

ACRP Problem Statement: 476

Assessing and Improving Data Analytic Capabilities in Airports

Recommended Allocation: \$300,000

Tags: Airport-Planning, Operations, Workforce

Thought Leader Forum on Emerging Issues: Customer Experience

Research Roadmaps: N/A

Staff Comments

ACRP has conducted some research on data sharing and analysis for discrete issues (e.g., collaborative decision making (CDM) as presented in Research Report 137); however, ACRP has not holistically researched ways of improving airport data analytic capabilities.

AVERAGE INDUSTRY RATING BY AUDIENCE SEGMENT

Audience Segment	Average Rating	Number of Responses
Academicians	5.00	1
Airline Representatives	N/A	0
Airport Employees	4.25	8
Consultants	4.20	6
Fed/State/Local Government Employees	5.00	1
Private Sector	5.00	2
Undefined	N/A	0
Overall Total	4.69	18

AOC Disposition

The average AOC rating among voting members was **4.1** on a scale of 1 to 5. Approved and funded at \$300,000 as ACRP Project 03-61.

Assessing and Improving Data Analytic Capabilities in Airports

Summary

Airports are currently facing numerous organizational challenges, and it is often difficult to identify the primary areas of concern, prioritize effectively, and make effective changes for the future. Improved data analytic capabilities can help airports make better informed decisions to improve their organizational issues. This research will result in a user-friendly guidebook that will provide simple and effective methods for airports to improve their data analytics capability.

Background

Today's airports stand at the cusp of a data analytic revolution. The possibilities available to airports are growing rapidly in terms of the data available to support evidence-based decision making and improve airport effectiveness. For example, data analytics can help airport operators easily visualize the busiest spikes for their gates and security checkpoint which can allow the airport to better plan for and allocate resources where they are needed most (Kohli, 2018). Through data analytics, airports can perform valuable tasks such as better visualizing their data to gain a more comprehensive understanding of their operations, developing predictive analysis and what-if scenarios, backing up their management decisions with hard data, identifying operational inefficiencies, and leveraging historical information and/or real-time data to better plan for the future (Weinberg, 2016).

The Dublin Airport serves as one example of an airport that has gained insight into airport operations using data analytics. The airport has introduced a new initiative to improve the flow of air traffic at the airport and reduce flight delays using Airport Collaborative Decision Making (A-CDM). With greater data-sharing it will be possible to review the process end to end and identify points of congestion that lead to delays (Mullan, 2018). However, as airports evolve in their thinking about data management, analytics, and governance, some of the shortcomings of their current data situation are becoming pain points. For example:

- A wealth of available data without the time, knowledge, or skills required to effectively analyze it – In modern airports, a wealth of data is often readily available; however, many airports simply lack the resources needed to use it effectively. The challenges of heavy workloads and limited budgets across airports have been well documented (e.g., ACRP Report 186; ACRP Web-only Document 28), and innovative data analytics may seem like an unrealistic goal under these constraints.
- Poor visibility of data to their own users – In many cases, data sets may operate within functional silos, with limited awareness of the data available across the airport.
- Incompatibility of analysis methods and tools – A lack of common data structures, formats, and interfaces often makes integrated data analytics exceedingly difficult within airports or through cross-airport collaboration.
- Lack of awareness of modern data science techniques – Data science is not the core mission of most airport staff. Generating greater value from data sets that are varied in their composition, are growing at ever-increasing rates, and can no longer be properly supported through legacy business intelligence and data visualization is a task that requires a change to how staff are trained and supported.

Through this effort, airports can modernize and make more effective and efficient their data management, analysis, and reporting to better achieve their mission. The results of this project will allow a diverse range of airports improve their data analytic capability and to more effectively use their data for operational success.

Objective

The objective of this research is to help airports leverage their data more effectively and enhance their data analytic capabilities. The main outcome will be a user-friendly guidebook to assist airports with assessing and improving data analytic capabilities. The guidebook will include background information on the opportunities and challenges associated with airport data analytics, a data analytics maturity model assessment that can be flexibly implemented depending upon individual airport needs, detailed action plans, and real-world case studies of airports using data analytics to support implementation of the strategies within the action plans. For example, this may include guidance on how to produce an inventory of data, data environments, and data analytics within an airport; detailed strategies and action plans for improving data analytics maturity; guidance for establishing a data analytics team; and resources for analytics training. The goal is to provide airports with guidance to arm them with the ability to enact meaningful improvements to their data analytics capabilities.

Research Approach

The proposed research will comprise three main phases.

Phase 1: Literature Review to Understand Airport Data Opportunities and Challenges. The goal of the literature review will be to develop a deeper and broader understanding of the opportunities and challenges surrounding data analytics in the airport industry. The review will focus on identifying emerging data possibilities and anticipated future trends, as well as the common obstacles airports face in effectively leveraging their data.

Phase 2: Stakeholder Interviews to Uncover Data Analytics Needs and Best Practices in the Airport Industry. The objective of Phase 2 will be to build on the literature review results by collecting qualitative data from stakeholders. This will involve conducting interviews with professionals in the airport industry with data analytics expertise, as well as those who would be the intended users for the guidebook. Through this process, more detailed information regarding data analytics needs and best practices specifically within the airport industry will be identified.

Phase 3: Guidebook for Airport Data Analytics. Based on the research described above, a guidebook for improving data analytics capabilities will be created. The guidebook will include background information on the opportunities and challenges associated with airport data analytics, a data analytics maturity model assessment that can be flexibly implemented depending upon individual airport needs, detailed action plans, and real-world case studies of airports using data analytics to support implementation of the strategies within the action plans. For example, this may include guidance on how to produce an inventory of data, data environments, and data analytics within an airport; detailed strategies and action plans for improving data analytics maturity; guidance for establishing a data analytics team; and resources for analytics training.

Cost Estimate/Backup

Recommended Funding: The estimated funding for this proposed effort is \$300,000.

The estimated time needed to complete this research is 18 months, including 3 months for review and revision of a draft final report. These estimates are based on the complexity of information to be gathered as well as the high level of detail that will be expected in the final products.

Related Research

After examining ACRP studies conducted, there are currently no projects related to data analytics and the proposed idea to use data analytics to assess and improve capabilities in airports. There is much data available for airports to collect, analyze, and use to make decisions and improve their operations, and the development of this user-friendly guidebook will assist airports with leveraging their data more effectively.

1. Andersson, K., Carr, F., Feron, E., & Hall, W. D. (2001). Analysis, Modeling, and Control of Ground Operations at Hub Airports. *Air Transportation Systems Engineering*, 305–341. doi: 10.2514/5.9781600866630.0305.0341

2. Ferri, R. (n.d.). People Analytics: Overcoming HR Data Challenges for Program Success. Retrieved from <https://www.gr8people.com/blog/talent-acquisition/people-analytics-overcoming-hr-data-challenges-for-program-success>

3. Kohli, D. (2018). The Important Role of Big Data in Airport Transformation. Retrieved from <https://www.aviationpros.com/airports/article/12434059/the-important-role-of-big-data-in-airport-transformation>

4. Lees, Eliot. (2016) A Better Way to Manage Airports: Passenger Analytics [White Paper]. ICF. <http://www.crowdvision.com/wp-content/uploads/2016/10/A-BETTER-WAY-TO-MANAGE-AIRPORT.pdf>

5. Mullan, M. (2019). How digitalisation is accelerating opportunities with data and analytics. Retrieved from <https://www.internationalairportreview.com/article/101763/data-analytics-dublin-airport-digitalisation/>

6. Nash, M., et al. (2012). ACRP Report 65: Guidebook for Airport Irregular Operations (IROPS) Contingency Planning. Washington, D.C.: Transportation Research Board of the National Academies.

Author: Chelsey Jackson, Manager, Human Capital, ICF

INDIVIDUAL COMMENTS FROM THE INDUSTRY REVIEW

Airports are dynamic environments that change quickly. The availability of complete and accurate information is critical to making informed decisions.

airports have access to a lot of data, but it is not utilized to as it should be

Applicable: Subject is needed, and if successful, could provide a good source of information for airport uses. Achievable: Yes, but they need to also work with ACI ACRIS and other airport sources already investing efforts in this area Implementable: I think so. But the way it is written, they count too much on airport interviews. I think case study work is needed. As such, their \$300k cost estimate is too low. Understandable: Yes

Big data analytics needs to periodically reviewed for implementation into airport operations. This project could bring the focus.

Excellent problem statement in an area that needs some common guidance. A lot of work is being done on A-CDM and other products of data, but I know airports are struggling to stand up data analytics programs, and this would be especially helpful for those who don't have significant resources to dedicate to the topic.

Flabbergasted by how many airports seem not to have research departments, or make decisions based on analytical data. Implementable for all airports and achievable. This got lower star ratings because, it's fairly a smaller project, somewhat obvious solutions. I am not sure why more airports don't use data as they should, but experience says it's mainly the leadership. Not sure a research project will solve that.

I agree with this sentiment, that airports face many challenges, and its always difficult to identify the primary areas of concern. However, with data analytics capabilities, the issues can be identified and informed decision can be made to improve the airport challenges.

In our work with airports, we've frequently seen that data analysis and decision support lags well behind other industries. More often than not, analysis seems to rely on trending of available data that doesn't connect well to organizational inputs or that has strongly predictive capability. The return on this research is undeniable.

Knowing how to use data in any environment is important. This Problem statement suggests that a user friendly guidebook could be developed to greatly improve data analytics capability at airports. It has a good example of where that is being accomplished and the problem statement expands on the explanation the background ACRP reports. The project meets the criteria in all four areas.

Most airports lack data analytic capabilities, both in the acquisition, analysis, and use of data. So many issues can be addressed based on good data. Excellent study.

The trend now is "Big Data". Airports can gain so much from this trend with the correct guidance. This research has to potential to change the way airports think.

This is enormously important and I vote to fund this project. As a retired Business/Finance manager I speak from direct experience of the difficulty in implementing an organization-wide platform for data analysis and reporting. For while a small number of individuals in a management structure may understand the need for such tools and devote their time and energy to that goal, such initiatives often die due to lack of executive enthusiasm or support, lack of time or prioritization from senior managers, or lack of interest. The downsides of lacking access to real-time trend data are many but includes lack of awareness to what is happening, inability to take advantage of opportunities before windows close, and constantly findng yourself in a reactive mode rather than a proactive mode. My own experience

indicates how difficult it is to develop and nurture a sustained in-house capability for org-wide data analytics and reporting. Therefore I recommend that the contractor look into possibilities that include contracting such tasks as they can be time-consuming.

This looks doable and useful. I would include some guidance on collection of the airport data.

Idea Number: 476

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Input Provided by ACRP IdeaHub Community

The votes and comments below were provided by the IdeaHub community prior to the idea's submission as a problem statement.

Idea Link: <http://ideascale.com/t/UKsrZBj7e>

Tags: Airport-Planning, Operations, Workforce

Votes:

Votes	
Up	0
Down	0
Total	0

Comments:

N/A