

Decision Making Framework to Identify Successful AI Investments for Airports

Part 1 ▶▶▶▶▶

*Creating Value: Critical Success
Factors for AI Investment Decisions*

Navigating the AI landscape: The CEO's forward



The adoption of AI is becoming increasingly important for airports to meet the evolving needs and expectations of their customers.

Rishi Mehta
CEO, WAISL Ltd.

Artificial intelligence(AI) has the potential to significantly improve the operations and competitiveness of airports, offering numerous benefits to both customers and airport operators. However, with a rapidly growing number of AI products and solutions on the market, it can be challenging for airport operators to identify the most suitable and cost-effective options for their organization.

This paper presents a comprehensive framework for evaluating AI solutions in the context of airport operations, with a focus on identifying the critical success factors that drive value creation. The airport domain is a complex and multi-stakeholder environment, and this framework aims to guide airport operators in making informed decisions about AI investments that align with their corporate strategy and goals.

By considering the strategic fit between the corporate and AI strategies, the potential

for generating new revenue streams, the probable impact on employees and customers, and improving operational efficiency, airport operators can ensure that their AI investments are successful and contribute to sustainable competitive advantage. The framework also addresses the need for effective communication and collaboration among stakeholders, as well as the potential risks and ethical considerations associated with AI adoption.

As the aviation industry continues to embrace technology and digital transformation, the adoption of AI is becoming increasingly important for airports to meet the evolving needs and expectations of their customers. This paper offers valuable insights and guidance for airport operators looking to leverage AI to create value and gain a competitive edge.



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Rachna has a B.Tech in Computer Science and Engineering from Jawaharlal Nehru Technological University, Kakinada. She began her career in the Enterprise IT department of a large conglomerate in aviation sector and in a short time got an opportunity to work for the chairman of the group. Currently, she is part of the CEO's office in **WAISL** and has been covering artificial intelligence and its impact in the airport ecosystem.

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Executive Summary

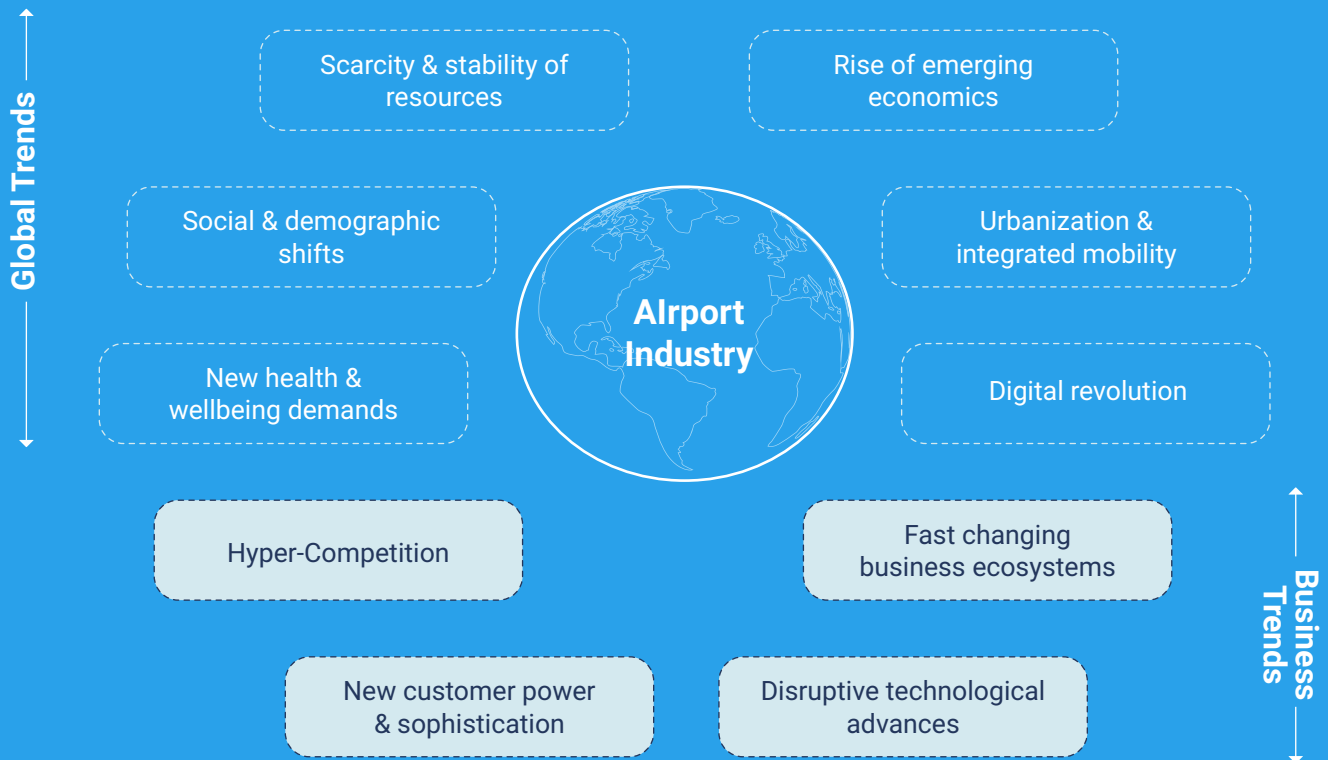
This paper gives a comprehensive framework that aims to guide airport operators to place their bets on the right Artificial Intelligence (AI) solutions. The airport domain is a complex socio technical and multi stakeholder environment. Airport operators struggle to keep up with the escalating expectations of their customers and passengers, who are now accustomed to sophisticated, fast-changing technological environments at every walk of their lives. Passengers have grown to expect painless self-service and instant unfettered access to the latest technological advancements. A walk through the lanes of the digital transformation of airports indicates the presence of an underlying blanket of AI that has enabled this transformation. AI is undoubtedly the present and future of technology solutions in the airports. While the number of AI products and solutions are growing exponentially, it might not always be economically viable to deploy all these solutions at the airport. There arises a need for a framework to evaluate these products and solutions in the light of the critical success factors that would help the management decide on the right AI investment destinations.

An AI powered digital greenfield airport is expected to generate an additional 10% EBIT margin. Key question that needs to be addressed to realize this margin is

Which critical success factors are extremely important for AI powered value creation?

Introduction

Airports are mini cities in themselves, which in the most fascinatingly complex yet efficient way handle multiple stakeholders and a case study around them could be an excellent and exhaustive choice for developing a framework. The importance of the modern aviation industry is difficult to overstate, but one of the main reasons for this is the globalized nature of the industry, helping to connect different continents, countries, and cultures. By design, airports have access to an ecosystem of customers in various segments without having to invest in marketing efforts. The more that airport management can support their customers, the more these customers can contribute towards its revenue.



The digital transformation of the airport industry includes the use of emerging self-service, big data, and open data technologies. The evolution of the digitization of the airport industry is discussed in terms of their levels: Airport 1.0, 2.0, 3.0, and 4.0.

Airport 1.0 (Basic airport operation) refers to the traditional airport that relies on manual operations and basic IT solutions.

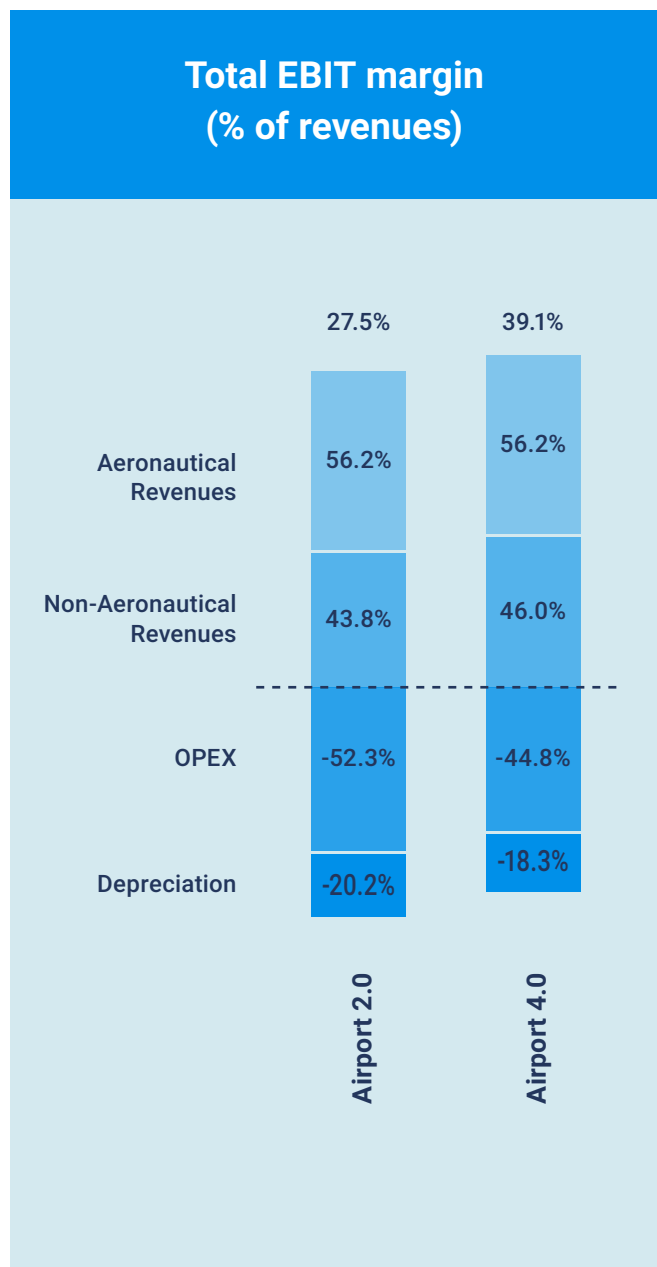
Airport 2.0 (Agile airport) are the early adopters of digital technologies, mainly partial self-service facilities like Wi-Fi and check-in process. In this phase, one could witness the implementation of self-service and automation of key processing tasks such as passport check, bag-drop etc.

Airport 3.0 (Smart airport) involves the adoption of self-service at all levels of passenger services, including automated operations and mobility. Several focused initiatives to leverage digitalization and to optimize flow monitoring and processing takes place.

Airport 4.0 (Smart airport) uses open and big data technologies to create value from real-time passenger information flow. The United States, Europe and leading Asian economies have all started to adopt Airport 4.0. Superior proactivity and reactivity that will enable the airports to adapt to real-time solicitation of the airport operational needs, customer requests and other technological advancements will be commonplace.

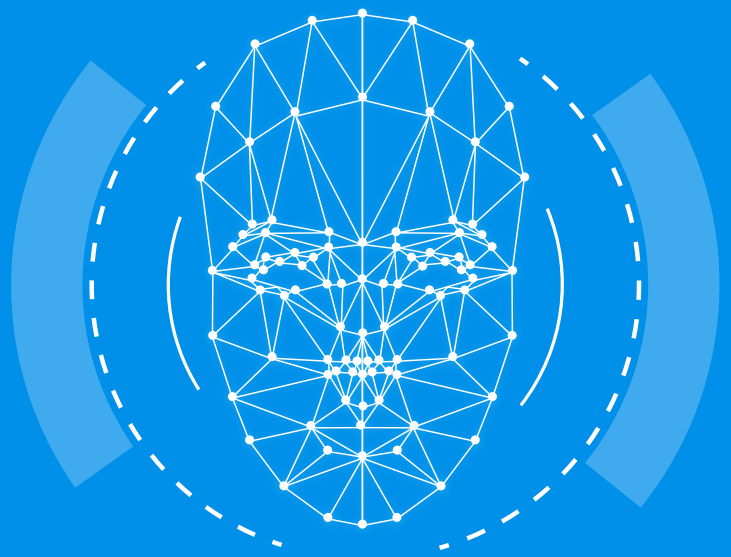
Airports are currently mature to implement 3.0 digital solutions. Across the world, all major airports are looking forward to implementing a 4.0 model by the end of this decade. Digital transformation using the power of artificial intelligence is the key to address the current and future customers who are grown to expect seamless access to the latest technological advancements.

AI powered digitalization is the key to the success of the businesses of the future. Pertaining to the airports, revenue increase that would be brought to the table by digitalization of airports is extremely uncertain. Nevertheless, digital interaction is a must have!



Analysis by Arthur D. Little shows that AI powered digital greenfield airport is expected to generate an additional 10% EBIT margin. Key questions that are brought to the table are

1. Creating Value: What are the critical success factors to achieve AI powered digital transformation?
2. Capturing Value: How to strategically preserve most gains for the airport operators while sharing part of the additional profits between the stakeholders?



AI Powered Digital Transformation

With how pervasive artificial intelligence is these days, leaders of all the organizations know that AI can fundamentally change their businesses. Business leaders across organizations are hiring experts in the AI domain who would assist the management in deciding on AI investments. Companies often treat AI as a “technology thing” and hence struggle to deliver value. In fact, an IT focus on AI tends to generate less value than a broad strategic focus.

These AI experts in themselves despite possessing the necessary skills ranging from being acquainted with different programming languages to possessing knowledge about neural network architectures, might still not possess a necessary and crucial skill. Business leaders often think that when the AI ideas are given the right kind of push with investments at one end of the tunnel, success comes out from the other end. However, this doesn't always happen.

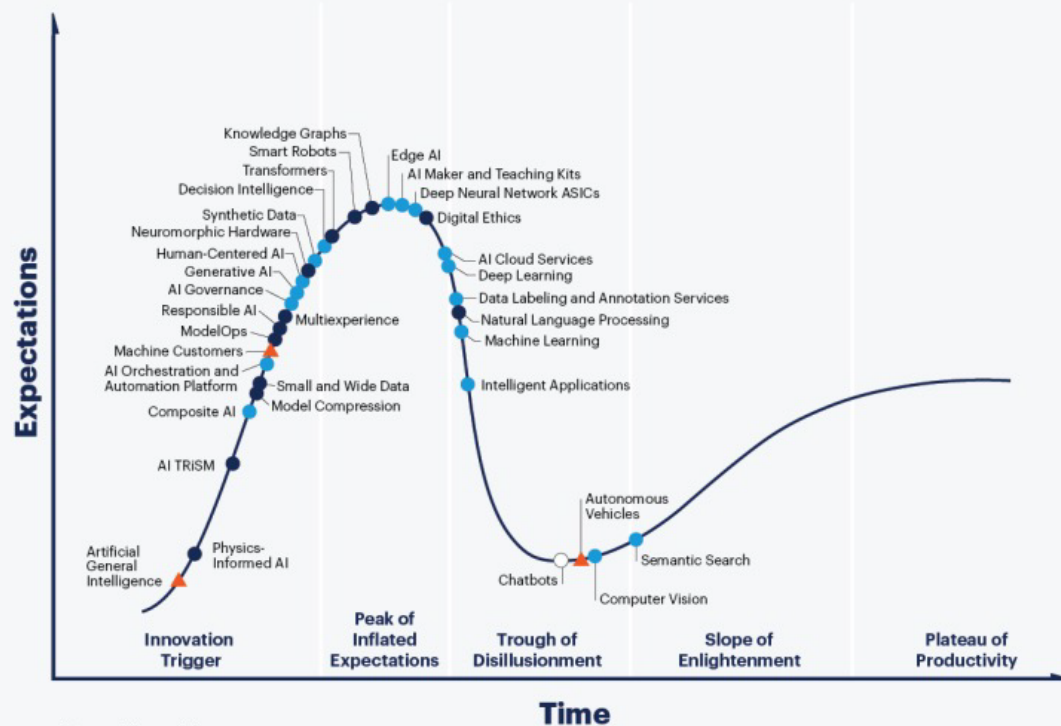
Analytics Maturity Model survey, conducted by Carnegie Mellon University, has shown that only 6% had AI initiatives scaled across the enterprise. And 76% of organizations surveyed barely broke even with their investments in AI capabilities.

Another survey conducted by BCG along with MIT Sloan management review has found that “Significant challenges remain,

and many AI initiatives fail. Seven out of 10 companies surveyed report minimal or no impact from AI so far. Among the 90% of companies that have made at least some investment in AI, fewer than 2 out of 5 reports obtaining any business gains from AI in the past three years. This number improves to 3 out of 5 when we include companies that have made significant investments in AI. Even so, this means 40% of organizations making significant investments in AI do not report business gains from AI.”

The Gartner Hype Cycle for Artificial Intelligence, 2021 report finds challenges for businesses seeking innovative AI technologies with proven business uses. This hype cycle report addresses how AI applies to static business applications, devices, and tools. This report also focuses on the hype surrounding new AI technology and techniques with various levels of commoditization and operationalization to develop systems that reach beyond everyday AI. Early adoption of these innovations can drive significant competitive advantage and business value and ease problems associated with the fragility of AI models. This report will also open the ears of even those organizations that had ignored AI investments and force them to jump into the race.

Hype Cycle for Artificial Intelligence, 2021

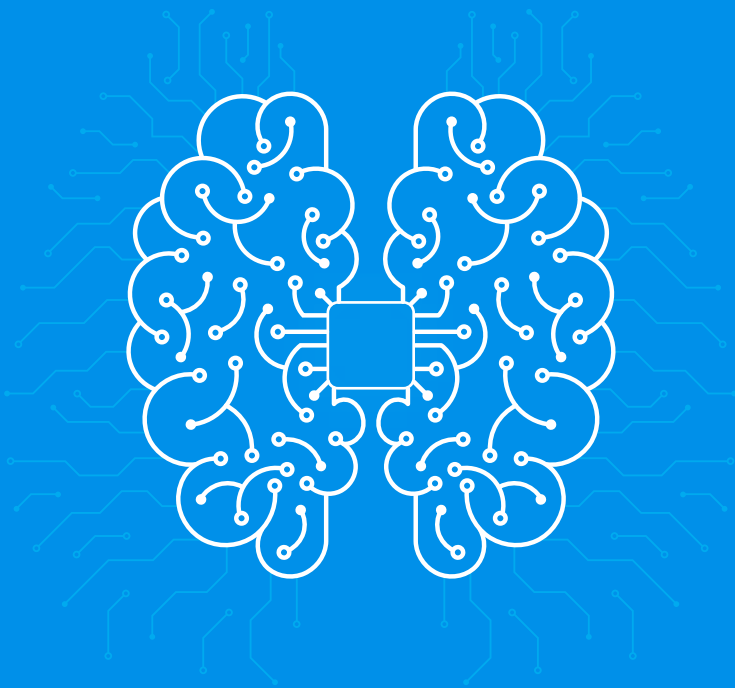


From this hype cycle it is evident that AI capabilities needn't be extremely advanced to deliver business value. However, they should be fit-for-purpose and geared toward the organization's specific strategic goals and must be grounded in an honest assessment of the organizational maturity regarding data, capability, governance, and other dimensions.

Genuine success with AI always depends on generating revenue (either in short term or in long term) reimagining organizational alignment and investing in the organization's ability to use AI across the enterprise. None of this is easy to achieve. By coupling strategic intent with technology, then creating clear plans to develop tangible capabilities, organizations can establish a strong foundation on which to deploy AI. Thus arises a desperate need for a framework such as ours which would guide the combined team of decision makers. This framework will empower the business leaders to be strategic about AI. By adopting this framework, traditional enterprises that are struggling to steer AI investments can now confidently drive them.

"Here is a common story of how companies trying to adopt AI fail. They work closely with a promising technology vendor. They invest the time, money, and effort necessary to achieve resounding success with their proof of concept and demonstrate how the use of artificial intelligence will improve their business. Then everything comes to a screeching halt – the company finds themselves stuck, at a dead end, with their outstanding proof of concept mothballed and their teams frustrated."

– Harvard Business Review



Critical Success Factors to Achieve AI Powered Digital Transformation

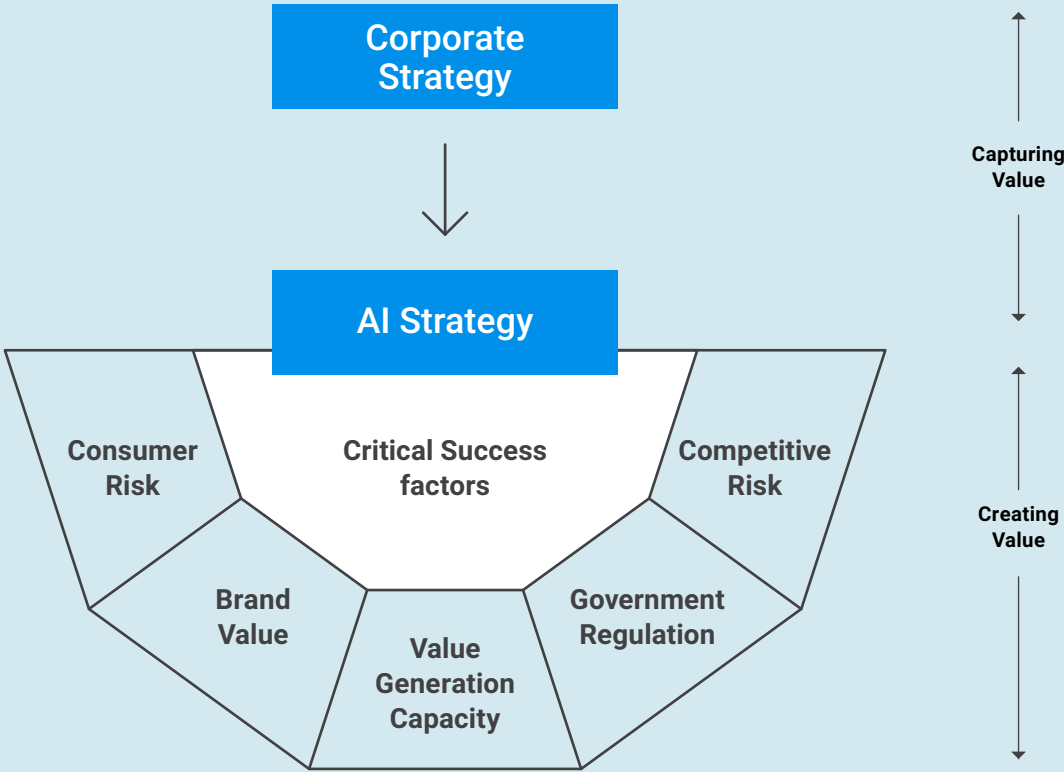
It is undeniable that artificial intelligence is changing the way we do everything in every industry, from the possibility of self-driving cars to social media algorithms showing you customized content. From the above section, we understand how instrumental its role has been in the digital transformation of airports. The hope is that machines will eventually replicate human intelligence and function without the need for human input or interference. This space is growing rapidly, and it seems likely that every industry will be impacted by it. Many major companies have invested heavily in AI, and any company which still hasn't, fears being left behind in this race.

Being successful, requires resisting the urge to indulge in what fantastical things AI can do. Instead, organizations/experts need to stay grounded in what practical things AI can help them achieve. Even as AI opens up

new avenues for realizing economic value, the organization ought to lead, and technology ought to follow—while still articulating new ideas for what's possible and constraints on what's not.

Although the excitement to quickly join this AI revolution is tremendous, it is imperative that the company should be strategic about AI. Artificial Intelligence projects that best fits with its own corporate strategy should be selected for investments. To achieve this, the airport operator must closely analyze all the critical success factors that would drive the AI implementation. The combined impact of these critical success factors will determine the potential success of the company's AI investments.

The visual framework for AI investment decision making below illustrate the necessity of critical success factors for creating value and the need for strategic fit to capture value.

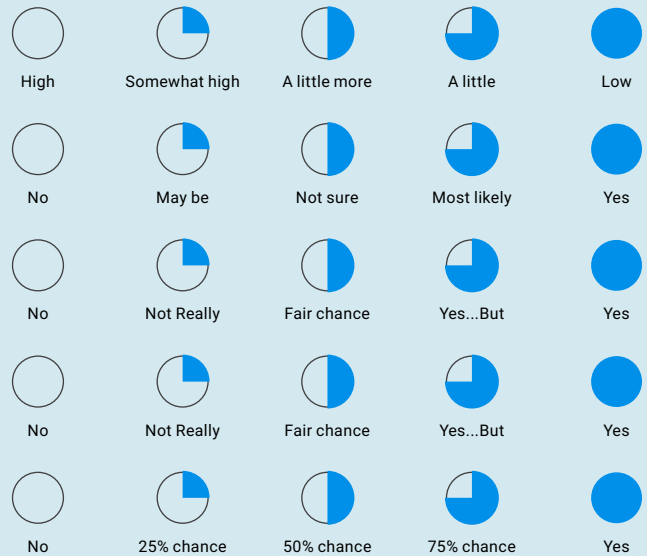


This framework is built top-down. An airport operator, making an AI investment decision, ought to begin by analyzing their own corporate strategy. There is no single AI strategy that would promise universal fruitfulness. AI projects / programs that would have a superior chance of success should be the ones that must be invested into. The airport operator may choose a Build-Operate-Transfer model for developing AI capability. However, if the airport operator decides to become AI first, then the strategy, skills and shared vision must be adopted across the organization. Being strategic about AI will ensure increase in profitability of the company. The five drivers of success namely, the customer risk, competitive risk, brand value,

value generation capacity and expected or existing government regulation must be in sync. Building AI capability that strategically fits with the corporate strategy will break the barriers and help in realizing the value of AI investments.

Although the framework is built top down, the implementation of the same is bottom up. Addressing the critical success factors will enable value creation. When AI strategy and corporate strategy are resonating then the company will be able to capture value. Using a quick questionnaire demonstrated here, an airport operator could easily evaluate potential projects in the light of the critical success factors.

Consumer Risk	What is the learning curve for the customer to use this technology?
Brand Value	Will we be the first in bringing this AI technology to aviation?
Value Generation Capacity	Does this AI technology have the ability to bring cash/kind?
Government Regulation	Will the regulators make this AI product mandatory in this decade?
Competitive Risk	Are our competitors bringing this technology into the market?



Consumer's risk is a potential risk found in all consumer-oriented products, that a product not meeting quality standards will pass undetected through the manufacturer's quality control system and enter the consumer marketplace. However, when a new technology enters the market, the developer must ascertain the learning curve that the end user might have.

What is the learning curve for the customer to use this technology?

Brand value is the monetary worth of your brand. If a company were to merge or be bought out by another business, and someone wanted to use the name, logo, and brand identity to sell products or services, the brand value would be the amount they would pay you for that right to use.

Will the airport operator be the first in bringing this AI technology to the airports globally or locally?

Value generation capacity is one of the most important activities that B2B companies engage in. It's the process of planning, marketing, and selling products, with the aim of generating income immediately or in the visible future. Alternatively, it could be bringing in goodwill and other kinds of benefits that would deliver a topline or bottom-line growth in near future

Does this AI technology have the ability to bring cash / kind into the airport operator?

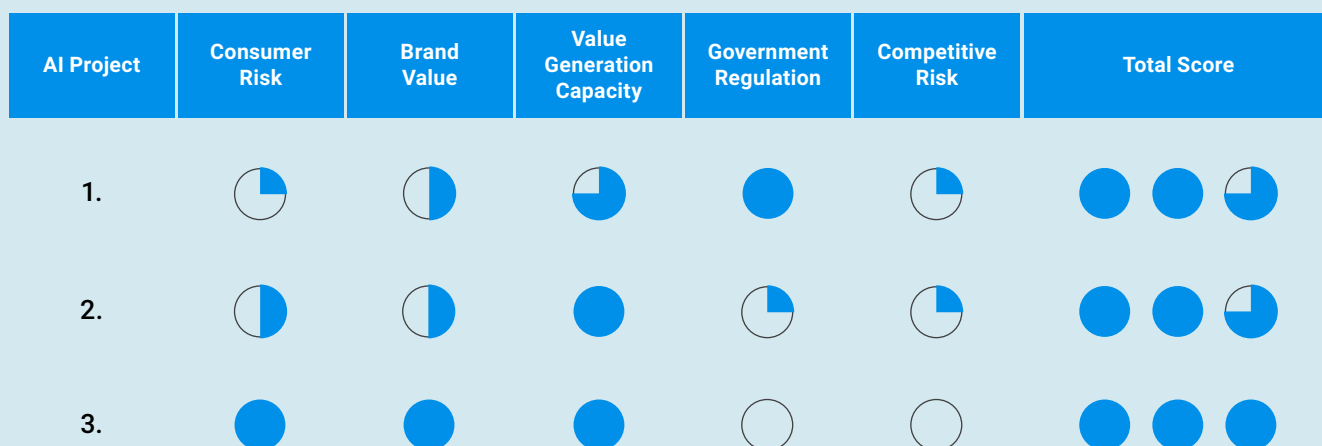
Government Regulation has been one of the critical factors that drives investment by the airports. Assessing the chances of these regulations coming through within the next ten years would enable one to address the investment opportunities effectively.

Will the regulators make this AI product / technology mandatory in this decade?

Competitive risk is the risk associated with the fact that there are often competing companies on the market, each of which seeks to obtain the highest position and consumer ratings on it in order to gain maximum benefits for themselves. When competitive risk is successfully addressed, one would visibly witness the increase in market share, sales, the degree of penetration of the company into international markets and so. on.

Are our competitors bringing this technology into the market?

The answers to the above questions would be recorded for various projects and the cumulative scores calculated for further shortlisting. It could either be a direct addition or weighted average based on the business needs.

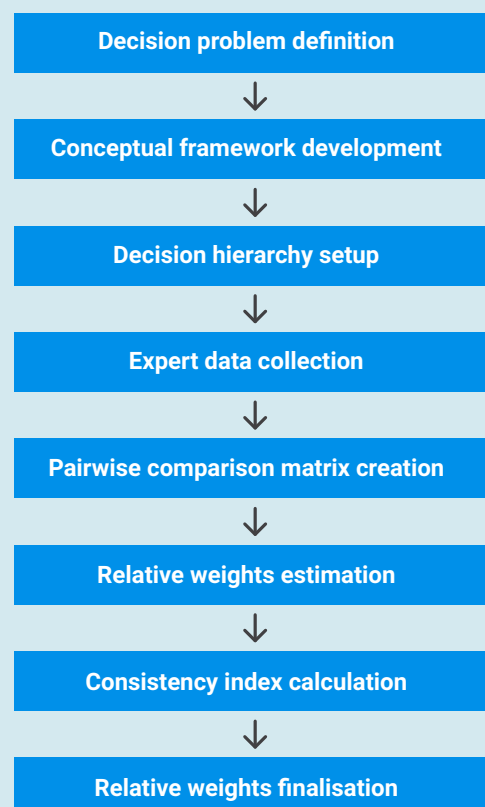


This cumulative score alone might be sufficient in certain business scenarios. But it is prudent to incorporate the opinion of the leadership team into this AI investment decision-making. Opinions of the leadership team could be easily captured using simple questions and a Multi Criteria Decision Making (MCDM) algorithm could be used to obtain the weights (as against the equal weightage illustrated above). MCDM method deals with the process of making decisions in the presence of multiple criteria or objectives. A decision maker is required to choose among quantifiable or non-quantifiable and multiple criteria. The evaluations on qualitative criteria are often subjective and imprecise. The objectives could also be conflicting and therefore the solution is highly dependent on the preferences of the decision maker. Besides, it is very difficult to develop a selection criterion that can precisely describe the preference of one alternative over another. The evaluation data of subject alternatives suitability for various subjective criteria, and the weights of the criteria are generally expressed in linguistic terms.

When we go through a rigorous analysis of sending each project through the lens of its critical success factors, the likelihood of success of AI powered digital transformation increases. For companies that wants to capture the benefits of AI what truly matters is

not the AI technology itself but whether there is a strategic resonance of AI with that of its corporate strategy. And then value can be created and captured by the airport operators.

In Brief Analytic Hierarchy Process (AHP)



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AHP Excerpt

Analytic hierarchy process (AHP) would be the recommended MCDM approach for our framework. Thomas. L. Saaty developed the AHP in 1971-1975 while at the Wharton School (University of Pennsylvania).

In a keynote, Professor Satty introduced AHP by saying, "You can't compare apples and oranges," the saying goes. But is this true? Consider a hungry person who likes both apples and oranges and is offered a choice between a large, red, pungent, juicy looking Washington State apple and an even larger, old, and shriveled, pale color orange with a soft spot. Which one is that-person more likely to choose? Let us reverse the situation and offer the same person on the next day a small, deformed, unripe apple with a couple of worm holes and a fresh colored navel orange from California. Which one is he or she more likely to choose now?

We have learned through experience to identify properties and establish selection criteria for apples and oranges and in fact we use that experience to make tradeoffs among the properties and reach a decision. We choose the apple or orange that yields, according to our preferences, the greater value over all the various attributes."

The Analytic Hierarchy Process is an approach to decision making. It is designed to cope with both the rational and the intuitive to select the best of a number of alternatives evaluated with respect to several criteria. In this process, the decision maker carries out only simple pairwise comparison judgments which are then used to develop overall priorities for ranking the alternatives. The AHP allows for inconsistency in the judgments and provides a means to improve consistency.

AHP has application in group decision making and is used around the world in a wide variety of decision situations, in fields

such as government, business, industry, healthcare and education.

Rather than prescribing a "correct" decision, the AHP helps decision makers find one that best suits their goal and their understanding of the problem. It provides a comprehensive and rational framework for structuring a decision problem, for representing and quantifying its elements, for relating those elements to overall goals, and for evaluating alternative solutions.

AHP involves structuring multiple choice criteria into a hierarchy, assessing the relative importance of these criteria, comparing alternatives for each criterion, and determining an overall ranking of the alternatives based on cost, benefits, and risk. In AHP, decision maker is required to provide judgments about the relative importance of each criterion and then he must specify a preference for each decision alternative on each criterion. The output of the AHP is prioritized ranking indicating the overall preference for each of the decision alternatives, which eventually helps the decision maker to select the best approach.

The AHP always includes the following key steps:

- Define the problem and determine the kind of knowledge sought.
- Structure the decision hierarchy from the top with the goal of the decision, then the objectives from a broad perspective, through the intermediate levels (criteria on which subsequent elements depend) to the lowest level (which usually is a set of the alternatives).
- Construct a set of pairwise comparison matrices. Each element in an upper level is used to compare the elements in the level immediately below with respect to it.

- Use the priorities obtained from the comparisons to weigh the priorities in the level immediately below. Do this for every element. Then for each element in the level below add its weighed values and obtain its overall or global priority.

Continue this process of weighing and adding until the final priorities of the

alternatives in the bottom most level is obtained.

The answers to pairwise comparison questions asked will be converted into numbers using the scale below!

Intensity of important on an absolute scale	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance of one over another	Experience and judgment moderately favor one activity over another
5	Essential or strong importance	Experience and judgment strongly favor one activity over another
7	Very strong importance	An activity is strongly favored and its dominance demonstrated in practice
9	Extreme important	The evidence favoring one activity over another is of the highest possible order of affirmation
2,4,6,8	Intermediate values between the two adjacent judgements	When compromise is needed
Reciprocals	If activity i has one of the above numbers assigned to it when compared with activity j , then j has the reciprocal value when compared with i	
Rationals	Ratios arising from the scale	If consistency were to be forced by obtaining numerical values to span the matrix

Weights of each of the criteria is nothing but the eigen values of the pairwise comparison matrix constructed from the answers provided by the leadership team. The real and practical use of eigen values in decision making is not contrived but we are led to them in a very natural way. AHP ensures that the opinion of the leadership team is mathematically used in every decision without going back to them each and every time.