The Illinois Sustainability Impact Engine, is a strategic roadmap to transform the Gies Sustainability Dashboard from a descriptive repository into a predictive and prescriptive platform. This approach focuses on scaling the data foundation, generating actionable intelligence for key stakeholders, and delivering a world-class user experience to connect university expertise with pressing societal needs.

The strategy is organized around the three core pillars outlined in the competition: Data Engine, Insight Generation, and User Experience.

Pillar 1: The Data Engine (A Scalable Data Strategy)

The goal here is to create a robust, scalable, and trustworthy data foundation that provides a holistic view of the university's sustainability impact.

Data Acquisition and Verification

- **Phased Scaling Strategy:** To scale beyond Gies to other universities, we propose a three-phase rollout:
    1. **Phase 1 (University of Illinois System):** Expand data collection to all Urbana-Champaign colleges, followed by the Chicago and Springfield campuses. This leverages existing infrastructure and institutional knowledge.
    2. **Phase 2 (Big Ten Academic Alliance):** Target partner institutions by combining API access from primary academic databases (like Scopus or Web of Science) with targeted web scraping of their official faculty directories and research portals.
    3. **Phase 3 (Top Research Universities):** Generalize the data ingestion process to accommodate the varied data structures of other top US universities.
- **Automated Faculty Verification:** To ensure data accuracy , we'll implement a multi-source verification process that cross-references university faculty directories with publication metadata and persistent researcher identifiers (like ORCID iDs) to create a confidence score for each faculty member's current affiliation.

Expanding Data Horizons

To create a more complete picture of sustainability impact, we recommend incorporating new data types beyond research publications:

- **Grants & Funding:** Integrate data from federal databases (e.g., NSF, NIH) to link research projects with their funding sources, amounts, and stated objectives.
- **Patents & Intellectual Property:** Pull data from the USPTO and other patent offices to track the commercialization of sustainability research.
- **Course Curricula:** Scrape the university's course catalog to identify and map sustainability-related courses, providing insight for students and curriculum planners.
- **Public Policy & Corporate Partnerships:** Use NLP to scan university press releases, news archives, and foundation reports to identify mentions of faculty expertise influencing policy or corporate strategy.

Accuracy and Trustworthiness

To build user trust, the platform must be transparent and responsive.

- **Transparent AI:** We propose an **"Insight Details"** feature. For any AI-generated classification (like mapping a paper to an SDG), users can click to see the model's confidence level, the key text snippets that influenced the decision, and a simplified explanation of the logic.
- **Human-in-the-Loop Feedback:** We will integrate an interactive feedback mechanism, such as a **"Flag this Classification"** button. User-submitted corrections (especially from verified faculty) will be used to flag potential errors and provide valuable data for retraining and fine-tuning the classification model.

Pillar 2: From Data to Decisions (Actionable Insight Generation)

A great dashboard provides intelligence that drives decisions. Our strategy focuses on creating tailored insights for specific audiences.

Strategic Tools for University Leadership

For Deans and Provosts, we propose a secure **"Strategic Planning View"** that visualizes:

- **Research Portfolio Analysis:** Maps showing institutional strengths, weaknesses, and gaps across the 17 SDGs.
- **Collaboration Networks:** A network graph identifying opportunities for interdisciplinary research teams by connecting faculty from different colleges working on similar problems.
- **Emerging Trend Analysis:** Using predictive analytics on publication data to identify emerging research trends, which can inform faculty hiring and strategic investments.

Fostering Collaboration and Storytelling

- **Collaboration Hub:** A feature that allows researchers to search for collaborators not just by name or department, but by SDG alignment, research methods, or specific keywords. The system could proactively suggest potential interdisciplinary teams based on complementary research profiles.
- **Automated Impact Narratives:** For donors and sponsors , the dashboard will generate dynamic "impact stories". For example, it could automatically construct a narrative: *"Professor X's research on SDG 7 (Clean Energy), funded by the Y Foundation, has resulted in 3 patents, a spin-off company employing 25 people in Illinois, and has been integrated into 2 undergraduate courses."*

Pillar 3: The User Experience (Dashboard & Visualization Design)

This pillar reimagines the interface to maximize clarity and impact for a diverse audience. All elements listed in the prompt are addressed below.

The Landing Page

The "first glance" experience must be compelling and intuitive.

- **The 5 Critical Elements:**

1. **A Prominent, Persona-Driven Search Bar:** "Explore research, find experts, and see our impact."
2. **High-Level Impact Metrics:** Live-updating numbers (e.g., "1,200+ Researchers," "Supporting 17 SDGs," "300+ Active Projects").
3. **Interactive SDG Wheel:** A clickable graphic of the 17 UN SDGs, allowing users to immediately dive into an area of interest.
4. **Featured Impact Story:** A rotating tile showcasing a compelling, data-driven narrative about a project or researcher.
5. **Clear Calls to Action:** Buttons tailored to key audiences: "For Students," "For Researchers," and "For Partners & Donors."

- **Wireframe:** The layout would feature the search bar at the top, key metrics below it, the SDG wheel on the left, and the featured story on the right, with the calls to action at the bottom.
- **Driving Traffic:** We will drive traffic by embedding dynamic content widgets (e.g., "Recent Sustainability Publications") on college, department, and faculty profile websites. We will also promote the dashboard in university-wide communications to students, alumni, and donors.

Advanced Visualizations

We will move beyond standard charts to tell a more compelling story.

- **Network Graphs:** To visualize collaboration between researchers, departments, and even universities. This is more effective than a table because it instantly reveals clusters of expertise and potential interdisciplinary connections.
- **Geographic Heatmaps:** To show the global impact and geographic focus of research projects. This makes the abstract concept of "societal impact" tangible and visually engaging.
- **Interactive Trendlines (Streamgraphs):** To illustrate how research focus across different SDGs has evolved over time, showing the university's responsiveness to global challenges.

User Journeys & Personas

We will design intuitive navigation paths for key user personas.

- **Persona 1: A prospective student looking for a faculty mentor in sustainable finance.**
    1. **Entry:** Lands on the dashboard and types "sustainable finance" into the main search bar.
    2. **Navigation:** The results page shows relevant faculty, publications, and courses. The student uses a filter to select "Faculty" and "College of Business."
    3. **Discovery:** Clicks on a professor's profile to view their specific SDG alignment (e.g., SDG 8: Decent Work and Economic Growth), a list of recent publications, active grants, and contact information. The journey is quick, targeted, and provides all necessary information in one place.
- **Persona 2: A donor interested in funding renewable energy research.**

1. **Entry:** Lands on the dashboard and is drawn to the interactive SDG wheel, clicking on **SDG 7: Affordable and Clean Energy**.
2. **Navigation:** This leads to an SDG 7 portal page summarizing the university's work in this area, including top researchers, key labs, total funding attracted, and major corporate partners.
3. **Discovery:** The donor uses a "drill-down" option to explore featured "impact stories" , reading about how a solar research project led to a local startup. The story concludes with a clear link to "Partner with Us," directing the donor to the university's advancement office to facilitate a donation.