GenAI for targeted and customized advertising, companies can enhance the monetization of their customer base. In fact, the low advertising spending per capita of SAR ~240 [35], in KSA presents a valuable opportunity for media and entertainment companies.

Telecom

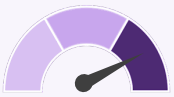
● High impact ● Medium impact ● Low impact

Operational Efficiency Impact

- **Customer Value Management:** Analyze customer data to learn preferences, predict behavior, and generate hyper-personalized recommendations (e.g., real-time cross-sell/up-sell product recommendations based on customer behavior).



- **Network Management:** Optimize network planning, deployment, and operations via generation of deployment scenarios, definition of configuration recommendations, detection and diagnosis of faults, and training of security threat detectors.



- **Product Development:** Generate tailored product portfolios to address the needs of customer segments by developing highly sophisticated customer segmentations and synthesizing customer insights.

- **Customer Service Chatbot:** Optimize customer service operations using conversational AI chatbots capable of complex customer conversations (i.e., understanding natural language inquiries and generating contextualized responses).

- **Marketing Content Generation:** Generate personalized content in different formats (e.g., text, pictures, audio, video) distributing it across different channels (e.g., forums, social media, website) to maximize customer engagement and lead generation.

The KSA telecom market continues to expand, driven by a young, tech-savvy population, high mobile and internet penetration, and growing demand for digital services. However, the market is becoming increasingly challenging due to intense competition, price wars, and monetization hurdles. To navigate these dynamics, telcos are constantly seeking new strategies to differentiate their commercial propositions and internal operations from competitors. GenAI can support these efforts and help telcos establish competitive advantages across their business construct.

Telcos can utilize GenAI to develop highly sophisticated customer segmentations, synthesize customer insights from a range of data sources, and generate customized product portfolios to address segment needs. For example, they can gain deeper insights into broadband customers, tailor the broadband value proposition, and enhance broadband infrastructure utilization, currently at ~50% [32], for fiber-to-the-home (FTTH). Additionally, by integrating GenAI into customer value management engines, telcos can better analyze customer behavior and hyper-personalize cross-sell, up-sell, and churn mitigation campaigns. This includes accelerating ICT cross-selling to SMEs and better capturing an opportunity expected to reach SAR ~10 billion by 2028 [32], For customer engagement, telcos can deploy sophisticated chatbots to enhance the productivity of their contact centers. For instance, Vodafone partnered with Google and Genesys to develop a chatbot capable of resolving ~70% of digital customer queries [36]. On network management, telcos can use GenAI to optimize planning, deployment and operations by simulating deployment scenarios, generating configuration recommendations, and detecting and diagnosing faults.

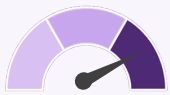
Healthcare

● High impact ● Medium impact ● Low impact

Operational Efficiency Impact

- **Medical Diagnosis:** Diagnose patient diseases and support the development of personalized treatment plans based on medical images, lab tests, and patient information

- **Drug Research & Development:** Analyze vast datasets to determine the most effective drug formulations for diseases, accelerating drug discovery (e.g., KSA startup "NanoPalm" used GenAI to accelerate development of nano-robots to address sickle cell disease[33]).



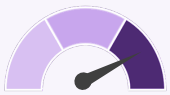
- **Medical Record Access & Management:** Enable healthcare providers to extract and synthesize patient data, and to generate health reports based on test results and consultation transcripts/ audio notes.

- **Healthcare chatbots:** Build chatbots or virtual assistants that interact with patients, answer administrative queries, assist in appointment scheduling, and provide medical direction.

- **Operations & Resource Management:** Generate end-to-end operational plans for healthcare facilities covering patient scheduling, bed management, staffing, and inventory management.

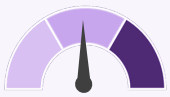
Energy, Utilities & Resources

- **Exploration and Extraction Optimization:** Analyze geological data, create 3D visualizations of sub-surfaces, identify areas likely to contain resources, and determine optimal extraction methods.



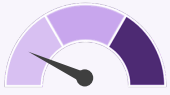
- **Predictive Maintenance:** Predict equipment failures and generate proactive maintenance schedules by analyzing historical maintenance data and real-time sensor information.

- **Demand Forecasting:** Generate granular demand forecasts and create optimized energy production and distribution plans by analyzing usage data, weather conditions and socio-economic factors.



- **Safety & Risk Management:** Identify risks associated with resource extraction and processing activities through computer vision and machine learning algorithms and generate risk mitigation measures.

- **Infrastructure Management:** Optimize energy and utility infrastructure planning, deployment, and operations via generation of deployment scenarios, definition of configuration recommendations, and detection and diagnosis of faults.

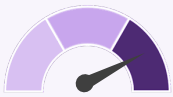


Education

● High impact ● Medium impact ● Low impact

Operational Efficiency Impact

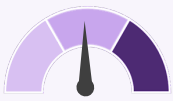
- **Assessment, Grading and Feedback:** Teachers can use GenAI to automate test generation and the grading of quizzes/essays, and to increase the volume and improve the consistency of student feedback with individualized guidance and suggested actions on misunderstood themes.



- **Educational Content Creation:** Faculty utilize GenAI to accelerate the authoring of lesson plans, teaching videos, images, presentations, lecture notes and study support materials.

- **Student Administrative Assistant:** Students engage with a conversational UI to answer questions on course logistics, assignment details and due dates, and to access information stored across administrative, library and learning systems.

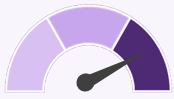
- **Personal Productivity in Education:** Students and staff leverage GenAI tools to accelerate report authoring, coding, meeting planning, data analytics and decision support.



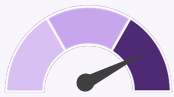
- **Personalized Tutor:** Students leverage large language models (LLMs) to assist in explaining concepts, prompting reflection and providing additional resources to accelerate learning.

Transport

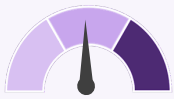
- **Intelligent Traffic Management:** By analyzing real-time and historical data, GenAI can explain where congestion hot spots are likely to exist.



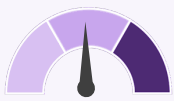
- **Passenger Service and Support:** Chatbots can use GenAI to generate personalized responses to passengers, automate queries for repetitive questions and even provide multilingual support.



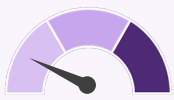
- **Data Analytics Self-Service:** GenAI can automatically generate insights and reports and answer questions in natural language, empowering organizations to explore data without needing extensive technical expertise.



- **Maintenance Process Guidance:** GenAI can create guided practical instructions for technicians based on varied sources of detailed repair or maintenance processes. These sources include official factory manuals, prior work records, and advice from other owners of the same asset.



- **Synthetic Data For AI Training:** GenAI can generate synthetic data, which is realistic, but simulated information. This generated data can include things like weather patterns, traffic jams, or sensor readings from vehicles.

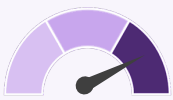


General Security

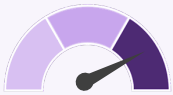
● High impact ● Medium impact ● Low impact

Operational Efficiency Impact

- **Regulatory and Grant Reporting:** GenAI can be used to create contextual status summaries of an incident, a multi-incident, or operational summary over a period of time, and support the drafting of reports to state/national officials or granting organizations.



- **Support Public Safety in (FOI) Responses:** GenAI can be used to draft freedom of information (FOI) responses, which need relatively little work to confirm that correct and current data is being provided.



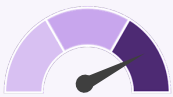
- **Nonemergency Incident Chatbot:** GenAI can be used to improve chatbots that support the reporting of nonurgent/non-life-threatening incidents and tip lines to capture relevant/more information and route it as needed.

- **Public Safety Training:** GenAI can be used to develop training plans and materials based on real-world situations and incidents by mimicking previous callers' behavior.

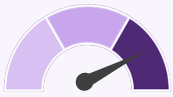
- **Intelligence Analysis:** Open-Source intelligence (OSInt) and analytics solutions can use GenAI for answering queries for analysts and investigators from intelligence information sources.

Tourism

- **Enhanced Customer Service:** AI-powered chatbots can provide 24/7 customer support, answering questions, resolving issues, and providing recommendations. This can improve customer satisfaction and streamline operations for travel businesses.



- **Dynamic Pricing and Revenue Management:** GenAI can analyze real-time market data to optimize pricing strategies for hotels, airlines, and tour operators.



- **Personalized Travel Planning:** GenAI can analyze a traveler's preferences, budget, and interests to create highly personalized travel itineraries.

- **Language Translation:** GenAI can facilitate communication between travelers and locals by providing real-time language translation services. This can enhance the overall travel experience and break down cultural barriers.

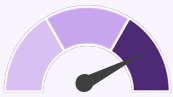
- **Travel Content Creation:** GenAI can generate engaging travel content, such as blog posts, social media posts, and video scripts. This can help travel businesses attract more visitors and increase brand awareness.

Real Estate

● High impact ● Medium impact ● Low impact

Operational Efficiency Impact

- **Improving Customer Support:** A chatbot can be trained to answer common questions from potential buyers. If you lease property, then you could also automate work on simple requests from residents, like maintenance.



- **Generating Property Descriptions:** Instead of spending hours on writing descriptions for each property, you 'feed' a GenAI tool with all the key information. GenAI tools can be used to generate descriptions based on the key information provided.

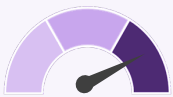
- **Creating Images from Property Descriptions:** Generative AI tools equipped with advanced capabilities can create images of properties based on written descriptions. These tools can transform text into visuals that accurately represent the described details, such as room layouts, furniture, or surrounding landscapes.

- **Creating AI-Powered Visualizations:** A real estate agent can use GenAI tools to create property visualizations – they might select modern furniture, cherrywood floors, etc. Seeing how a cold, empty apartment turns into a cozy home can speed up the decision-making process.

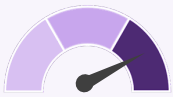
- **Generating Consistent and Engaging Social Media Copy at Scale:** GenAI can help you create an engaging copy around your real estate. The more details you feed it with, the better the output will be – share who you're targeting, what tone of voice to use, how long the copy should be, etc.

Agriculture

- **Precision Agriculture:** GenAI can analyze vast amounts of data from sensors, satellites, and drones to create detailed maps of fields.



- **Autonomous Farm Equipment:** GenAI can power autonomous tractors and drones, enabling them to perform tasks like planting, spraying, and harvesting with greater efficiency and precision.



- **Crop Yield Prediction:** By analyzing historical weather data, soil conditions, and planting patterns, GenAI models can predict crop yields with greater accuracy. This helps farmers plan for the future, make informed decisions about planting and harvesting, and potentially increase overall production.

- **Pest and Disease Detection:** GenAI can analyze images and videos of crops to identify early signs of pests and diseases. This enables early intervention and reduces the need for broad-spectrum pesticides, promoting sustainable farming practices.

- **Livestock Management:** GenAI can analyze data on livestock health, behavior, and production to optimize feeding, breeding, and disease prevention strategies. This can improve animal welfare and increase productivity.

* The results presented in this section are from a study conducted by Strategy&

A Survey on the study via the following link:

Survey

SCAN HERE

For more Research Studies, please follow the link below

Digital Studies

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