GAIBL Project Capstone

# Step 0 - Introduction. 100-day Plan: Build a Generative AI Strategy with Project Roadmap

Upon assuming a new leadership role within a company (whether from an internal move or joining the company anew), it is common for an executive to be asked to prepare a plan for their first 100 days in the job.

As part of this project, you will prepare/build/create the following:

1. Identification of six Generative AI opportunities for the organization
   1. Opportunities must:
      * Represent at least three different functional areas
      * Include at least two *specific to* individual functional areas
      * Include at least two that span *across* multiple functional areas (or are company-wide)
      * Include no more than three projects for a single functional area
      * Include at least one external-facing initiative
      * Include at least one internal-facing initiative.
2. Prepare a roadmap for executing these six Generative AI opportunities.
   1. Detail the risks, challenges, and key factors for success for each of these opportunities
   2. Prepare a "rack and stack" evaluation of these opportunities
   3. Identify the order in which these projects might be launched in a strategic roadmap
   4. Provide justification for the order in which you've decided the projects should be launched
3. Prepare a Human Capital plan for your Generative AI implementation
   1. Describe how the Generative AI function will be organized within your company. Why is that organizational strategy the best match for your company right now?
   2. Identify the individuals you might invite to participate in a Stakeholders Council. What other stakeholders should also be involved outside of that council?
   3. Identify the roles you would initially want to fill to execute your Generative AI initiatives.
4. Draft an initial Generative AI Position Statement outlining the company's perspective on Generative AI and how it will be implemented.
   1. Detail how Generative AI fits with the company's core strategy
   2. Detail how Generative AI will be implemented in a responsible manner reflective of the context in which the company operates.
5. Prepare a Technical plan for executing your Generative AI roadmap.
   1. Identify how your first three Generative AI projects will leverage a foundation model(s) yet also be able to respond with information particular to your business and the specific business problem addressed by the project.
   2. Provide justification for each project's foundation model approach, and detail any challenges you anticipate having to address with each project.
   3. For each project, provides 2 example prompts along with each of the following:
      * Wording of the example prompt
      * Examples of business data expected to support the prompt response (in whatever foundation model approach is chosen)
      * Wording of an ideal response
   4. Your company will, of course, need to build an architectural "stack" to support your generative AI projects. For each of your top two projects, detail how each of the components of this stack will operate to support the execution of that project.

The work product for this Capstone project will be a detailed presentation to the CEO, detailing your plan and the rationale behind your decisions.

This project asks you to prepare that 100-day Generative AI plan for a company of your choosing; this could be your current company or some other existing company.

**Name of Company Chosen:** Center for Artificial Intelligence at King Khalid University.

**Brief Company Description:** The Center for Artificial Intelligence (CAI) at King Khalid University, located in Abha, Saudi Arabia, is dedicated to advancing AI research and applications. Established in 2019, the center focuses on developing intelligent solutions across various sectors, including healthcare, education, and energy. By leveraging machine learning, big data, and the Internet of Things, CAI aims to address real-world challenges and contribute to the goals of Saudi Vision 2030. The center collaborates with both internal university departments and external partners to foster innovation and enhance quality of life through AI-driven initiatives.

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# Step 1 - Identify Generative AI Opportunities in the Business

Throughout the course, you have been exposed to multiple examples of Generative AI projects implemented in a business setting. Now, based on your knowledge of your specific business context, you will generate six potential projects to be considered by the executive leadership team. It is expected that these are largely (or fully) represented by text generation models, though projects involving other media (e.g., images, audio, video, or mixed modalities) are acceptable as well.

Your Generative AI projects must collectively:

* Include at least two specific to individual functional areas
* Include at least one that spans across functional areas
* Represent at least three functional areas
* Include at least one that is external-facing (targeting customers, partners, investors, etc.)
* Include at least one that serves an internal audience (such as employees)

**Please identify your six projects here:**

**Project 1:** AI-Powered Academic Advisor

**Project 2:** Automated Research Literature Summarization

**Project 3:** Intelligent Course Material Generation

**Project 4:** Multilingual Virtual Librarian

**Project 5:** Employee Knowledge Assessment System

**Project 6:** AI-Driven Predictive Maintenance for IT Infrastructure

**Note: You may choose to represent this information on slide 5 of the CEO Presentation Template**

**For your first project, please provide the following detail:**

**Project 1 Name:** AI-Powered Academic Advisor

**Business Functional Area(s):** Academic Support

**Target Users:** University students seeking academic guidance

**1. Description of the project (including business problem to be addressed, how Generative AI will address that business problem, and the targeted business objective (revenue? customer acquisition? cost reduction?):**

- Business Problem Addressed: University advisors often handle high volumes of inquiries about course selection, registration processes, and academic policies, leading to longer wait times and less personalized guidance. This creates inefficiencies and delays in support for students.

- Role of Generative AI in addressing the business problem: The AI-powered academic advisor will serve as a virtual assistant, leveraging natural language processing (NLP) to respond to students’ academic questions. It can offer personalized recommendations on course selection, check academic progress, and provide step-by-step guidance on registration and university procedures. By automating routine inquiries, the AI advisor can reduce the advisors' workload and provide immediate responses to students.

- Targeted business objective(s):

 **Cost reduction**: Minimizes the need for additional academic advising staff by automating frequent queries.

 **Student satisfaction**: Increases response speed and improves the overall student experience by providing accessible and consistent support.

**2. Magnitude of opportunity (with justification)**

 **Magnitude**: Medium

 **Justification**: While this project has the potential to transform student support and reduce operational costs, its primary value is in improving the student experience rather than directly generating revenue. Given the number of students that rely on academic advising each term, the impact would be significant but not at the same scale as a revenue-generating initiative.

**3. Feasibility of development and implementation (with justification)**

1. **Individual components of feasibility**

 **Project Cost**: Moderate – Requires investment in AI model training, infrastructure, and integration with student databases.

 **Complexity of Implementation**: Moderate – The system will need to be trained on academic FAQs and integrated with the university’s systems for course and registration information.

 **Data Adequacy**: High – The university has extensive data on academic policies, course structures, and student profiles, providing a solid foundation for training.

1. **Overall feasibility**

High.

With adequate data and moderate project costs, developing an AI academic advisor is achievable. The implementation complexity is manageable, as many academic FAQs and structured data are readily available.

**4. Likelihood of value capture (Low/Medium/High) with justification**

 **Likelihood**: High

 **Justification**: The project directly addresses a high-demand service area (academic advising), ensuring its adoption by students. Immediate and efficient responses to student inquiries will likely boost user engagement and satisfaction, leading to higher value capture.

**5. Key Business Stakeholders**

 **Academic Support Department**: Primary user and overseer of the AI advisor's functionality and accuracy.

 **IT Department**: Responsible for data integration, system maintenance, and user experience.

 **Student Affairs**: Key stakeholders in monitoring the AI’s impact on student satisfaction and academic outcomes.

 **University Administration**: Executive leadership who may assess the broader impact on operational efficiency and cost savings.

**For your second project, please provide the following detail:**

**Project 2 Name:** Automated Research Literature Summarization

**Business Functional Area(s):** Research Support

**Target Users:** University researchers and faculty members

**1. Description of the project (including business problem to be addressed, how Generative AI will address that business problem, and the targeted business objective (revenue? customer acquisition? cost reduction?):**

- Business Problem Addressed: Researchers face challenges in staying up-to-date with the overwhelming amount of academic literature, which slows down research progress and increases the time required for literature reviews. Manually sifting through and summarizing relevant research is both time-consuming and resource-intensive.

- Role of Generative AI in addressing the business problem: A Generative AI-powered tool would summarize research articles, identifying key findings, methods, and implications. This tool could be tailored to provide summaries of large volumes of academic papers, allowing researchers to quickly digest information and focus on relevant findings, ultimately accelerating the research process.

- Targeted business objective(s):

 **Cost reduction**: Reduces the time researchers spend on literature reviews, allowing them to focus on higher-impact research activities.

 **Research productivity**: Increases research throughput and quality by enabling quicker access to relevant information.

**2. Magnitude of opportunity (with justification)**

 **Magnitude**: High

 **Justification**: This project offers substantial value for researchers and academic staff, providing an opportunity to significantly increase research productivity. The potential time saved across multiple departments and research projects justifies its high importance and impact.

**3. Feasibility of development and implementation (with justification)**

1. **Individual components of feasibility**

**Project Cost**: Moderate – Development requires access to academic datasets and advanced natural language processing capabilities, but existing foundation models could streamline implementation.

**Complexity of Implementation**: High – Building a summarization tool that can accurately process diverse research topics will be complex due to the nuanced nature of academic language.

**Data Adequacy**: High – The university’s access to academic databases and research publications provides a robust foundation for training the AI tool.

1. **Overall feasibility**

Medium.

Although data is readily available, the complexity of accurately summarizing academic research may increase development and testing requirements, making feasibility moderate to high.

**4. Likelihood of value capture (Low/Medium/High) with justification**

 **Likelihood**: High

 **Justification**: Given the strong demand for literature review support among researchers, this tool is likely to see high adoption, enabling researchers to work more efficiently. Its value capture potential is strong because it directly addresses a persistent challenge in the academic research process.

**5. Key Business Stakeholders**

 **Research Department**: Primary users and beneficiaries who will directly engage with the tool.

 **Library Services**: Supports the integration of academic databases and monitors the AI’s effectiveness in accessing diverse research topics.

 **IT Department**: Manages the tool's infrastructure, data security, and performance.

 **University Administration**: Key stakeholder in evaluating the impact on research output and potential for institutional recognition.

**For your third project, please provide the following detail:**

**Project 3 Name:** Intelligent Course Material Generation

**Business Functional Area(s):** Education & Training

**Target Users:** Faculty members and students

**1. Description of the project (including business problem to be addressed, how Generative AI will address that business problem, and the targeted business objective (revenue? customer acquisition? cost reduction?):**

- Business Problem Addressed: Faculty members spend significant time creating educational resources such as quizzes, study guides, and flashcards. This process can be repetitive, especially when adapting materials for diverse student needs, leading to inefficiencies in course preparation and student engagement.

- Role of Generative AI in addressing the business problem: The Generative AI tool will assist faculty in generating personalized course materials based on course syllabi, lecture notes, and other instructional content. By automating resource creation, the tool will enable instructors to tailor materials for different learning levels and focus areas, enhancing both teaching efficiency and learning outcomes.

- Targeted business objective(s):

 **Cost reduction**: Reduces the time and effort faculty spend on resource creation, freeing them to focus on instruction.

 **Enhanced learning experience**: Improves students' engagement and knowledge retention through personalized study materials.

**2. Magnitude of opportunity (with justification)**

**Magnitude**: Medium

 **Justification**: While the project does not generate direct revenue, it has a considerable impact on learning outcomes and student satisfaction. Streamlining resource generation is particularly valuable as it can enhance educational quality and support faculty workload management.

**3. Feasibility of development and implementation (with justification)**

1. **Individual components of feasibility**

 **Project Cost**: Low – Developing this project is relatively cost-effective as it can be built on top of existing foundation models for text generation.

 **Complexity of Implementation**: Moderate – The project will require NLP models fine-tuned to educational language and curriculum content, making implementation complexity manageable.

 **Data Adequacy**: High – The university’s access to syllabi, course materials, and assessments provides ample data to train the model effectively.

1. **Overall feasibility**

High.

With low cost and high data availability, this project is feasible and can be executed with moderate technical complexity.

**4. Likelihood of value capture (Low/Medium/High) with justification**

 **Likelihood**: Medium

 **Justification**: This tool’s impact will depend on the degree of adoption by faculty members. If widely adopted, it could lead to improved educational outcomes and reduce preparation time, achieving value capture through better academic experiences.

**5. Key Business Stakeholders**

 **Faculty Members**: Primary users who will use the tool to create course materials.

 **Educational Technology Department**: Supports integration and maintenance of the tool within the existing learning management systems.

 **IT Department**: Responsible for model updates, system stability, and data security.

 **University Administration**: Oversees the impact on teaching quality and faculty productivity.**For your fourth project, please provide the following detail:**

**Project 4 Name:** Multilingual Virtual Librarian

**Business Functional Area(s):** Cross-Functional (Library Services, External Outreach)

**Target Users:** University students, external visitors, and international academic partners

**1. Description of the project (including business problem to be addressed, how Generative AI will address that business problem, and the targeted business objective (revenue? customer acquisition? cost reduction?):**

- Business Problem Addressed: The university library often faces high demand for research assistance, particularly from users with diverse linguistic backgrounds. This can create challenges in providing adequate support, especially during peak times or for non-native speakers seeking resources in other languages.

- Role of Generative AI in addressing the business problem: This AI tool will act as a virtual librarian, offering research assistance, book recommendations, and resource navigation in multiple languages. By incorporating NLP with multilingual capabilities, the virtual librarian will cater to both internal and external users, enhancing accessibility and user satisfaction.

- Targeted business objective(s):

 **Enhanced accessibility**: Supports both local and international students by offering language-flexible research assistance.

 **User engagement and outreach**: Provides an interactive experience that increases the library’s engagement with students, faculty, and visitors.

 **Cost reduction**: Reduces the need for additional multilingual support staff.

**2. Magnitude of opportunity (with justification)**

 **Magnitude**: Large

 **Justification**: The virtual librarian can significantly impact both internal and external audiences by providing seamless, language-inclusive access to resources. The added reach to international partners enhances the university’s image and outreach efforts, making this a high-value project.

**3. Feasibility of development and implementation (with justification)**

1. **Individual components of feasibility**

 **Project Cost**: Moderate – Development involves integration with library systems and adding multilingual support, which may require additional resources.

 **Complexity of Implementation**: High – Multilingual capabilities require extensive language model customization and may need integration with external language libraries.

 **Data Adequacy**: Moderate – While some language resources are available, additional data for certain languages might be needed for optimal performance.

1. **Overall feasibility**

Medium.

Although moderately feasible, the complexity of multilingual support raises the technical bar. However, given its impact, the additional investment in language resources is justified.

**4. Likelihood of value capture (Low/Medium/High) with justification**

 **Likelihood**: High

 **Justification**: With the potential to serve a wide audience and improve accessibility, this project is highly likely to capture value by enhancing user experience and increasing engagement, especially among international visitors and non-native speakers.

**5. Key Business Stakeholders**

 **Library Services**: Core user group overseeing the virtual librarian’s functionality and integration.

 **IT Department**: Manages technical aspects, including system integration, multilingual model updates, and security.

 **International Relations Office**: Ensures alignment with international outreach and partnerships, especially for foreign language support.

 **University Administration**: Supports the project’s alignment with accessibility and engagement goals.**For your fifth project, please provide the following detail:**

**Project 5 Name:** Employee Knowledge Assessment System

**Business Functional Area(s):** Internal Operations & Human Resources

**Target Users:** University employees across various departments

**1. Description of the project (including business problem to be addressed, how Generative AI will address that business problem, and the targeted business objective (revenue? customer acquisition? cost reduction?):**

- Business Problem Addressed: Maintaining up-to-date knowledge of university policies and protocols among staff is challenging, especially as new policies are introduced or updated. Traditional training and assessments are time-intensive and may not provide real-time insights into staff knowledge retention.

- Role of Generative AI in addressing the business problem: This AI-powered system will generate quizzes and assessments on-demand based on existing policy documents and updates. It will evaluate employees' understanding of protocols, ensuring they remain informed and compliant with institutional guidelines. Real-time assessments will provide HR with insights into areas where further training may be needed.

- Targeted business objective(s):

 **Compliance and policy adherence**: Ensures employees understand and adhere to institutional policies, reducing risks associated with non-compliance.

 **Cost reduction**: Streamlines the training and assessment process, saving time and resources.

 **Employee performance and accountability**: Enhances employee performance by reinforcing knowledge of key policies.

**2. Magnitude of opportunity (with justification)**

 **Magnitude**: Medium

 **Justification**: While this project is not revenue-generating, it is crucial for maintaining compliance and reducing operational risks. The impact is significant in fostering a well-informed and compliant workforce, contributing to overall organizational efficiency.

**3. Feasibility of development and implementation (with justification)**

1. **Individual components of feasibility**

 **Project Cost**: Low – The cost is minimized by leveraging existing data on policies and training materials to develop assessments.

 **Complexity of Implementation**: Moderate – While creating the system requires some initial configuration, it mostly relies on text generation and question-answer models.

 **Data Adequacy**: High – The university already has policy documents, training materials, and procedural content that can be used to train the system effectively.

1. **Overall feasibility**

High.

With low costs and high data availability, this project is feasible and relatively straightforward to implement, making it a practical solution for enhancing compliance.

**4. Likelihood of value capture (Low/Medium/High) with justification**

 **Likelihood**: Medium

 **Justification**: The project’s value capture is moderate, as it will depend on consistent use by employees and support from HR to actively integrate it into training routines. Its impact on compliance and policy adherence makes it valuable, albeit indirectly.

**5. Key Business Stakeholders**

 **Human Resources (HR)**: Manages and oversees the system, ensuring it aligns with employee training goals.

 **IT Department**: Responsible for system maintenance, data security, and integration with HR systems.

 **Compliance Department**: Monitors assessment outcomes to ensure adherence to key policies.

 **University Administration**: Ensures that the tool aligns with organizational goals and contributes to a compliant and informed workforce.**For your sixth project, please provide the following detail:**

**Project 6 Name:** AI-Driven Predictive Maintenance for IT Infrastructure

**Business Functional Area(s):** IT & Infrastructure Management

**Target Users:** IT Department and university administrators

**1. Description of the project (including business problem to be addressed, how Generative AI will address that business problem, and the targeted business objective (revenue? customer acquisition? cost reduction?):**

- Business Problem Addressed: Unexpected IT infrastructure failures can disrupt operations, impacting student services, faculty access, and administrative tasks. The lack of a predictive mechanism for potential system failures increases the likelihood of downtime and maintenance costs.

- Role of Generative AI in addressing the business problem: This AI solution will analyze historical performance data to predict and flag potential failures in IT infrastructure. By leveraging generative models, the tool can simulate potential system states and anticipate failures, allowing proactive maintenance and minimizing disruptions.

- Targeted business objective(s):

 **Cost reduction**: Lowers maintenance expenses by transitioning from reactive to proactive maintenance.

 **Operational efficiency**: Enhances uptime, ensuring consistent availability of IT systems and resources.

 **Risk mitigation**: Reduces risks associated with unexpected system downtime.

**2. Magnitude of opportunity (with justification)**

 **Magnitude**: Large

 **Justification**: Given the criticality of IT infrastructure to daily university operations, proactive maintenance can prevent costly disruptions, enhance productivity, and maintain high levels of user satisfaction.

**3. Feasibility of development and implementation (with justification)**

1. **Individual components of feasibility**

 **Project Cost**: Moderate – Requires investment in data analytics and model training, but the long-term cost savings from predictive maintenance justify the initial expenditure.

 **Complexity of Implementation**: High – This involves advanced predictive modeling and integration with IT monitoring systems, which requires specialized expertise.

 **Data Adequacy**: Moderate – While some historical data exists, additional data collection and monitoring infrastructure may be required to build accurate predictive models.

1. **Overall feasibility**

Medium.

With moderate costs and data availability, the project is feasible but complex. It will require substantial setup, though the operational benefits are compelling.

**4. Likelihood of value capture (Low/Medium/High) with justification**

 **Likelihood**: High

 **Justification**: The project directly impacts the university’s operational reliability, making it highly likely to capture value by reducing downtime, improving user satisfaction, and lowering maintenance costs.

**5. Key Business Stakeholders**

 **IT Department**: Primary user and maintainer of the system, responsible for proactive infrastructure management.

 **Facilities Management**: Works alongside IT for coordinated maintenance, especially if physical components are involved.

 **University Administration**: Evaluates the project’s return on investment and operational impact.

 **Finance Department**: Assesses cost savings from reduced maintenance and downtime.

# Step 2 - Developing a Roadmap: Prioritizing Generative AI Opportunities in the Business

A strategic approach to Generative AI requires the business to consider the relative opportunities, costs, and risks of potential projects to identify the best order to carry out the projects. What should be tackled first? What is best pushed off until later? Completing the Generative AI Roadmap requires stepping through key considerations to determine which project(s) should be considered ‘top priority’ and at what pace these and subsequent projects should be initiated.

**1. Complete this “Rack and Stack Exercise” worksheet to determine the relative strategic alignment, cost, complexity of implementation, data adequacy, certainty of value capture, and magnitude of benefit for each of the six projects**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Direct Alignment with Strategic Goals?** | **Cost** | **Complexity of Implementation** | **Data Adequacy** | **Likelihood of Value Capture** | **Magnitude of Benefit** |
|  | 1=Low; 5=High | 1=High; 5=Low | 1=High; 5=Low | 1=Low; 5=High | 1=Low; 5=High | 1=Small; 5=Large |
| **Project 1:**  **AI-Powered Academic Advisor** | 4 | 2 | 3 | 5 | 3 | 3 |
| **Project 2:**  **Automated Research Literature Summarization** | 5 | 3 | 4 | 5 | 5 | 4 |
| **Project 3:**  **Intelligent Course Material Generation** | 3 | 1 | 2 | 5 | 2 | 2 |
| **Project 4:**  **Multilingual Virtual Librarian** | 5 | 4 | 4 | 3 | 5 | 5 |
| **Project 5:**  **Employee Knowledge Assessment System** | 2 | 1 | 2 | 4 | 3 | 2 |
| **Project 6:**  **AI-Driven Predictive Maintenance for IT Infrastructure** | 4 | 3 | 5 | 3 | 4 | 4 |

**Note: You may choose to represent this information on slide 8 of the CEO Presentation Template**

**Step 2, Part 2: Complete the Generative AI Opportunity Matrix, using slide 1 of the** [**CEO Presentation Template**](https://docs.google.com/presentation/d/1M8GtSkbWBq7R6f5N5_89ZRj0SEPSXgYzOdTs6J1d9tA/edit#slide=id.g88b9b2feb8_0_82)**. This matrix is intended to help prioritize GenAI projects, so you may decide to include your completed matrix as part of your CEO presentation.**

**Step 2, Part 3: Complete the table below by referencing the first four Generative AI projects chosen for implementation. Include your justification for each project's order of implementation (e.g., how will the third project benefit from being implemented after the completion of the first two projects?)**

|  |  |  |
| --- | --- | --- |
| **Project Order** | **Project Title** | **Order Justification** |
| 1 | Multilingual Virtual Librarian (Project 4) | This project has a high feasibility and significant impact on both internal and external users, as shown in the Opportunity Matrix. Implementing this first will provide immediate value and establish a foundation for accessibility that supports students, faculty, and international partners. |
| 2 | Automated Research Literature Summarization (Project 2) | With a high impact on research productivity and strong data adequacy, this project complements the first by enhancing research support for faculty and students. The academic impact will help increase productivity, laying a foundation for future research-driven initiatives. |
| 3 | AI-Driven Predictive Maintenance for IT Infrastructure (Project 6) | This project addresses IT stability, supporting a consistent environment for all digital projects. Its proactive maintenance capabilities reduce downtime risks, benefiting the prior projects by ensuring robust infrastructure availability for academic and research applications. |
| 4 | AI-Powered Academic Advisor (Project 1) | As a student-facing tool, this project will benefit from the enhanced stability and accessibility established by the prior projects. It focuses on improving the student experience through efficient academic support, rounding out the foundational set of tools for both students and faculty. |

**You may choose to represent this information on slides 6 and 7 of the CEO Presentation Template**

# Step 3 - Establishing a Generative AI Human Capital Strategy for your Data-driven Business

Now that we have established a roadmap for carrying out Generative AI projects, our attention must turn to building and configuring the organization we will leverage to carry out this roadmap. The Generative AI Human Capital Plan completed in this step will cover the organizational structure and talent configuration best suited to carry out the business’s roadmap, as well as the activities that the organization in particular -- and business more broadly -- must complete in order to promote a data-driven culture throughout the business.

**1. Identify the organizational model best suited for the Generative AI organization that your business will need to deliver on the roadmap completed in Step 2. Provide justification for your selection based on the needs, scope, and timing of projects to be implemented in the Generative AI Roadmap. If your organization should start with one model and evolve toward a different model, you may provide that detail and justification in your response.**

**Organizational Model:** Center of Excellence (CoE) with Cross-Functional Collaboration

**Justification:**

The **Center of Excellence (CoE)** model is the best fit for the Generative AI organization within the Center for Artificial Intelligence at King Khalid University, especially given the roadmap and diverse requirements of the projects outlined. Here's why this model is well-suited:

1. **Centralized Expertise and Resources**:
   * The CoE model allows for a centralized team of AI experts who are responsible for overseeing the development, deployment, and monitoring of Generative AI initiatives. This concentration of expertise ensures that each project benefits from a high level of AI proficiency, ensuring consistent quality and adherence to best practices.
2. **Cross-Functional Collaboration**:
   * While expertise is centralized, the CoE will work closely with specific functional departments, such as Academic Support, Research, Library Services, and IT Infrastructure. This cross-functional collaboration ensures that each project is closely aligned with the unique needs of its respective functional area, promoting effective customization and adoption.
3. **Scalability and Flexibility**:
   * The CoE model provides a scalable structure. As the AI initiatives mature and become more integrated into the university's operations, the organization could evolve toward a **Hybrid model**, where some departments take on more autonomy in managing AI tools and solutions. Initially centralizing the AI efforts allows for streamlined project management, while the flexibility of the model accommodates future decentralization as specific departments become more proficient in using and managing AI solutions independently.
4. **Efficient Resource Allocation**:
   * Given the sequential nature of the roadmap, the CoE model allows resources to be allocated efficiently. Expertise, data resources, and computing power can be prioritized according to the timeline, focusing on each project in turn. This structure minimizes redundancy and ensures that the team can focus on delivering high-quality, impactful projects in line with the roadmap.
5. **Support for a Data-Driven Culture**:
   * A CoE dedicated to AI initiatives will also play a crucial role in fostering a data-driven culture across the university. Through training sessions, workshops, and regular updates, the CoE can educate staff and students on the benefits and ethical considerations of Generative AI. This helps to build awareness, trust, and excitement around AI, encouraging broader acceptance and integration.

**2. Identify the individuals you might invite to participate in a Stakeholders Council. What other stakeholders should also be involved outside of that council?**

1. **Individuals you would include on a Generative AI Stakeholders Council:**

 **Chief AI Officer (CAIO)**

* **Role**: Leads the overall vision and strategic direction for AI initiatives at King Khalid University, ensuring alignment with institutional goals and generative AI advancements.

 **Chief Academic Officer (CAO)**

* **Role**: Represents academic support services, especially for student-focused projects like the AI-Powered Academic Advisor. Provides insights to tailor projects for student success and faculty needs.

 **Chief Research Officer (CRO)**

* **Role**: Oversees research-related AI applications, such as the Automated Research Literature Summarization project. Ensures that AI initiatives align with university research goals and enhance academic productivity.

 **University Librarian**

* **Role**: A critical stakeholder for the Multilingual Virtual Librarian project, offering expertise on library resources, user needs, and external outreach, especially for international students and visitors.

 **Chief Information Officer (CIO)**

* **Role**: Responsible for IT infrastructure, data security, and integration, with a particular focus on the AI-Driven Predictive Maintenance project. Ensures system compatibility and security across all generative AI projects.

 **Chief Human Resources Officer (CHRO)**

* **Role**: Provides guidance on staff training and AI-driven HR initiatives, such as the Employee Knowledge Assessment System. Plays a key role in fostering a data-driven culture and identifying AI-related skill requirements.

 **Chief Compliance and Ethics Officer (CCEO)**

* **Role**: Ensures all Generative AI projects align with ethical standards and regulatory requirements, focusing on data privacy and responsible AI usage. Maintains transparency and trust in AI initiatives.

1. **Other stakeholders who should be involved outside that council:**

 **Faculty Representatives from Key Departments**

* Faculty members from departments like Computer Science, Library Sciences, and Business provide insights on the impact and usability of AI projects, especially for student-facing tools.

 **Student Representatives**

* Engaging students in feedback sessions provides firsthand user insights, particularly for tools like the AI-Powered Academic Advisor and Multilingual Virtual Librarian. They can help gauge student satisfaction and suggest improvements.

 **IT Support Staff**

* While not decision-makers, IT staff are essential for implementing, troubleshooting, and maintaining the systems developed by the Generative AI initiatives. Their feedback ensures smoother operations and improved support structures.

 **External Academic and Industry Advisors**

* External advisors bring best practices, emerging trends, and insights into potential challenges in AI implementation, helping to align university projects with industry standards and innovations.

 **Marketing and Communications Team**

* Responsible for communicating AI project progress and successes to stakeholders, students, and the wider community, building trust in AI-driven changes and ensuring transparency in AI initiatives.

**3. Identify the technical and non-technical roles you would initially want to fill to execute your Generative AI initiatives.**

|  |  |
| --- | --- |
| **Role** | **Primary Job Duties** |
| AI Project Manager | Oversees project timelines, resources, and deliverables, ensuring that AI initiatives align with the roadmap. Coordinates between technical and non-technical teams. |
| Data Scientist | Develops machine learning models, fine-tunes foundation models, and analyzes data to optimize AI solutions. Works closely with data engineers and domain experts. |
| Machine Learning Engineer | Implements, tests, and deploys AI models, focusing on model performance and scalability. Collaborates with software engineers for integration into university systems. |
| Generative AI Engineer | Specializes in building and optimizing Generative AI systems, ensuring efficient model training, fine-tuning, and deployment. Works closely with data scientists and ML engineers to adapt models for specific business needs. |
| Prompt Designer | Focuses on designing and structuring effective prompts to optimize LLM responses. Collaborates with data scientists and UX designers to create prompts tailored to each project's needs. |
| Software Engineer | Builds, maintains, and integrates AI solutions into university applications and databases. Ensures compatibility and stability of AI tools within the existing infrastructure. |
| Data Engineer | Prepares, cleans, and organizes data pipelines to support AI model training and real-time data feeds. Works on data warehousing and ensures data integrity. |
| NLP Specialist | Focuses on natural language processing tasks, especially for text generation and multilingual applications. Optimizes language models for specific tasks like summarization. |
| User Experience (UX) Designer | Designs intuitive interfaces for AI tools, focusing on enhancing user interactions for projects like the AI-Powered Academic Advisor and Multilingual Virtual Librarian. |
| Ethics and Compliance Officer | Ensures AI projects adhere to ethical standards, regulatory guidelines, and privacy laws. Develops guidelines for responsible AI use and addresses potential risks. |
| Human Resources (HR) Liaison | Manages recruitment and training for AI roles, ensures the team has required skills, and fosters a data-driven culture through internal workshops and educational programs. |
| Academic Liaison | Acts as a bridge between the AI team and academic departments. Gathers feedback on AI tools from faculty and students to ensure solutions meet educational needs. |
| IT Infrastructure Specialist | Manages the hardware and software infrastructure needed for AI models, including cloud services, GPUs, and networking requirements. Ensures system reliability and uptime. |
| Library Services Liaison | Works with the AI team to integrate the Multilingual Virtual Librarian with library resources. Provides insights on user needs and collaborates on enhancing library services. |
| Quality Assurance (QA) Tester | Tests AI tools for functionality, usability, and robustness. Ensures that each tool meets performance requirements before release and identifies areas for improvement. |
| Communications Specialist | Develops internal and external communication strategies to update stakeholders on AI project progress. Manages content for AI-related announcements, tutorials, and feedback. |

# Step 4 - Crafting a Generative AI Position Statement for your Business

The explosion in public interest in generative AI has ushered in a period in which, more than ever before, a business’s external and internal stakeholders are showing interest in the ways in which a business is implementing a specific technology. As such, businesses who plan to leverage Generative AI must determine and make public its position regarding how this technology is aligned with core strategy as well as how the business will implement the technology in a responsible manner. The Generative AI Position Statement completed in this step will cover both of these needs.

Draft an initial Generative AI Position Statement outlining the company's perspective on Generative AI and how it will be implemented. In particular:

* Detail how Generative AI fits with the company's core strategy
* Detail how Generative AI will be implemented in a responsible manner reflective of the context in which the company operates.

**Generative AI Position Statement for the Center for Artificial Intelligence at King Khalid University**

**Position Statement:**

At the Center for Artificial Intelligence at King Khalid University, we believe that Generative AI is a transformative technology with the potential to significantly enhance the educational experience, drive research innovation, and streamline university operations. Our commitment to leveraging Generative AI aligns closely with our core strategy of fostering a forward-thinking, data-driven, and accessible academic environment that supports students, faculty, and researchers in achieving their fullest potential.

**Alignment with Core Strategy:**

Generative AI directly supports our mission to advance academic excellence and innovation through cutting-edge technology. By integrating AI-driven solutions across our academic support, research, and administrative functions, we aim to:

* **Enhance Educational Quality**: Empower students and faculty with AI tools that provide personalized learning support, streamlined access to resources, and enriched research capabilities.
* **Advance Research Productivity**: Enable faculty and researchers to access and synthesize information faster, contributing to higher-quality academic output and promoting a culture of knowledge sharing and innovation.
* **Improve Operational Efficiency**: Streamline university operations, reduce administrative burdens, and allocate resources effectively through predictive and automated AI solutions.

**Commitment to Responsible Implementation:**

As we integrate Generative AI into our operations, we are dedicated to a responsible approach that reflects our values, ethical standards, and the unique context of our academic community:

* **Ethical AI Practices**: We prioritize transparency, fairness, and accountability in our AI applications, ensuring that our Generative AI solutions uphold high standards of data privacy, security, and user consent.
* **Inclusivity and Accessibility**: Our AI initiatives, such as the Multilingual Virtual Librarian, are designed to make university resources accessible to a diverse population, including international students and users from varied linguistic backgrounds.
* **Continuous Monitoring and Improvement**: We will establish oversight mechanisms, including a dedicated Ethics and Compliance team, to monitor the impact of our AI solutions and make iterative improvements based on stakeholder feedback and evolving standards.
* **Educational Outreach and Transparency**: Through workshops, clear communication, and feedback channels, we aim to foster a data-driven culture within the university, helping students, faculty, and staff understand and engage with AI responsibly.

In aligning Generative AI with our core strategic goals and committing to ethical practices, King Khalid University is poised to lead in the responsible adoption of AI in academia, creating a sustainable and innovative academic environment for future generations.

# Step 5 - Establishing the Technical Infrastructure to Support the Generative AI Organization

Having identified Generative AI opportunities, worked those opportunities into a roadmap, identified how best to organize Generative AI within the organization, identified whom to hire to execute our Generative AI initiatives, and crafted a GenAI Position Statement, we now turn the final piece of our GenAI puzzle: planning for the technological capabilities that must be built to support the new Generative AI organization.

Your task for Step 5 is to prepare a Technical plan for executing your Generative AI roadmap.

1. **Explain how your first three Generative AI projects will leverage a foundation model(s) yet also be able to respond with information particular to your business and the specific business problem addressed by the project.**

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| **Project** | **Explanation** |
| Project 1:  Multilingual Virtual Librarian | * **Foundation Model(s)**: This project will leverage a large language model (LLM) pre-trained on multilingual data, such as OpenAI’s GPT-4 or Google’s T5 model, fine-tuned for library-related queries and content in multiple languages. * **Customization for Business Needs**: The model will be fine-tuned with King Khalid University’s library catalog, research databases, and commonly accessed resources, enabling it to provide specific book recommendations, research assistance, and resource navigation tailored to our collections. * **Problem-Specific Solution**: The customized model will handle diverse linguistic needs, ensuring that users receive relevant information in their preferred language. The fine-tuning process will also incorporate frequent library inquiries and usage patterns to provide prompt and accurate responses. |
| Project 2:  Automated Research Literature Summarization | * **Foundation Model(s)**: This project will utilize a summarization-focused LLM, such as BART or T5, optimized for processing academic language. An open-source model like BERTSUM can also be customized for summarizing complex academic texts. * **Customization for Business Needs**: The model will be fine-tuned with research papers, academic articles, and scholarly databases that are regularly accessed by King Khalid University researchers. Domain-specific jargon, publication structure, and abstract patterns from scientific fields will be incorporated into the model’s training set. * **Problem-Specific Solution**: Fine-tuning with research literature from relevant fields will allow the model to generate concise, meaningful summaries that highlight methodologies, results, and implications. This tailored approach will help researchers quickly digest information, enhancing productivity in academic research.. |
| Project 3:  AI-Driven Predictive Maintenance for IT Infrastructure | * **Foundation Model(s)**: For predictive maintenance, a time-series or anomaly detection model such as Prophet (Facebook’s model) or an LSTM-based model is well-suited. These models can forecast potential issues based on historical data from IT infrastructure. * **Customization for Business Needs**: The model will be trained with historical performance logs, error codes, and downtime records from the university’s IT infrastructure to detect unusual patterns or predict failures. Specific parameters and thresholds can be adjusted based on the university’s operational requirements. * **Problem-Specific Solution**: By leveraging a model trained on King Khalid University’s IT data, the predictive maintenance system will alert the IT department to potential failures, enabling proactive maintenance. This customization ensures the model is aligned with the university’s unique infrastructure, reducing system downtime and improving operational reliability. |

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1. **Provide justification for each project's foundation model approach, and detail any challenges you anticipate having to address with each project.**

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| --- | --- | --- |
| **Project** | **Justification** | **Challenges** |
| Project 1:  Multilingual Virtual Librarian | A multilingual foundation model like GPT-4 or T5 is ideal for this project because these models are pre-trained on multiple languages, providing an extensive linguistic base. This allows for rapid adaptation to the diverse language needs of university library users. By fine-tuning with library-specific data, we can enhance the model’s relevance and usability for students, faculty, and international visitors, providing tailored recommendations and support. | * Data Privacy and Security: Ensuring that no sensitive user data is exposed during interactions with the model. * Multilingual Nuances: Achieving accuracy across languages can be challenging, especially with complex academic terms or idiomatic expressions in different languages. * Bias in Multilingual Data: Addressing inherent biases in multilingual pre-trained models to ensure fair and equitable support for all users, regardless of language. |
| Project 2:  Automated Research Literature Summarization | The use of summarization models like BART or T5 is justified because these models are effective at condensing long-form text while preserving key information. Fine-tuning the model with academic literature enables it to handle the specific structure and terminology found in research papers. This approach will significantly reduce the time researchers spend on literature reviews, making the summarization tool highly beneficial for academic productivity. | * Data Privacy and Security: Ensuring that no sensitive user data is exposed during interactions with the model. * Multilingual Nuances: Achieving accuracy across languages can be challenging, especially with complex academic terms or idiomatic expressions in different languages. * Bias in Multilingual Data: Addressing inherent biases in multilingual pre-trained models to ensure fair and equitable support for all users, regardless of language. |
| Project 3:  AI-Driven Predictive Maintenance for IT Infrastructure | Time-series and anomaly detection models, such as LSTM or Prophet, are well-suited for predictive maintenance tasks. These models are effective at detecting patterns in historical data to forecast potential failures. By customizing the model with the university's IT infrastructure data, we can tailor it to predict specific maintenance needs, enabling proactive support and minimizing downtime. | * Data Privacy and Security: Ensuring that no sensitive user data is exposed during interactions with the model. * Multilingual Nuances: Achieving accuracy across languages can be challenging, especially with complex academic terms or idiomatic expressions in different languages. * Bias in Multilingual Data: Addressing inherent biases in multilingual pre-trained models to ensure fair and equitable support for all users, regardless of language. |

1. **For each project, provides 2 example prompts along with each of the following:**
   1. **Wording of the example prompt**
   2. **Examples of business data expected to support the prompt response (in whatever foundation model approach is chosen)**
   3. **Wording of an ideal response**

**Project 1:**

1. **Wording of first example prompt:**

Can you recommend books on machine learning in Arabic?

1. **Examples of business data expected to support the prompt response**

Library catalog data, metadata for books (including topics and languages), user language preferences, and prior search data.

1. **Wording of an ideal response**

Here are some recommended books on machine learning in Arabic: Machine Learning Basics by Dr. Ali Al-Mutlaq, Applied Machine Learning by Prof. Noura Al-Saad, and Deep Learning Principles by Ahmed Al-Rahim. Would you like assistance with locating them in the library?

1. **Wording of second example prompt:**

What resources are available on climate change research for international students?

1. **Examples of business data expected to support the prompt response**

Library’s database of research articles and journals, resource metadata tagged by topic, language, and intended audience, and information about access permissions for external resources.

1. **Wording of an ideal response**

We have several resources on climate change research available for international students, including Journal of Climate Change Science, Environmental Research Letters, and Global Warming Review. You can access these journals online or request printed copies.

**Project 2:**

1. **Wording of first example prompt:**

Summarize the key findings of recent research on renewable energy efficiency.

1. **Examples of business data expected to support the prompt response**

Full-text research articles on renewable energy, abstract and summary data from research databases, and keywords related to renewable energy.

1. **Wording of an ideal response**

Recent studies on renewable energy efficiency highlight advancements in solar panel technology, with improvements in photovoltaic efficiency by up to 20% in recent models. The findings also emphasize the importance of hybrid systems combining wind and solar power to maximize efficiency in varying climates.

1. **Wording of second example prompt:**

What are the main challenges discussed in recent publications about AI in healthcare?

1. **Examples of business data expected to support the prompt response**

Academic journal articles on AI in healthcare, abstracts and conclusions from recent studies, and topic-specific data on challenges in healthcare.

1. **Wording of an ideal response**

Key challenges in AI implementation in healthcare include data privacy concerns, interoperability between systems, the need for standardized data formats, and the high cost of integrating AI solutions into existing healthcare infrastructure.

**Project 3:**

1. **Wording of first example prompt:**

What is the likelihood of a server failure in the next 30 days based on recent data?

1. **Examples of business data expected to support the prompt response**

Historical server performance data, incident logs, failure rates, and environmental factors (e.g., temperature, usage levels)

1. **Wording of an ideal response**

Based on recent performance data, there is a 25% likelihood of a server failure within the next 30 days. Factors contributing to this probability include increased CPU usage and previous error logs indicating potential hardware issues.

1. **Wording of second example prompt:**

Identify any anomalies in network traffic over the past week that could indicate a future breakdown.

1. **Examples of business data expected to support the prompt response**

Network traffic logs, historical patterns of network usage, error and warning logs, and server health metrics.

1. **Wording of an ideal response**

Analysis shows an unusual spike in network traffic on two occasions over the past week, coupled with minor packet loss. These anomalies could indicate potential network strain and may require further investigation to prevent future disruptions.

1. **Your company will, of course, need to build an architectural "stack" to support your generative AI projects. For each of your top two projects, detail how each of the components of this stack will operate to support the execution of that project.**

**Project 1:**

|  |  |
| --- | --- |
| **Component** | **How component will operate to support project execution** |
| Data Preprocessing | Data Preprocessing Pipeline: Cleans and organizes library data, user query logs, and multilingual resources to ensure accurate information retrieval. Prepares library metadata, FAQs, and resource guides to support the NLP Engine and Language Model, creating a robust dataset for multilingual understanding and library-specific responses. |
| Prompt Engineering | Natural Language Processing (NLP) Engine: Processes user queries across multiple languages, translating them into structured prompts that the Language Model can interpret effectively. Tailors prompt structures based on common library queries, optimizing them to respond accurately to questions related to book recommendations, research assistance, and navigation. |
| Prompt Execution | Language Model (e.g., GPT-4 or T5): Serves as the core foundation model, fine-tuned for multilingual support and library-specific queries, generating accurate responses based on the user input. The Recommendation Engine leverages the executed prompts to provide personalized book recommendations, research materials, and resources based on user history and query context. |
| Maintenance and Orchestration | Analytics and Monitoring Tools: Track engagement metrics, user satisfaction, and response times, enabling continuous improvement. Cloud Infrastructure (e.g., AWS or Azure) provides scalable storage and processing power. Identity and Access Management (IAM) ensures secure user access to resources, while Audit and Compliance Monitoring maintain data privacy and ethical AI use. Feedback Loop System collects user feedback on response relevance, facilitating ongoing model refinement and improvement. |

**Project 2:**

|  |  |
| --- | --- |
| **Component** | **How component will operate to support project execution** |
| Data Preprocessing | Data Preprocessing Pipeline: Cleans, organizes, and prepares academic research articles, ensuring consistency and quality before inputting into the summarization model. It structures data with domain-specific vocabularies, integrating academic terminology to improve summarization accuracy. Academic Database Integration provides access to research papers, enabling comprehensive preprocessing for optimal input. |
| Prompt Engineering | Natural Language Processing (NLP) Engine: Processes research-related queries and academic language, converting them into structured prompts optimized for summarization. Domain-Specific Vocabulary Layer refines prompts by integrating field-specific terminology and keywords, ensuring that the summarization model produces outputs with high relevance and context in academic language. |
| Prompt Execution | Summarization Model (e.g., BART or T5): Executes the core summarization tasks, generating concise summaries of research articles based on structured prompts. Search and Retrieval Module allows efficient access to summarized content by researchers, based on keywords or research topics, ensuring that users quickly find relevant insights and literature reviews. Storage Layer archives past summaries for easy reference and reduces the need for repeated processing. |
| Maintenance and Orchestration | Analytics and Monitoring Tools: Track system usage, summary accuracy, and user engagement, providing data for continuous improvement. High-Performance Computing (HPC) Resources and Cloud Infrastructure support the computational requirements for large academic datasets, enabling smooth summarization processes. Ethics and Compliance Module ensures summaries adhere to ethical guidelines and academic standards, while Audit and Compliance Monitoring tracks compliance with academic database usage policies. The Feedback Loop System enables researchers to provide quality feedback on summaries, allowing further model fine-tuning. |

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# Step 6 (OPTIONAL) - Record a short video of you presenting your final slide deck to your CEO or Executive Committee (5 minutes)

You may wish to submit a short video of you presenting your final presentation to your CEO; while this is not a formal requirement for the Capstone project, it does provide an outstanding way to gain practice with communicating about Generative AI in business contexts.