ALY6080

Professor: Dr. Junwei Huang

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Sponsor: ImEx Corporation

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Team members:

Shivam Patel

Surya Devrath

Narasimha Singireddy

Introduction:

The primary goal of the IMEX CARGO project is to examine the distribution of funds linked to logistics and transportation that are offered by different national and international organizations. The need for optimized logistics infrastructure and effective freight movement has never been greater due to the growing interconnectedness of the global economy. IMEX CARGO uses grant data to find trends, pinpoint important players, and draw attention to financing objectives that will influence supply chains and international trade in the future.

The interactive dashboard offers a quick overview of:

- The leading organizations that award grants,
- Grants' annual keyword trends from 2019 to 2025,
- Distribution of financing organizations worldwide,
- Additionally, the percentage of grant attention that each logistics-related term received.

IMEX CARGO provides insightful information on how many industries and geographical areas are making investments in the future of international trade and transportation through this data-driven and visual investigation.

Data Creation & Overview:

To support the IMEX CARGO initiative with timely and relevant insights, we built a custom dataset by tapping into the U.S. federal grants system. Using R programming, we connected to the Grants.gov API and automated the search for grant opportunities that align with logistics-related areas like freight, exports, transportation, and warehousing.

Our R script was programmed to cycle through a list of targeted keywords logistics, freight, export, transportation, and warehousing—and pull data on both currently posted and upcoming (forecasted) grant opportunities. For each match, the script extracted key information such as the grant ID, title, issuing agency, status, open/close dates, and CFDA codes (which indicate the funding program).
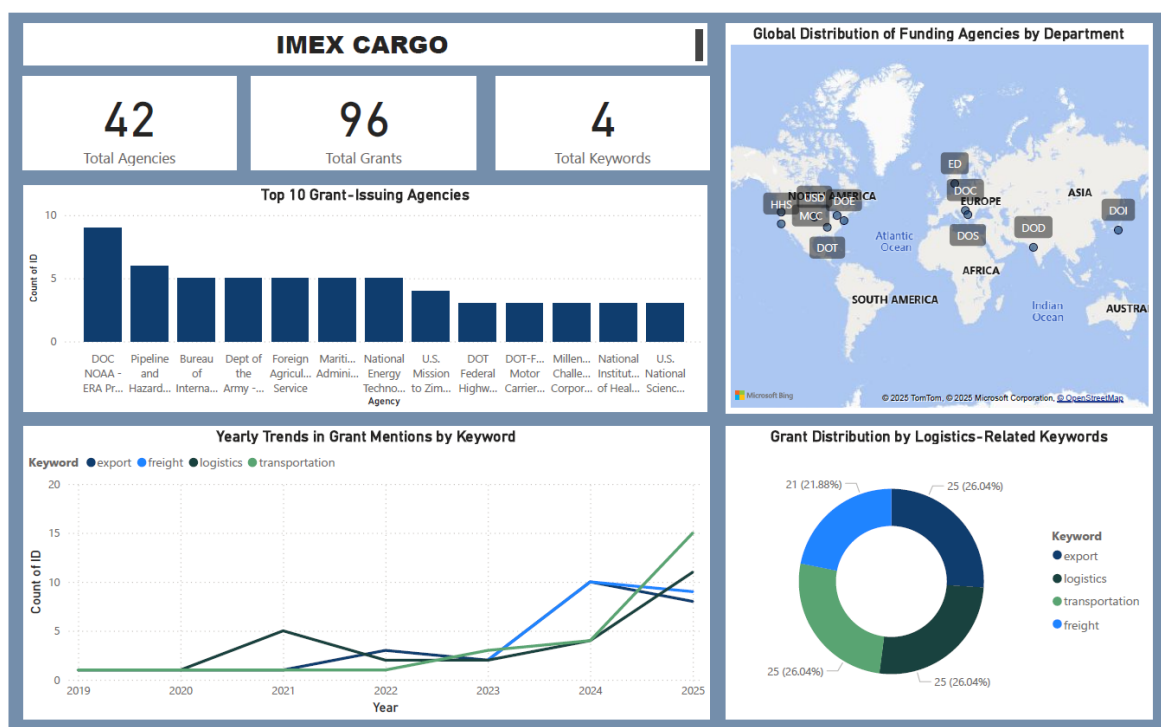
Once we had the raw data, we manually enhanced it to make it more relevant for analysis. We added NAICS codes and their corresponding descriptions by aligning the keywords and grant summaries with official industry classifications from the NAICS directory. This helped us better categorize each grant based on its sector.

We also created a Map Location field by referencing each agency's geographic or jurisdictional reach. For instance, if a grant came from the "U.S. Mission to Zimbabwe," we tagged it under "DOS" (Department of State), which has global coverage. Grants from the Department of Transportation were marked as "DOT," reflecting their domestic transport focus. This step allowed us to build more meaningful geographic visuals in Power BI.

By combining automated data collection with thoughtful manual enrichment, we've developed a well-rounded dataset that can effectively track logistics-focused federal funding trends across industries and regions giving IMEX CARGO a valuable edge in strategic planning and decision-making.

EDA Dashboard Visualizations:

The interactive dashboard provides an in-depth visual exploration of the logistics-related grant data. It enables stakeholders to quickly identify key agencies, track keyword trends, and understand the global scope of funding activities.

To get a clear picture of who's leading the charge in funding logistics-related initiatives, we created a **bar chart showcasing the Top 10 Grant-Issuing Agencies**. Bar charts are great for highlighting differences between categories, and in this case, they clearly show which agencies are most active. Not surprisingly, departments like **DOC NOAA-ERA, the Department of Transportation (DOT), and the Department of State (DOS)** top the list. This gives organizations and researchers a quick snapshot of where to focus their outreach or partnership efforts.

We also wanted to understand the **geographical footprint of logistics funding**, so we visualized it using a **global map**. This map highlights that the majority of grants come from U.S.-based agencies like DOT and DOC. However, it also reveals a growing presence of international contributors in regions such as **Africa, Europe, and Asia**, emphasizing the global nature of supply chain and logistics support. Maps are particularly effective for conveying this kind of spatial insight.

Next, we explored **how funding priorities have evolved over time** using a **line chart of yearly keyword trends** from 2019 to 2025. One of the most noticeable patterns is the sharp increase in transportation-related grant mentions after 2023. This likely reflects renewed government focus on infrastructure and supply chains following the pandemic. Line charts are perfect for identifying trends, and here, they highlight how dynamic the funding landscape has
Finally, to understand the **focus areas within logistics**, we used a **donut chart to break down grant mentions by keyword**. The results were pretty balanced: transportation, freight, and logistics each accounted for about 26% of mentions, with export slightly behind at 21%. This even spread suggests that funding is being thoughtfully distributed across core logistics

domains. The donut chart makes it easy to grasp these proportions at a glance.

Key Findings:

1. **KPI Summary Cards**

   - **Total Agencies:** 42 unique organizations issued logistics-related grants.
   - **Total Grants:** 96 grants were retrieved based on relevant keywords.
   - **Total Keywords:** 4 major operational terms were tracked logistics, freight, transportation, and export.

   These KPIs provide a snapshot of the breadth and depth of federal engagement in logistics funding.

2. **Top 10 Grant-Issuing Agencies**

   The bar chart highlights the most active agencies. The DOC NOAA-ERA Program leads with the highest number of grants, followed by the Pipeline and Hazardous Materials Administration, and Bureau of International Labor Affairs. This chart reflects both the sectoral spread and volume of engagement in logistics-supporting initiatives.

3. **Global Distribution of Funding Agencies by Department**

   The world map visual categorizes agencies geographically by department (e.g., DOT, DOC, DOS, DOE, etc.). While the United States dominates the landscape, international missions such as the U.S. Mission to Zimbabwe and agencies in Europe, Asia, and Africa reflect global investment in transportation and infrastructure development.

4. **Yearly Trends in Grant Mentions by Keyword (2019–2025)**

   This line graph tracks annual keyword mentions to show trends over time:
   - Significant growth is observed from 2023 onward, particularly for transportation.
   - This rise likely aligns with post-pandemic recovery efforts, infrastructure investments, and renewed supply chain resilience priorities.
   - Other keywords **freight**, **logistics**, and **export**—also show upward movement, indicating consistent relevance.

5. **Grant Distribution by Logistics-Related Keywords**
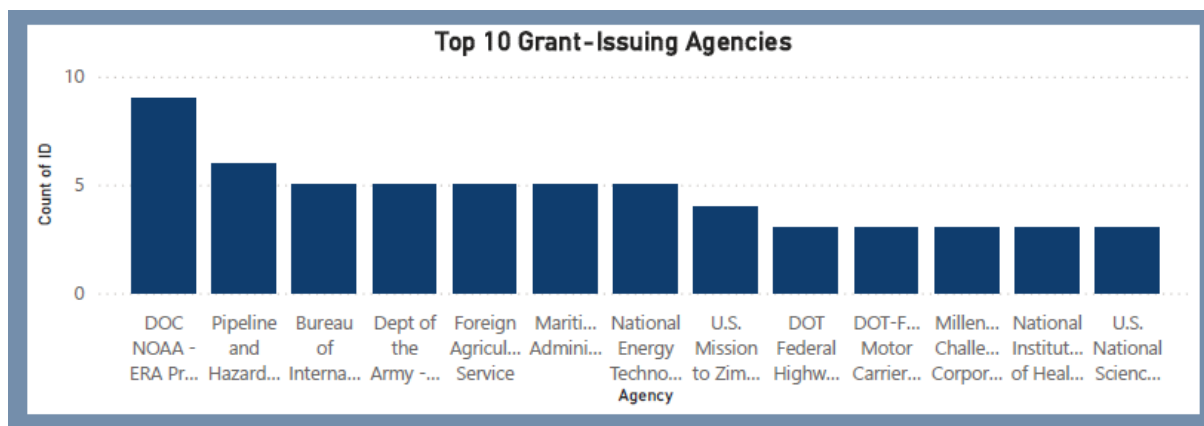
   This donut chart shows a nearly even distribution:
   - **Logistics, transportation, and freight** each account for 26.04% of grants.
   - **Export** trails slightly at 21.88%.

   This balance demonstrates a **comprehensive funding approach**, covering all facets of cargo movement—from planning to infrastructure and international trade.

Dashboard Visuals for EDA and Insights

1. Top 10 Agencies Issuing Grants

- Nine funds were awarded by the DOC NOAA-ERA Program, demonstrating its critical role in advancing transportation infrastructure and environmental resilience.
- Funding priorities for hazard reduction, cargo safety, and marine logistics are recommended by organizations such as the marine Administration and the Pipeline and Hazardous Materials Safety Administration.
- Cross-sectoral integration is demonstrated by the Department of the Army and the Bureau of International Labor Affairs, which highlight the connections between logistics, labor, and defense.

Takeaway: The range of organizations participating demonstrates that financing for logistics extends beyond conventional transportation departments and includes the labor, environmental, military, and diplomatic domains.
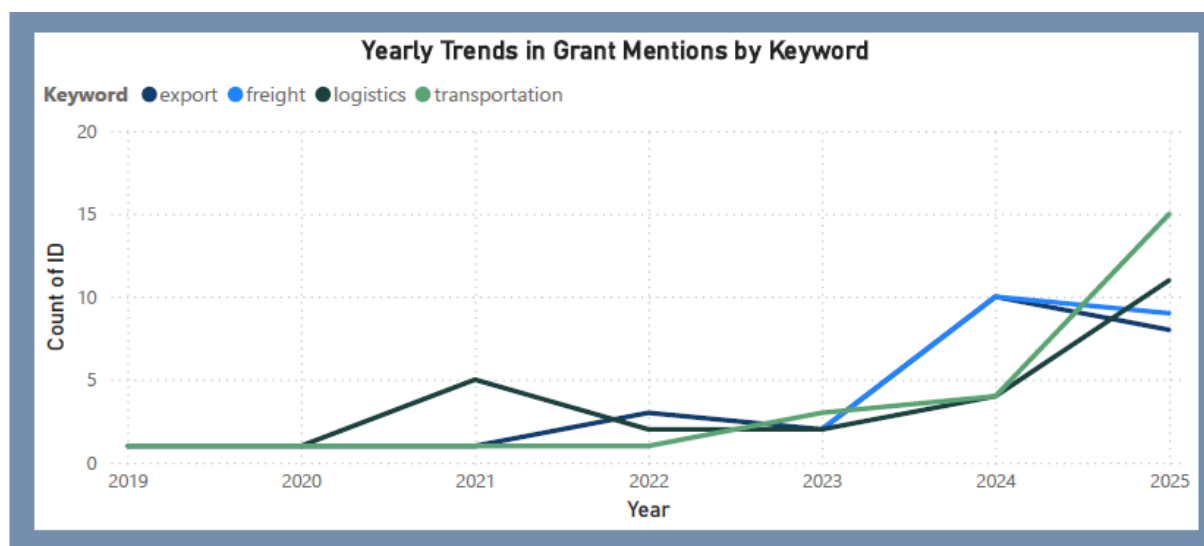
2. Global Distribution of Grant-Issuing Departments

This map displays the geographic distribution of federal departments that issue logistics-related grants. Each labeled point represents a department (e.g., DOT, DOC, DOE, DOS) and its associated presence across global regions. The majority of funding agencies are concentrated in the United States, as expected, with prominent departments such as the Department of Transportation (DOT), Health and Human Services (HHS), and Department of Energy (DOE). However, the map also highlights international engagement, with agencies active in Africa, Europe, Asia, and Australia. Departments like DOS (Department of State) operate globally, which is reflected in their widespread footprint. This map offers a clear spatial overview of where grant activity is based and emphasizes the global scope of logistics funding efforts.

Takeaway: Despite the United States' dominance in grant issuing, international involvement shows a common commitment to enhancing trade flows and logistics infrastructure.
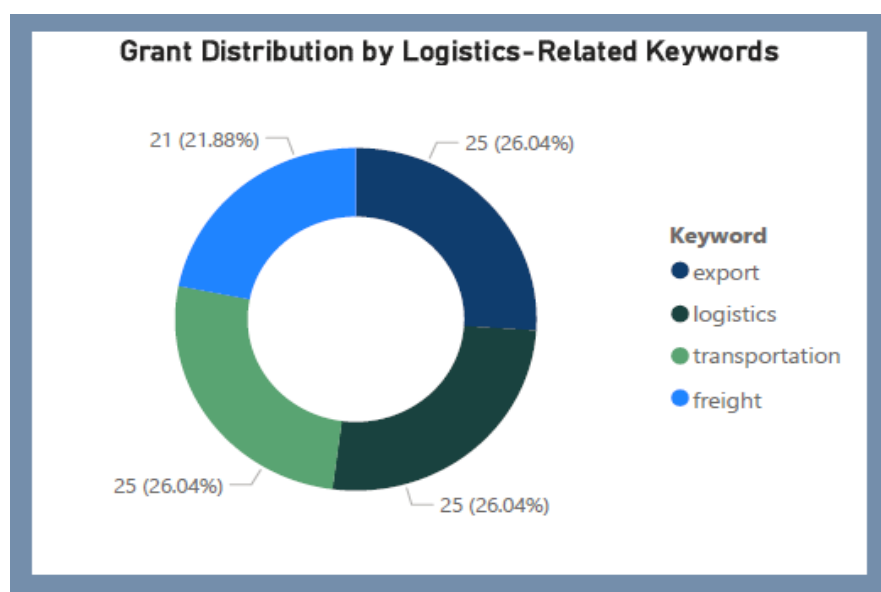
3. Yearly Keyword Mentions (2019-2025)

- Keyword mentions were steady and comparatively low from 2019 to 2021.
- Particularly in the "transportation" category, there is a notable increase that starts in 2023 and peaks in 2025.

This increasing tendency may be related to:

- Recovery from COVID-19
- Initiatives for supply chain resilience
- New investments in infrastructure

Takeaway: Following global upheavals, there is a noticeable increase in interest and investment in logistics and transportation, which may be affected by both recovery requirements and future-proofing tactics.

4. Grant Distribution by Keywords

Grant Distribution by Logistics-Related Keywords

- A strategic balance in finance is implied by the equal distribution of funds among logistics (25), transportation (25), and freight (25).

Grants for Export (21) are marginally lower, which may suggest:

- An emphasis on operations and infrastructure rather than external trade assistance.
- Or that grants connected to exports be categorized differently.

Takeaway: The nearly equal distribution of keywords indicates a comprehensive finance approach, in which market access (export), operations (logistics/freight), and infrastructure (transportation) are all crucial.

Overall Conclusion:

The IMEX CARGO dashboard offers a well-rounded analysis of logistics-related grant funding, revealing a strategically balanced and globally distributed financing landscape. With 96 grants from 42 agencies, the data highlights the growing importance of freight, logistics, transportation, and export initiatives in both national and international contexts. A significant increase in funding activity post-2023 points to renewed government focus, likely influenced by post-pandemic recovery, global trade realignment, and infrastructure development. The even distribution of keyword mentions reflects a comprehensive approach not just toward moving goods, but also strengthening the systems, policies, and frameworks that support cargo operations. Overall, the dashboard provides valuable insight for understanding current investment priorities and planning future strategies in global logistics.

All things considered, this dashboard offers insightful information to researchers, policymakers, and industry participants who want to comprehend trends and spot possibilities in the rapidly changing fields of international logistics and cargo management.

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