

# Five Best Practices to Improve Capital Efficiency in Airport Infrastructure Investment

# Introduction

Airport infrastructure plays a vital role in the economic growth and sustainability of a city, region, or country. It stimulates commerce and is a key catalyst in promoting regions as tourist attractions and business destinations. Airports are hubs for large volumes of cargo, further promoting commerce related to a range of industries. In many ways, the word “airport” is a misnomer: a more accurate term is “aerotropolis.”

Building and maintaining an aerotropolis is a major, multi-year undertaking. In addition, any airport construction, capacity increase, or upgrade project creates thousands of direct and indirect jobs. Indeed, whole regions can find themselves supported by a large domestic or international airport.

Airports are undoubtedly complex and consist of a diverse set of infrastructures, with multiple interrelationships. Rail and road connections are required to bring passengers and cargo in and out; retail space is used to maximize revenue and provide leisure activities to travelers; communications networks are needed to support increasing levels of mobility in the workforce; and hotels are needed to support journeys. In many ways, an airport and its surroundings are a city within a city, with an economy of its own.

That’s why coordinating the planning, investment, construction, and maintenance of airports underpins the transformational nature of any aerotropolis.

**GlobalData’s Construction Intelligence Center (CIC)\* is tracking airport construction projects globally with a total value of US\$737.3 billion. Of this, \$212.0 billion is in the planning stage. Asia-Pacific accounts for the greatest share with \$241.4 billion, followed by the Middle East and Africa with projects valued at \$196.4 billion.**

**The Americas follow with projects with a value of \$153.7 billion, and Europe has projects valued at \$145.8 billion. By country, the United States leads airport project investment with \$114.9 billion, followed by China with projects valuing \$67.1 billion. The largest projects in the pipeline are the \$37.1 billion Al Maktoum International Airport in the United Arab Emirates and the \$36.0 billion Istanbul New Airport in Turkey.**

# Global Drivers for Airport Capital Investment

Although the growth in air travel in specific locations correlates with regional GDP growth, a number of factors drive global investment in airport infrastructure.

## Regional Economic Growth

Growth in developing regions like Latin America, the Middle East, and Asia-Pacific has resulted in an uplift in passenger numbers in areas that have previously not used air transportation on such a large scale. As a result, existing airports are investing in extending their capacity to deal with these increases and to future-proof themselves for further growth, while new airports are constructed where the current capacity has become inadequate or as an economic stimulus.

## Shifting Revenue Models

Another factor that's driving interest in investment is a shift in revenue models over the past decade. A significant portion of airport revenue now comes from retail and real-estate portfolios in addition to the traditional aeronautical services, where revenue was generated from landing fees. This shift requires new areas of expertise and tools to continuously improve the operational model and efficiently manage new projects, while maintaining diverse ongoing operations.

**According to GlobalData's CIC "Project Insights – Global Airport Construction Projects" report, by 2022 the passenger traffic of emerging economies is expected to grow to 5.4 billion and surpass advanced economies' 5.3 billion, with emerging economies showing high growth, particularly in Asia-Pacific. By 2040, emerging economies are expected to dominate with passenger traffic of 13.7 billion, representing 61.6% of the total, compared with advanced economies' 8.6 billion, or 38.4%**



## Global Drivers for Airport Capital Investment

### Investment-Grade Asset Class

Perhaps most significantly, in many parts of the world, airports have emerged as a new investment asset class for investors from pension or mutual funds. This trend has shifted ownership of airports from the traditional government-owned-and-operated model to a private model. Most airport expansion is now no longer solely state funded, but financed from the airport's own balance sheet, commercial bank loans, public-private partnership initiatives (P3s), or other infrastructure investment vehicles.

This shift means the cost of capital for such projects is now market-related and, thus, airport operations must ensure efficiency and a healthy return. Like any other business venture, airport owners need certainty around their costs and schedules to determine acceptable time to revenue and return on investment (ROI).

### Advances in Airport Technology

Advances in technology bring multiple benefits to airport operations, airlines, and passengers alike. These advances also mean that airports need to continually adopt and update their operations to remain commercially competitive. Some of the current technology investments and projects may include:

- Biometrics for passenger processing and security to move passengers more quickly and securely into the boarding areas
- Blockchain for passenger identification and processing and flight data management to improve security and accuracy of records
- Robotics for improved baggage handling—reducing lost and late luggage and increasing customer satisfaction
- Artificial intelligence for improved customer service by better managing security queues
- Improvements in cybersecurity to help ensure overall safety and security

# Challenges in Airport Projects

Airport investment projects present a number of significant challenges to shareholders, administrators, and the project management teams involved.

**Best practices from airports such as San Francisco International point to the importance of collaboration supported by the physical space the team works in, the contract style of the projects, and the project technology selected.**

## Project Identification and Selection

It is critical to ensure visibility and traceability when identifying, prioritizing, and selecting projects at airports—and associated transport infrastructure, such as rail links—to optimize the use of capital.

Since many parties are involved in the funding and implementation process, they want to ensure that projects are assessed in a comprehensive manner. Having a consistent, objective, and documented process for project identification and selection is essential to this goal.

## Project Collaboration

Airport infrastructure projects typically involve a large, extended project team outside of just the owner's team. Enabling easy-to-use, timely, and accurate collaboration across team members is a critical component to project success.

## Information Management

Airport infrastructure projects generate massive amounts of documents, drawings, specifications, and contractual correspondence. Managing these items manually is an enormous task. Version control, missing documents, and communication delays all impact project success. Having a fully digital project record provides a solid audit trail and is an essential tool to support handover and ongoing operations.

With the large number of consultants, contractors, subcontractors, and suppliers involved, it's no surprise that the owner's project team has to manage a high number of commercial agreements. Managing progress payments, earned value, and compliance is labor intensive, and errors result in increased risk and payment delays. Without full traceability, final invoicing may be disputed and even delayed, causing cash flow concerns for affected parties. Strong financial governance must also be maintained under these circumstances to eliminate possible collusion and corrupt practices.



## Challenges in Airport Projects

### **Construction Contract Administration**

Infrastructure delivery is a complex and risky venture and should be undertaken by those best placed to deal with these challenges.

As infrastructure projects have grown in size, joint ventures have become more common. This is a way to gain required resources and share the risk on these projects. Also, as there is not always public funding available, alternative entities, such as P3s, are increasingly popular.

While these alternative models support the delivery of critical infrastructure, they each bring new challenges, such as the need for cross-organizational tools and processes with stringent visibility and reporting requirements.

In almost all infrastructure delivery contracts, there is a requirement for the project owner or employer to provide financial guarantees to the contractor or P3 partner as a risk-mitigation mechanism. Managing construction contracts in accordance with standard and special terms is often a challenge in construction procurement. In addition, a lack of rigorous project, contract, and scope change management can result in multiple claims from both sides of the contract, resulting in time delays and cost increases.

## Challenges in Airport Projects

### Project Complexity

Many infrastructure projects—including some airports—are large enough in scale to be considered “megaprojects.” These projects have grown in size and complexity such that traditional project management processes simply do not work.

“It’s not about perfecting an imperfect model, it is about creating a new one,” says Bob Prieto, chairman and CEO of Strategic Program Management LLC, and author of *The GIGA Factor; Program Management in the Engineering & Construction Industry*. Prieto asserts that the reason megaprojects have such a high rate of schedule and budget overruns is due to using traditional methodologies on this new breed of project.

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### Low Adoption of Technology

Globally, the construction industry has been slow to adopt technology, causing low productivity growth in the industry and a high volume of manual administrative processes during construction. Infrastructure initiatives, such as airport development or expansion, are no exception.

The use of manual and paper-based processes has excluded project teams from the benefits to be gained by digital design and project delivery processes.

Disparate project delivery systems and multiple individual spreadsheets used across teams also do not enable project owners and managers to benefit from real-time information and predictive analytics.

Not having real-time access to the latest design and planning information on an infrastructure project causes significant delays in everything from equipment delivery to payment processing.

# Best Practices to Improve Airport Infrastructure Capital Efficiency

Implementing various best practices for infrastructure development enables airport organizations to address the aforementioned challenges and, ultimately, improve capital efficiency and ROI.

## **Project Portfolio Management**

Project portfolio management is a key component of ensuring capital efficiency in airport infrastructure investments. Making sure that a predictable and repeatable process is in place to propose, evaluate, score, and prioritize projects and initiatives as part of the capital planning process will ensure that approved projects are aligned to the airport master plan. Insight into the time-phased funding requirements will provide a robust capital plan for the airport, enabling long-range investment planning.

Real-time progress and performance tracking of projects in flight, combined with the ability to monitor the benefits realized through completed projects, will enable the airport management team to take timely action on the project portfolio to ensure that the strategic objectives of the organization can be achieved.





## Best Practices to Improve Airport Infrastructure Capital Efficiency

### Building Information Modeling

Complex airport infrastructure designs are facilitated through the use of 3D design models as part of an overall building information modeling (BIM) methodology. Electronic sharing of these designs with the wider project team facilitates communication and collaboration, improving the design and construction management process, and reducing requests for information and scope changes.

Organizations also can improve constructability assessments of the new infrastructure through the combination of the 3D design and the proposed construction schedule. Potential construction delays can be eliminated through the use of electronic clash detection and resolution capabilities, long before the infrastructure is actually built in the field.

In addition, when project teams provide a rich model with associated documentation and communication upon project completion, organizations can dramatically improve information access for ongoing operations and maintenance.

As an example of the benefits of BIM to airports, TAV Airports is combining construction and operation know-how to build BIM and geographic information system data models that contain information that is relevant to airport asset and facilities management.

“Integrating these models with the digital infrastructure used by facilities management—such as Computerized Maintenance Management and Building Management Systems—and day-to-day operations can foster improvements in areas such as analytics, performance, and energy management,” states the *Five Keys to Unlocking Digital Transformation in Engineering & Construction* a Global Industry Council Report and joint initiative of Oracle Construction and Engineering and Boston Consulting Group.

Additionally, Denver International Airport utilized BIM to help comply with a Federal Aviation Administration mandate.

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# Best Practices to Improve Airport Infrastructure Capital Efficiency

## Common Data Environment

The implementation of a common data environment (CDE) for airport projects will ensure a single source of the truth, including contractual communications, design information, documents, drawings, and specifications. Connected business processes and data will ensure that the extended project team can stay on track through electronic workflows and integrated project controls. Easy, digital handover from the project team to the operations team will be facilitated through a CDE.

## Construction Contract Management

Appropriate contracts for infrastructure development projects that reflect and incentivize the overall project goals will improve outcomes for all parties involved in the contract. This promotes good communication and cooperation between the parties, and provides clarity in roles and responsibilities.

Standard contract forms aim to provide a balanced risk allocation between the employer and the contractor, and deliver guidance on issues such as design responsibility, land acquisition, site access, and political and legal framework changes.

## Electronic Payments

Airport infrastructure development projects often require multiple contractors, suppliers, and subcontractors to work on a single construction site. Regular milestone or monthly payments for completed work is required, causing a significant administrative burden to the project management team. Ensuring timely processing of all approved payments is vital to protect the project supply chain from cash flow constraints, which could reduce the project's progress. A secure, cloud-based electronic platform to assist with the administration of all payment applications and approvals helps to maintain the required rate of project progress.

At San Francisco International Airport, Austin Commercial leverages such technology to improve efficiency and other outcomes on subcontractor payments and manages payment applications with just one person on the \$800 million Terminal 1 project.

**In the spirit of cooperation, standard contract forms establish a specific process to deal with variations and changes to the contract and avoid disputes. These are combined with specific provisions for payment by the employer and asset handover from the contractor to the employer.**

# Conclusion

According to the Aberdeen Group\*, as travel and transportation organizations attempt to transform their businesses to operate more effectively, the ability to select and deliver projects that meet strategic requirements—and produce ROI over an entire lifecycle—is now imperative.

A failure to do so leads to the financial downturn of the entity and—in the case of an aerotropolis—can negatively impact the economic growth of an entire region. Project portfolio management solutions are tools that give investors, owners, operators, and project teams full visibility and control throughout the lifecycle—and the greatest chance of success.

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