



**IT INVESTMENTS THAT FLY:**  
Unique Challenges for Airline Leaders

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## Introduction

*“That’s been one of my mantras - focus and simplicity. Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. But it’s worth it in the end because once you get there, you can move mountains.” - Steve Jobs*

For leaders within airlines, choosing which technology projects to allocate capital towards is a key decision that has lasting ramifications. This decision takes place in the context of an incredibly complex landscape and is influenced by differing agendas. Leaders are tempted to design a robust and often complicated project intake process that models financial return, risk, and expected benefits. However, research suggests that there is a better way.

Simple rules, as opposed to detailed models and bureaucratic processes, provide better performance when teams need to make decisions in environments that are complex and unpredictable. “Simple rules impose a threshold level of structure, while avoiding the rigidity that results from too many restrictions. The resulting flexibility makes it easier to adapt to changing circumstances and seize fleeting opportunities. Simple rules can also produce better decisions than more complicated models can, particularly when time and information are limited (Sull & Eisenhardt, 2015)”. We believe that the use of simple rules to guide technology investment decisions and determine the priority of project work can help airline leaders make stronger decisions, leading to improved outcomes from technology investments.

Technology should be a powerful enabler of the business, but leaders must choose the technology investments that will add the most economic value to the airline. Deployment of new technologies places a strain on the financial, human, and in some cases, the physical resources of the business. It is damaging to apply this strain to an organization if the investments don’t make a meaningful difference in the economic value of the organization.

**The pace of change of technology has, and will continue to drive numerous technology innovations aimed at solving business challenges.**

This is especially true in an industry, such as the airline industry, that has a long track record of failing to generate returns on invested capital that compensate investors for the level of risk present in the industry. A 2013 report from IATA states, “Over the past full business cycle investors in airlines have received a return on their invested capital which has been on average \$17 billion less each year than they would have earned by taking their capital and investing it elsewhere in assets of similar risk (Pearce, 2013).” ROIC for airlines has been lackluster, and leaders must not make investments that do not have a positive impact on ROIC. Unfortunately, many technology investments don’t result in positive gains for organizations.

### **New Technologies in the Airline Space**

In this current period of record profits, airlines face a tsunami of potential technology initiatives that could consume organizational resources. The pace of change of technology has, and will continue to drive numerous technology innovations aimed at solving business challenges. For the leader within an airline, this onslaught of potential innovations and requests from stakeholders drives a glaring need to determine how to focus the allocation of the key resources of the company towards the deployment of new technologies. Leaders must determine how to decide which technology investments to pursue.

Too often, the teams in charge of making strategic investment decisions related to technology do not have a consistent guide that provides direction to align investment choices with the strategy of the organization. “Bad strategy ignores the power of choice and focus, trying instead to accommodate a multitude of conflicting demands and interests. Like a quarterback whose only advice to his teammates is “let’s win,” bad strategy covers up its failure to guide by embracing the language of broad goals, ambition, vision, and values (Rumelt, 2011).” Often, the holistic view of technology investments is left to a portfolio management function. In many organizations this function doesn’t have the power to drive investments towards a set of reinforcing initiatives that align with the strategy of the airline.

Luckily, there are decision-based simple rules that can help with project selection and prioritization. The goal is to provide individuals that make technology investment decisions with a set of guidelines that will coordinate actions leading to flexibility, added value, and focused investment.

## Simple Rules to Guide Leadership

The three simple decision-based rules, described by Sull and Eisenhardt in their book *Simple Rules*, are:

1. **Boundary Rules** – Rules used to make decisions between mutually exclusive options, opportunity pursuit/rejection
2. **Prioritization Rules** – Rules aimed toward prioritizing options when there are limited resources available
3. **Stopping Rules** – Rules that signal when to stop or reverse a decision

As leaders within airlines, we can apply these rules to making investment decisions. A prime example that Sull and Eisenhardt describe in their book is the set of rules that DARPA (Defense Advanced Research Projects Agency) uses to decide which projects to consider for investment. DARPA uses the following rules to screen potential projects:

- The project must further the quest for fundamental scientific understanding
- The project must have a practical use

These two simple rules allow DARPA to apply its limited resources to develop some of the most amazing innovations in the world. Ever use Siri? Siri is based on DARPA research called Cognitive Assistant that Learns and Organizes (CALO.) DARPA also played a critical role in the development of GPS technology in coordination with the Department of Defense. Thank DARPA and simple rules the next time your GPS tells you to turn left in 100 feet.



The key to making these simple rules work is that they must have the effect of addressing issues that make a significant impact on the economic value of the organization. A critical concept described in Simple Rules, that helps one visualize the creation of the economic value, is the illustration of two needles. One needle represents the willingness of a customer to pay, and the other represents the cost profile of the organization. Visualize these needles lying parallel to each other with the gap between the two needles representing economic value. The authors suggest that there are many initiatives in an organization that will cause the needles to twitch, resulting in a small impact to economic value. However, the organization must identify those initiatives that will cause a step change in the positions of the needles widening the gap and increasing economic value for a sustained period. This is how real economic value is created. Simple rules are a proven method of focusing investments in technology to support overall strategy and increase the economic value produced by an organization.

If we apply this approach of creating value to technology investments within an airline, we can begin to differentiate the type of technology investments that might make a meaningful difference in the economic value produced by an airline. This in turn, can lead to the ability of a technology strategist within an airline to produce her own simple rules to guide the boundary conditions and the prioritization of technology projects, given the limited resources that are available for execution.

## Willingness to Pay

Willingness to pay is a critical component of creating economic value for a business. Fortunately, there have been a number of academic studies conducted to understand the willingness to pay factors in the airline industry. In general, it is difficult to increase the willingness to pay for air travel through additional product attributes. The factors influencing the willingness to pay are relatively small in number. A study by A. G. de Menezes and J. C. Vieira isolated key service attributes in an attempt to identify variance in willingness to pay.

**The reliability guarantees were followed by comfort, a cold snack, a hot meal, frequency of flights, and finally a penalty for ticket changes, which had a minor effect on willingness to pay.**

Specifically, the study identified differences in the willingness to pay for comfort, reliability, food choices, ticket change fees, and flight frequency (de Menezes & Vieira, 2008). This study was particularly interesting in that it demonstrated that customers placed guarantees of on-time performance, in the form of free tickets and compensation, above other attributes studied by a significant margin. The reliability guarantees were followed by comfort, a cold snack, a hot meal, frequency of flights, and finally a penalty for ticket changes, which had a minor effect on the willingness to pay (de Menezes & Vieira, 2008). Utilizing this type of information to drive investments in technology that support delivering what the customer really wants to buy, namely, an on-time flight that is comfortable, will focus capital in the areas that can lead to the creation of economic value for the airline.

Examining reliability further, we learn that a customer is likely to switch airlines when there is poor on-time performance and the customer has available options of airlines from which to choose (Suzuki, 2000).

This implies that service reliability not only influences willingness to pay, but may also represent a key lever for long-term airline performance in those markets where consumers have a choice of airlines to fly, and the price on the route is similar, given the level of service. When we consider that in many instances, a reliable operation is generally a more cost effective operation, this service attribute becomes even more meaningful as a lever of company performance.

Airlines have invested heavily in the creation of willingness to pay for ancillary products, such as seat choice, on-board entertainment, on-board meals, upgrades, purchase of additional loyalty miles, and others. Often, there is a substantial cost for delivering these new products, and technology plays a key role in the lifecycle of these products, especially those that leverage big data technologies and expertise. We urge leaders to investigate the total cost of providing a new product/service and ensure that the investment will widen the economic value versus cost gap.

Clearly, there are limitations in the types of technologies and software applications that will increase a customer's willingness to pay. In general, customers care about getting to the destination on-time and in a comfortable manner. Investments aimed at operational excellence and reliability are often promising, as it seems these aspects may preserve market share, while creating potential for a given airline to differentiate its service. Technologies that support the generation of ancillary revenue, outside the traditional business model, may be interesting pursuits, as these investments create willingness to pay through the innovation of new products. Conversely, the willingness to pay theory also highlights that there are many technology investments that shouldn't be pursued.

Our experience has shown us that across industries, there is generally poor discipline when it comes to funding technology investments based on willingness to pay. Often, there is not a shared understanding or commitment among decision makers to the true strategic challenges, plan, and set of choices that need to be made in order to focus the allocation of resources to the investments that will drive successful execution of the strategy. Instead, the excitement of new technologies available to the industry, personal agendas, and local goals create confusion and competition for resources among investment advocates. Simple rules can help solve this problem by providing boundaries for those technology investments that will drive significant, sustainable increases to the willingness of customers to pay for the products or services that an airline provides.

## **Leverage Through Managing the Airline Cost Needle**

Creating a sustainable cost advantage relative to competition is an incredibly powerful lever to differentiate performance and increase return on invested capital. It is clear that technology investments for an airline can play a more powerful role in the reduction of cost than in the growing of consumer willingness to pay for the services provided by an airline.

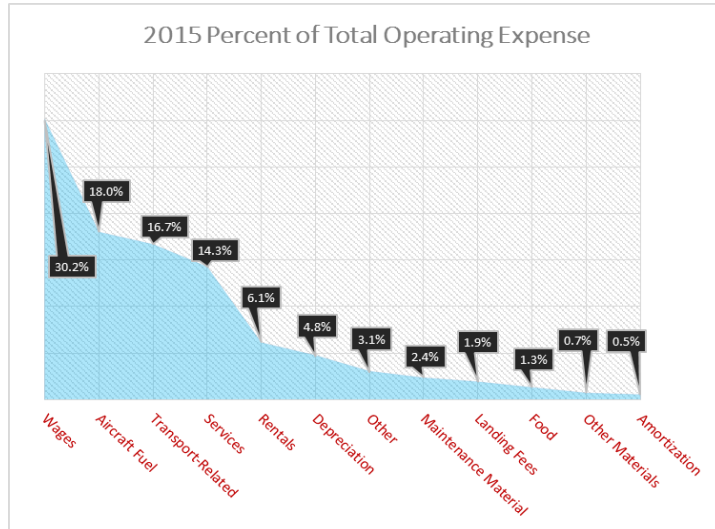


Figure 1: Percent of Operating Revenue

Figure-1, above, demonstrates the composite of airline operating expenses as reported to the Bureau of Transportation Statistics (USDOT, 2016). The recent decline in the price of oil has led to the wage category becoming the most significant operating expense, followed by fuel, transport related expenses, and services. Those four categories comprise nearly 80% of all the operating expenses reported in 2015.

Figure 2: Source: Bureau of Transportation Statistics



Decomposing the cost data further, Figure 2 illuminates the areas that are better fits for technology investments to drive lasting reductions in the cost profile of an airline. In 2015, the largest category, wages, broke down as follows (USDOT, 2016):

Almost 90% of the wage expenses are contained within three categories. Flight Operations personnel, including pilots and flight attendants represent 48% of the wage category. Other, which can essentially be thought of as back-office and corporate staff represents 20%, and Traffic, which is composed of airport personnel excluding maintenance, represents an additional 19%.

Technology investments have a tremendous potential to reduce labor costs or allow the airline to grow without adding incremental headcount.



Higher productivity of flight crew resources is one of the key advantages that many low cost carriers have, relative to legacy network carriers in the domestic US market. Technologies that support optimization of crew planning, crew scheduling, and recovery from irregular operations will help airlines boost the productivity of their flight crew resources.

Evolving technologies such as robotic process automation (RPA) have the potential to alter the amount of labor needed to support a large number of corporate processes. Examples of RPA include automated artificial intelligence based agents used to staff call centers, and robotic field engineers that are able to read maintenance manuals and diagnose equipment failures. Imagine a fleet of aircrafts that sends diagnostic data to a robotic maintenance engineer that diagnoses the problem, determines a solution and begins remediation, which includes queuing parts and notifying maintenance and scheduling teams of the unplanned aircraft downtime. The impact on reliability and cost would be significant. A challenge for many airlines that may limit the ability to deploy technology, to reduce headcount, or increase productivity is that a significant portion of the workforce is unionized, and work rules contained in contractual agreements limit the productivity of resources as well as the ability of the company to reduce headcount as new technologies are deployed.

**Route planning, taxi times, fuel burn, and takeoff weight are all areas in which technology investments aimed at optimization may represent long-term cost savings.**

The next largest operational expense, fuel costs, are highly volatile in nature. Volatility can be managed partially through hedging, but still represents a key challenge for the leadership of airlines. Investments in technologies that help reduce fuel consumption and reduce exposure to rising fuel prices are key. These types of technologies come in many forms including new aircraft technologies, but optimization is a key theme, as it was with labor resources. Route planning, taxi times, fuel burn, and takeoff weight are all areas in which technology investments aimed at optimization may represent significant long-term cost savings. Massive quantities of performance data generated by the internet of things can be gathered and analyzed, and the resulting analysis may provide another avenue for airlines to identify areas in which they can optimize fuel consumption.

Transport Related Costs are those costs associated with providing services that are supplementary to the air transportation services performed by the airline. Examples include in-flight sales and expenses from associated businesses (aircraft maintenance, fuel sales, restaurants, vending machines, etc.) (USDOT, 2016). Essentially, this category of costs exists because airlines have looked for other revenue streams to augment the normal business model of an airline. There is great complexity in supporting the ancillary products. For instance, the decision to allow customers to preorder meals during the booking phase of travel has tremendous ramifications throughout the IT ecosystem.

Many times, the organization focuses on the revenue generated by these types of services and does not consider all of the detailed costs associated with providing the service. Care must be taken to understand the profitability of ancillary services and determine if sustainable economic value is being created through the provision of these services.

The final large bucket of operating expense, services, contains a diverse spectrum of expenses generally provided by third parties to the airline including advertising, communication, insurance, legal fees and other services purchased. Robotic process automation, artificial intelligence, and other technologies may commoditize these services and provide an avenue to reduce expenses moving forward.

Determining approaches to make significant reductions in expenses is tremendously important for companies that exist in a highly competitive environment. "In 2011 IATA worked with Harvard's Professor Michael Porter to look at these competitive interactions and their influence on airline profitability.

He concluded that there were few industries where the "5-forces" were as strong as in the airline industry (Pearce, 2013)." Thus, it is critical that leaders within airlines pursue opportunities to reduce costs through the application of technology.

For airlines, there are large potential returns from technology investments aimed at improving the expense profile of the organization. Simple rules should be used to focus technology investments with a preference for those projects that will create a sustainable cost advantage relative to the competition. Total cost of ownership is an important consideration given that often, this metric is poorly understood or woefully understated when investments in technology are considered.

### **Putting it All Together: Simple Rules to Guide IT Investments of Airlines**

There are most likely only a few key areas in which technology investments create lasting economic value for an airline. Using simple rules to help guide investments allows an organization to cope with the complex business environment facing airlines. These rules free decision makers to behave in an agile manner, while still maintaining a focus that drives economic value. In Simple Rules, Sull and Eisenhardt provide an example from a related industry: ALL, a Brazilian rail line, used a set of simple rules to determine prioritization of investments in capital projects. The project:

1. Removed bottlenecks to growing revenues
2. Provided benefits immediately (rather than paying off in the long term)
3. Minimized up-front expenditures
4. Reused existing resources

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*“The simplicity of the rules made it straightforward for employees at many levels to understand and support the company’s investment strategy. Within three years, ALL **increased revenues 50 percent** and **tripled its operating cash flow**, while maintaining the best safety record of all freight lines in Brazil (Sull & Eisenhardt, 2015).”*

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## Conclusion

Each organization will need to develop its own set of simple rules, based on the identification of those key levers or decision points that the leaders within the business believe will widen the gap between the consumer's willingness to pay and the organization's cost profile. Leaders must determine guiding principles that address a key performance bottleneck. A keen focus should be placed on those technologies that support operational reliability, which in turn, can allow the airline to offer a guaranteed reliable service to the customer, while potentially reducing operational expenses. It may be possible for leaders to identify other service attributes, such as comfort or provision of on-board amenities, that can be used to guide the development of simple rules. From a cost standpoint, it is clear that labor and fuel are key areas that should be examined for long-term efficiency opportunities. Ultimately, the rules developed will differ, depending on the individual organization, the location of opportunities within the organization, and the challenges that the organization faces with regard to competing in the industry.

Technology is an incredible force multiplier that can help create sustainable long-term advantage, when applied to the right levers within an organization. In the last year, airlines have benefited from extremely low fuel prices, resulting in record profitability. When making capital investment in technology, a clearly focused set of investments will determine which players in the industry are positioned for success when margins face the pressures of rising fuel prices. Too often, spend on technology does not create lasting value. In fact, many technology investments destroy value for the organization, but they are pursued because of faulty logic, poor decision-making, or a blatant misunderstanding of the coordinated activities that need to occur to execute the organization's desired strategy. Leaders within airlines must use simple rules to guide technology investments by providing a clear focus that allows the flexibility for front-line management to make decisions in an agile manner. This behavior will support the creation of meaningful economic value.

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