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Innovating with Airborne Analytics

JOE LOCANDRO (CATHAY PACIFIC), INTERVIEWED BY DAVID KIRON

Hong Kong's premier airline uses a blend of data and know-how to guide its daily operations.

Flying passengers around the world is a complex business — one that is becoming increasingly data-driven. Hong Kong-based Cathay Pacific knows this as well as anyone, as they use analytics to support decision making on all fronts: from determining planes' fuel efficiency to improving customer experience to managing crews' flight and rest schedules. Even something as mundane as luggage handling is getting an analytics makeover.

Yet Cathay Pacific doesn't take an all-data-all-the-time approach. The company's chief information officer, Joe Locandro, is clear that data works in tandem with experience and business acumen when used for decision making. "Analytics will give you statistical spreads," he notes, "but you still need to have this thing called experience and insight."

In a conversation with David Kiron, executive editor for *MIT Sloan Management Review*'s Big Idea Initiative, Locandro describes how his company uses data — and what caveats he puts on its role.

What is your role and mandate at Cathay Pacific?

As the CIO, I'm in charge of all the technology globally, including our subsidiaries. It's a fairly comprehensive portfolio of systems infrastructure and business units, everything ranging from baggage to catering to airline planning, etc. We're currently going through a large IT investment cycle.

We have a three- [or] four-year strategy to take us to the next level in three areas. One is operational efficiency or improved performance. Two is customer intimacy. And three is innovation.

In terms of operational efficiency, we're using analytics on engine performance data for our fleet. That increases reliability and also helps reduce fuel burn if we can fine-

tune the aircraft engines. Fuel accounts for approximately 40% of our costs, so percentage gains on our fuel bill and our engine performance are worth a lot to the bottom line.

We also use analytics to optimize crew and shift deployment. We have 15,000 staff who have to be matched to plane types, to the destinations, to special breaks that they have to have, etc.

In terms of customer intimacy, we use analytics to look at frequent flyer preferences and assess flying preferences. We look at click-stream data on our site to see what customers are viewing, to get a feel for what stage in the cycle they're at. We also have analytics to look at customer complaint data to see if there's a trend developing about meals, or seats, or service or something else. These are all bundled up to improve the customer experience to keep us as number one airline in the world.

Basically, we're using analytics to make more data-driven decisions. But we combine that with experience and insight. Analytics will give you statistical spreads, give you training, but you still need to have this thing called experience and insight. I'm seeing business units use it more and more, and they're getting more and more comfortable blending data with their experience.

Are you also using data to look forward, or to innovate?

Yes, there's a paradigm change in the way we use data to innovate how we interact with customers.

For example, once we found what sites people were hitting, what types of things they were downloading before getting on a flight, we were able to tailor and streamline our cache next to the daily newspapers. That allowed customers to download *The Financial Times* and *The Wall Street Journal* onto their iPads in the lounge before they board on the plane. And that's probably a good example of how you can use data and analytics to drive a new customer experience or proposition.

What else are you doing to innovate with analytics?

We created an innovation center in IT. It's a small team of young people who are given problems that require design thinking, and they come up with solutions or proofs of concepts. They are based in headquarters and work with a small, targeted budget.

It's business-driven, directed by an innovation council. I'm the chair, and the head of HR is my co-chair. We have probably about 10 or 15 representatives as general managers from each of the business units. Once we have the IT and the business people working collaboratively to do a proof of concept, the innovation will go through a formal funding process and have a proper business case and proper justification.

Right now, the guys are developing a tag for baggage. We know how many bags get lost or misdirected. We can look at data that says it will cost us, on average, X dollars on a lost-bag retrieval, customer follow-up, etc. — and then ask, "What can we do on the end-to-end process? What causes this? By looking at the data and analytics, can we redesign this whole process?"

Today when people change their flights or flights are delayed, they have no idea if their bag made it with them or not. These new LED baggage tags can change dynamically as the circumstances change. When the bag gets on the carousel, it has the potential to appear on your iPhone, and you could track not only where it is, but then

just put your hotel into your iPhone, and somebody could pick it up and deliver it to your hotel while you go to a meeting. It will just change dynamically with low-energy Bluetooth.

Does this small team operate with mock-ups, or is most of the work that they do virtual, on computers?

Yes, they work with mock-ups, but they also actually go out into the environment and look at the design and [identify] what's appropriate. They were working on improving airplane inspections, [and] they would go there at night and see [what was happening]. Well, how do you do an air inspection on an aircraft when it's raining, or it's zero degrees and freezing at JFK versus the humidity in Singapore? We encourage them to get into that area of the business that has the business problem and work with the business people.

Does your organization see data as a core asset?

I think data has always been a core asset, because we fly 30 million people a year, but we probably have 100 million or so who have been flying with us over three [or] four years, and this gives us a huge data pool of data to draw upon.

So, the data is important to allow the proper functioning of the airport, aircraft , the crew and everybody else. The cycle-time of decision making gets shorter and shorter, and operationally, things change very quickly. For example: When do you swap out a plane or divert an aircraft to another location? Effectively leveraging information can give you a step-function change, or even an algorithmic improvement in operations.

Presumably the dollars invested in the technology means dollars not invested elsewhere. Is there an organizational consensus about the importance of data?

That's correct. It's an opportunity cost of investment. For example, a lot of data is used in determining product development. When we talk product, it could be seats, could be catering offers, customer usage and preferences in lounges and which airports we should go into, planes, duty-free shopping, all that. To support that product development, we use a state-of-the-art data warehouse that can house more structured and unstructured data.

We've created a customer hub so we can grab data from all different touch points, whether they are online, kiosks, check-in counters, etc. Now, if we are to take this correctly, the entire management team will not only be able to run more efficiently, but actually come up with new product services and operational areas of improvement.

We invest heavily in airplanes, and we have been doing that for some time. We have one of the most fuel-efficient fleets in the world. What's next? If you've got operational efficiency on your planes, you've got to look at the total ground and baggage and catering systems, and back-office systems and mobility systems and tablets, etc.

A lot of digitization and information coming through used to be paper-based, and now it's going end-to-end. The next level of maturity for organizations will be to digitize and architect so cleverly that you can modularize and plug-and-play for maximum flexibility. That's the real key. We spend a lot of time architecting the future based on projected growth and projected efficiencies. We know, every time we talk business case, where we expect the

benefit to be, and how it's to be realized and where it will be realized. It's very thoughtful and disciplined.

Do you have any trouble hiring data scientists?

We do. One, because they're expensive: If I were to give people career advice, I'd say, "Become a data scientists or get into data security." People will have to buy consulting services from data scientists rather than have them full-time on the bench because they aren't needed all the time. Keeping them fully employed may be a challenge. That's been our approach: We tend to hire data scientists as consultants.

Data scientists would be very good at helping us with what-if analyses that depend on higher-order analytics. For instance, you need to size the plane on the right route based on the right forward passenger predictions. You don't want a big plane flying one-third empty, or you're making a loss.

We are always looking at the economic tradeoff between the different aircraft deployments. Which planes do we put on which routes, on which seasonality, based on which forecast on our predictions, and then roster the cabin crew next to that? And what is the opportunity cost of doing all that? These analyses depend on very, very complex algorithms, that support how we develop schedules three and six months out, and [also] when we're looking at new destinations.

I would imagine, because of the complexity that you just described, data scientists would need to be paired closely with somebody who knew the business very well. How do you actually organize people to affectively address those kinds of problems?

It's a very good question. This is bordering on knowledge management and how you capture tacit knowledge in an organization, because after 20 or 30 years, people make these decisions by experience. But as your fleet grows and as your destinations grow, it can become overwhelming. You do need to partner up, because there are so many different what-ifs and combinations. It's extremely complex modeling, even just to model the revenue forecast, let alone the planes you need and the crews that you need.

What are the big risks that you see facing what you're trying to achieve with technology in the organization?

I think some of the risks are interoperability, data security, proper taxonomies and data ownerships. But the other risk is that people aren't using judgment with the data produced. You need them to have this ability to reason or put it in the context [of] what data results you are seeing.

Have you seen evidence of that happening yet?

Not in Cathay Pacific — but in previous roles, I have seen younger people who haven't got enough experience just blindly follow the data. The current Millennial generation has an implicit trust of the Internet and data. That could be a real risk for organizations in the future.

How do you educate that out of people?

I don't think it's educating it out. I think it's just [an issue] of leadership.

I went to a lunch with Eric Schmidt of Google. One of the people there said, "Eric, if you can find everything you want on Google and just search it, why do we need to have the traditional education system? I can find any fact on history, or about science just by Google search. Why do I need to spend the seven, 10, 15 years on education?" I thought it was a pretty good question.

And Eric said, "Well, when I came here today," he said, "I looked you up." And he said, "David, you studied at Oxford. You did engineering." And David goes, "No, no, no. I didn't study at Oxford or engineering. I was at Cambridge and I did arts and literature." And Eric said, "But I looked you up on Google. It must have been the wrong one." And then he said to the questioner, "You need to know the context of who you're looking at, because there were two David T's." And I think that's how we need to think about analytics and data. Put it in your context and understand it.

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