Aviation Strategy

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Airtificial Intelligence, Airline Reality

SCIENCE fiction fantasy is now reality. You can "chat" with a computer powered with generative artificial intelligence (AI), get it to write an article, citing sources; transform it into a presentation or video; create music and pictures. You can get it to write the code to power a website, or build a program to scrape, or hack other websites. And now you can use the same technology to set prices for airline tickets.

Delta Air Lines caused controversy following its Q2 results, stating that it was trialling AI in partnership with Fetcherr's engine — which it describes as providing "dynamic pricing". Fetcherr was founded in 2019 with a mission to "break the glass ceiling of legacy". It chose to specialise in airlines, despite lacking industry experience, with its three co-founders coming from algorithmic trading, e-commerce and advertising.

Very happy with the results so far, in Q2 covering 3% of its markets Delta hopes to expand it to 20% of its fares by the year end.

It didn't help, when Delta introduced the project at its Investor Day in Nov 2024, that Delta's President Glen Hauenstein said what they are working towards is offering specific prices on specific flights to specific customers, calling it "offer management".

"This is a full re-engineering of how we price", he said. "Today, there are two disciplines: there is pricing, which sets the price points and then there's revenue management, which controls access into the inventory of those price points. Over time, we think this is going to get melded together, that it's going to be really just offer management. That we will have a price that's available on that flight, on that time to you, the individual. Not a machine that's doing an accept reject and a static price grid."

The combination of the phrase "dynamic pricing" and "AI" created fears that Delta would be using personal information — historic booking patterns on their website, recent deaths, funeral notices, and even access to a passenger's banking details or earnings history — to raise prices offered to the individual passenger to their "pain-point". Questions were asked on Capitol Hill in Washington.

There is no reason to expect that Members of Congress would have any more understanding of the intricacies of how generative AI works — or airline yield management for that matter — than any man in the street. But Delta was forced to dispel the fears in an open letter to concerned Senators Gallego, Blumenthal and Warner, saying:

"There is no fare product Delta has ever used, is testing or plans to use that targets customers with individualized prices based on personal data. Furthermore, we have zero tolerance for discriminatory or predatory pricing and fully comply with applicable laws in privacy, pricing and advertising. Our AI powered pricing functionality is designed to enhance our existing fare pricing processes using aggregated data. This technology is a decision-support tool that simply provides informed insights for our analysts, who oversee and fine-tune the recommendations to ensure they are consistent with our business strategy."

This issue includes

An AI Primer

A recent white paper from *Visual Approach Analytics* provides useful insight into what this initiative from Delta is all about. Apart from anything else, it provides an idiot's guide to the history of the development of AI.

Mathematicians in the late 1800s started developing multi-variable regression models — one of the more useful early outcomes being an ability to forecast weather. The concept is based on trying to determine mathematically the relative impact of independent variables (which might be forecastable) on the outcome of one or more dependent variables to produce a reliable forecast of the depen-

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dent variables.

For example, the regression formula for aviation forecasters — we all work on the basis that air traffic growth is related to GDP (as a surrogate for income) and traffic yields (reflecting the cost of travel) — can be simplified to ΔRPK=exp (ln (ΔGDP)-ln (Δyield)+fiddlefactor[1..n]) — the rate of growth in traffic is a function of the growth in GDP less the growth in yields adjusted for various coefficients needed to fit the formula to explain historical outcomes. (Identifying the number and extent of the fiddlefactors, let alone forecasting them, is a high art).

Working through these regression models on paper is arduous. The advent of computers provided a significant elevation in calculation speeds. Data scientists have been able over the years to develop increasingly complex computerised optimisation models to validate the analysis. One of these models is referred to as "neural networks".

The easiest way to understand neural networks is to realise that *how* they work isn't as important as *what* they do.

Neural networks are a better way of determining the weights to assign to each of the variables in a multi-variable regressional model. Today this is termed "training" the AI model. Essentially, you give the neural network thousands of questions and the corresponding answers to those questions. It effectively solves the equation.

The solution to incorporating more time-series data into these neural networks was the introduction of recurrent neural networks (RNNs). This allowed the model to incorporate historical data into its predictions. The problem the recurrent neural network ultimately had was in determining how important the historical data should be. And which elements of the historical data to forget.

This led to the development of the Long Short-Term Memory (LSTM) model, designed to address the issue of the RNN remembering everything equally. In an oversimplified explanation, the LSTM divided historical data points into long-term or short-term memory, or any infinite combination of each. The arrival of LSTM brought the first viable models for predicting *words* based on prior *words*. For the yet-to-be-named AI industry, the race was suddenly on to use LSTM models to build a language model.

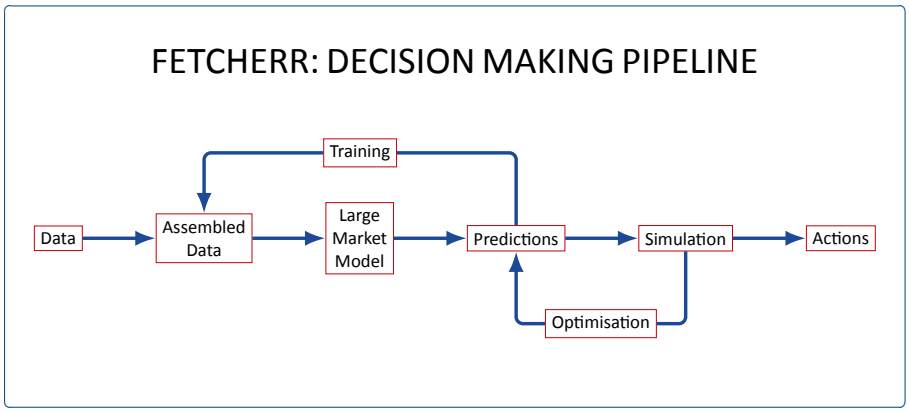
A new type of structure, coined the transformer, evolved the idea of the LSTM beyond just short and long-term memory to that of attention, and transitioning away from the recurrent nature of the prior networks altogether. The transformer was ultimately built into a working model called a Generative Pre-trained Transformer (GPT).

By appropriately modeling new information, yet still considering old data through the new context of "attention", GPT models could accurately predict what comes next. For the bulk of the world, this means predicting which *word* comes next. Do this enough, re-adding the model output as input for the next word, and a GPT can write volumes. The implementation of all this is known as a Large Language Model (LLM).

But as we still don't know *how* it works, it's also a big black box.

What's in the Fetcherr black box?

Fetcherr is very clear. In a white paper (appropriately published on a black background) downloadable from its website, it explains that the system



is based on the development of a Large Market Model (LMM). In contrast to the Large Language Models (LLM) that power the generative AI systems of OpenAI and others, that are designed through a GPT to choose the best next word to use in a conversation, Fetcherr's LMM uses the same transformer technology to choose the best number, or more specifically the best ticket price.

Its focus has been on compiling and using data pipelines, infrastructure, and advanced deep learning models specifically tailored to analyse airline market data. Its approach, it says, encompasses a comprehensive range of factors that influence market dynamics including internal and external variables such as pricing, seat availability, current news, weather conditions, significant events, flight schedules, competitor reactions, stock market performance, and oil prices, among others.

The LLM forms a critical part of an extensive iterative "pipeline" (see graph left) that continuously integrates historical and current data. The process involves numerous iterations of training the LMM, coupled with an exhaustive search for the ideal solution. This search is done within a simulated environment that feeds into a reinforcement learning circle to "refine and enhance the final decision-making process".

This does not seem much different from existing airline revenue management systems. Availability of tickets at particular price points are already continuously monitored and adjusted according to reactions to changes in all those variable mentioned.

And many airlines already use computer learning programs to help them in the pricing decision process. The big difference with Fetcherr ap-

pears to be the speed at which it reacts and the implementation of a "live" pricing environment — similar to the algorithmic trading platforms used in the financial markets, it is being used in real time.

In its (not very) white paper, Fetcherr claims that it has achieved a 10% improvement in revenues "at a particular airline" where the model has been implemented. It highlights the improvement using two contrasting charts reproduced on the previous page. What stands out is substantial increase in the number of price points along with a higher volume of changes in those price points.

It seems logical that a frequently and constantly changing pricing environment could fill in the revenue gaps to the theoretical price/demand curve: and that is what airline revenue management is all about. For any airline, such a model is not so much producing an optimised level of price, but possibly in producing an equally optimised price much more often.

A step-change in revenue management?

Delta is not Fetcherr's only customer. Others include Azul, Virgin Atlantic (of which Delta has a 49% stake), Westjet (15% owned by Delta), Viva Aerobus and Royal Air Maroc. And Fetcherr is not the only company in this space. Key players include PROS, (used by Emirates and Lufthansa), Wiremind (Emirates Cargo, Qatar Cargo), AirGain-AI (Singapore Airlines, Air Astana, Air Montenegro, Nok Air, Cyprus). And of course there is Sabre, the original creator of airline yield management.

AI-based real-time pricing is becoming the next step-change in perfecting airline revenue management. An intriguing thought, put forward by various commentators, is the effect it may have on competition; and what happens when two AI models start pricing against each other.

There is the possibility, as has happened with the financial markets' algorithmic trading systems, of a flash crash: models react to one another with such a speed that optimised prices drive each other in a response loop. (At 2.32pm ET on 6 May 2010, the DJI plunged 9%, or 1,000 points down within seconds before rebounding. The "crash" lasted 36 minutes.)

And, where AI models may perform well in a rational environment, they could be badly impacted by the maverick competitor who suddenly changes pricing tactics in a way unexpected by the model.

Delta made a faux pas in praising its experiment with Fetcherr. The ordinary passenger and politicians alike do not want to to hear that airlines want to make as much money from their passengers as they can.

On the other hand, under current stock market trends, as we head into what may yet turn out to be an AI "bubble", any quoted company thinks it can improve its share price rating by showing it is investing in Artificial Intelligence.

Guest column

For the following section we asked ChatGPT to provide an analysis of the impact of artificial intelligence on the airline industry in the style of Aviation Strategy. *It gave the following response:*

Artificial Intelligence: The Next Decade of Airline Transformation

Artificial intelligence is steadily moving from experimentation to operational reality in aviation. Over the next ten years, AI is likely to reshape how airlines manage fleets, crews, customers, and revenue streams. For carriers already navigating thin margins, volatile fuel costs, and decarbonisation targets, AI is not simply another technology trend — it is becoming a strategic necessity.

✈ Flight Operations and Safety

Airlines have long depended on operational data, but AI enables new levels of real-time decision-making. Machine learning models can process weather updates, traffic flows, and fuel burn data simultaneously to propose dynamic flight paths. For pilots, AI may act as a decision-support tool, detecting anomalies earlier and offering scenario analyses that go beyond traditional flight management systems.

These capabilities promise both cost savings and lower emissions, aligning with airlines' net-zero commitments. Delta Air Lines, for example, has trialled AI-based fuel optimisation tools that help flight crews make in-flight adjustments to reduce consumption. Regulators, however, will need to define clear boundaries between human and machine roles in the cockpit and ensure harmonisation across jurisdictions.

✈ Predictive Maintenance at Scale

The economics of predictive maintenance are compelling. Instead of relying on fixed schedules, AI can draw on sensor data to anticipate when parts will fail and schedule interventions accordingly. Early trials suggest significant reductions in unscheduled downtime, particularly for engines and avionics.

Lufthansa Technik has been a frontrunner here, using AI analytics to detect anomalies in engine performance before they escalate into costly failures. Similarly, Air France –KLM has invested in predictive maintenance platforms that integrate data streams from across its fleet. By the early 2030s, predictive systems could be standard practice, freeing up capacity and reducing AOG (aircraft on ground) events.

✈ Passenger Experience and Biometrics

Airlines are also deploying AI in customer-facing processes, though adoption is uneven. Digital assistants powered by natural language processing already handle routine queries, but the next phase involves personalised journey management — seat recommendations, upgrade offers, and disruption handling tailored to the individual traveller.

Biometric technology is central to this evolution. Singapore Airlines has rolled out facial recognition for boarding and immigration processes at Changi, while British Airways has tested biometric boarding gates at Heathrow. These systems promise faster throughput and reduced queuing, though data privacy legislation remains a variable constraint across markets.

✈ Revenue Management in Real Time

Revenue optimisation has always been an airline strength, but AI adds granularity. Traditional systems analyse booking curves and competitive data; AI systems incorporate macroeconomic signals, consumer behaviour data, and even social trends. The result is faster fare adjustments and more accurate demand forecasts.

American Airlines and Lufthansa have both begun using AI to fine-tune ancillary revenue offers, targeting passengers with personalised upgrades and add-on services during the booking process. For network carriers and LCCs alike, this is likely to become a critical differentiator in margin expansion.

✈ Operational Efficiency

AI's less visible but equally valuable role lies in ground and back-office operations. Crew scheduling, gate assignments, and aircraft rotations are optimisation problems ideally suited to machine learning. AI models can process disruptions — weather delays, crew shortages, aircraft swaps — faster than manual systems, minimising knock-on effects across networks.

United Airlines has invested in AI scheduling platforms to reduce crew misallocations, while Emirates has tested AI for improving aircraft turnaround at its Dubai hub. Supply chain management is another application: AI can forecast demand for spare parts and consumables, smoothing procurement cycles and reducing costs tied to inventory and logistics.

✈ Risks and Constraints

The promise of AI is balanced by several constraints. Cybersecurity is a primary concern: as airlines become more data-driven, the attack surface widens. Algorithmic transparency is another issue; carriers must be able to explain, not just trust, AI-driven decisions —particularly in safety-critical areas.

Labour dynamics will also shift. While automation may reduce demand for certain roles, it will create new needs in data science, systems oversight, and AI governance. Managing this transition will be a significant organisational challenge.

✈ Looking Ahead

The next decade will likely see AI embedded across the value chain, from cockpits to call centres. For airlines, the opportunity is not merely operational efficiency but strategic resilience: better disruption management, stronger customer engagement, and more flexible cost structures.

The trajectory is clear: by 2035, AI will not be a bolt-on to airline operations but a core enabler of competitiveness. The airlines that integrate AI most effectively will be those that treat it not as a technology project, but as a central component of business strategy.

China Airlines, EVA and Starlux: Interesting Times in Taiwan

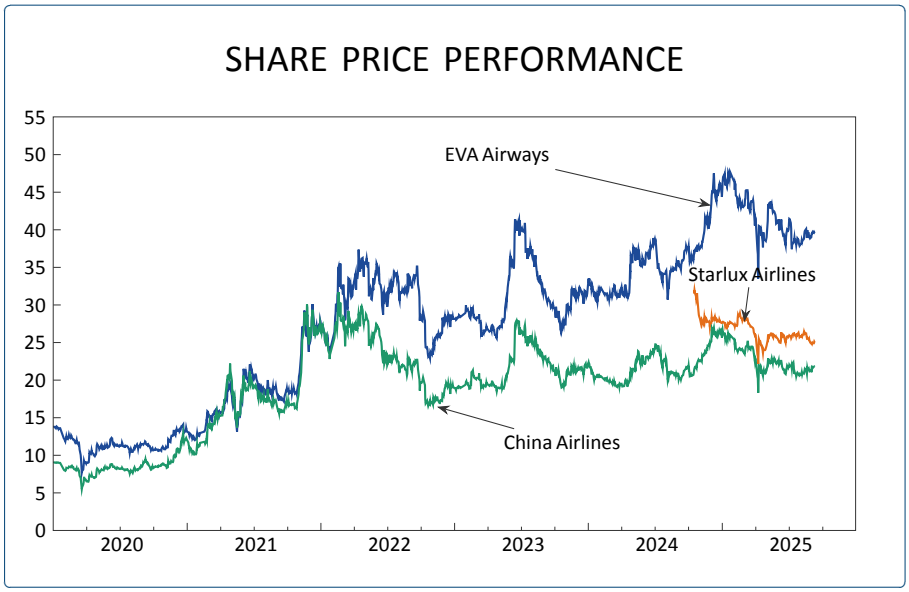
THE THREE Taiwanese network airlines — China Airlines, EVA Air and Starlux — live in interesting times, in the words of the apocryphal Chinese curse, buffeted by the volatile policies of Presidents Xi and Trump.

Taiwan is dwarfed by mainland China, with a population of just 23 million compared to 1.4 billion. But it is an economic powerhouse, the centre of the global semiconductor industry, with a GDP per capita of about US40,000 (recently overtaking South Korea) compared to just $13,000 for China.

China Airlines and EVA (14.4m and 13.5m passengers respectively in 2024 including subsidiaries) plus newcomer Starlux (4.1m passengers), play a critical role, both economically and politically in connecting Taiwan with the rest of the world, part of which does not recognise the country's existence. The two main carriers fly beyond Asia to North America and Europe; Starlux's network already includes the USA and it has ambitions to start up to Europe in 2026. (Brief profiles of the three airlines appear later in this article.)

The two Chinas

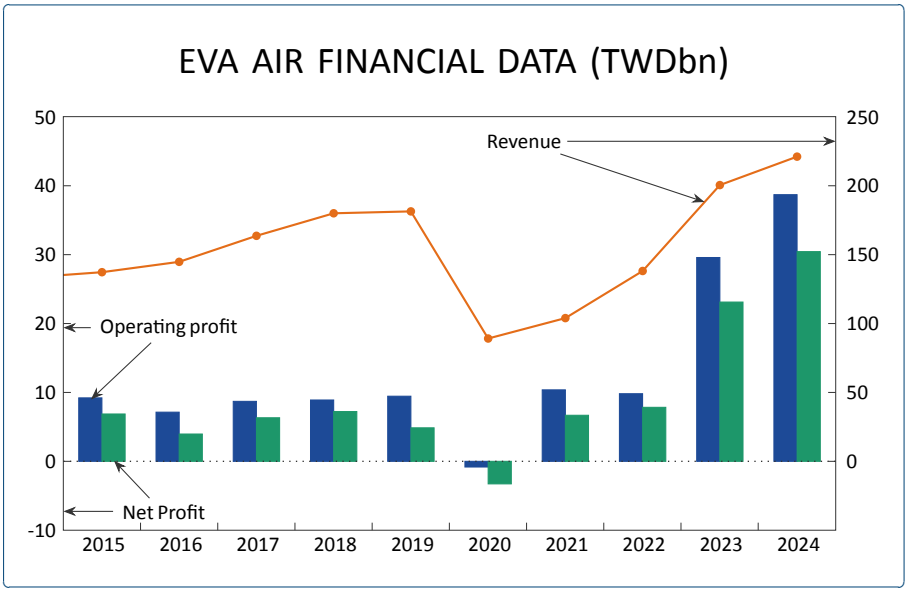
The pandemic raised the profile of China Airlines, which was heavily involved in the transport of PPE and other medical equipment to North America and Europe, but also highlighted confusion as to its national status; in the West it was widely assumed that it was a mainland carrier and frequently confused with the PRC's Air China. Consequently, there was a move by the airline's management to rebrand the flag-carrier, possibly as Taiwan Airlines, which engendered vehement political opposition, and the name change was eventually dropped. In a way, this episode encapsulated the identity issues between the two Chinas.

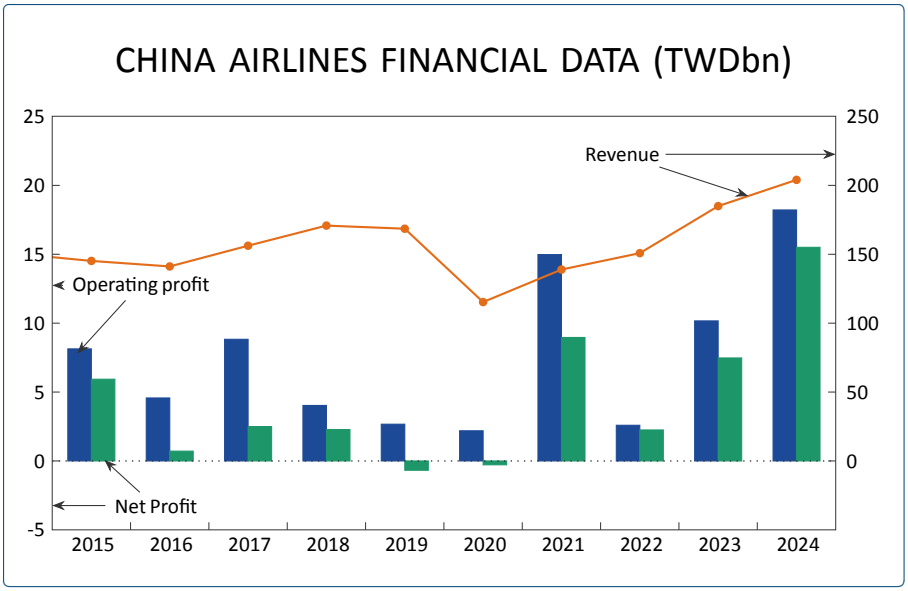


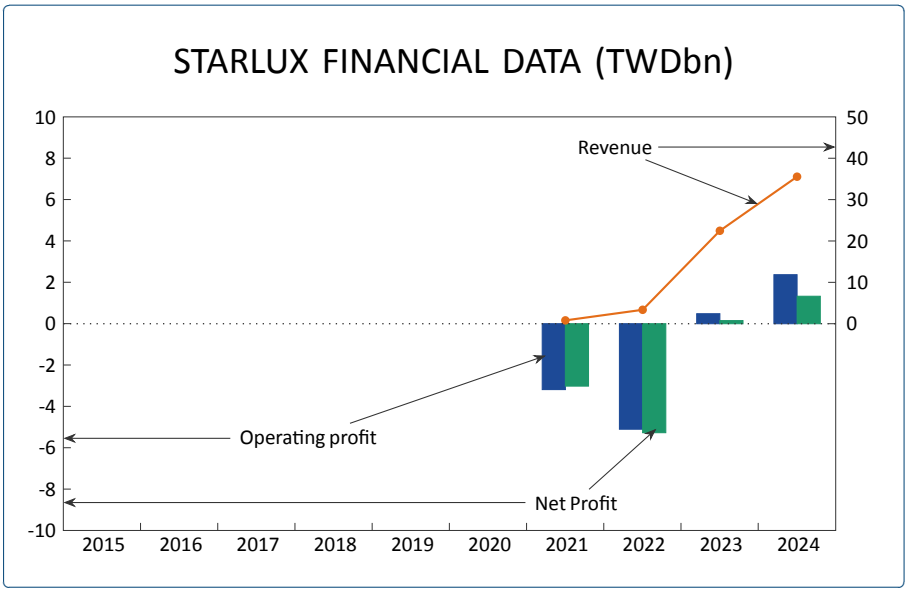
At the end of WW2, Taiwan, part of the Japanese empire for over 50 years, was transferred to China, which was in the throes of a civil war between the communists under Mao Tse Tung and the nationalists (the Kuomintang or KMT). The communists prevailed on the mainland, establishing the People's Republic of China (PRC) while the nationalists set up a provisional government in Taiwan, which was renamed the Republic of China (ROC).

Since then, relations between the two Chinas have been complex and fractious with both the PRC and the ROC claiming legitimacy. The ROC has lived in a state of constant alert over an attack from the mainland; tension has escalated after Russia's invasion of Ukraine and the ambivalent reaction of the USA. In his 2025 new year address President Xi stated that Taiwan would inevitably be reunited with mainland China. President Trump has appeared to be not too focused on the PRC-ROC political situation, being preoccupied by what he regards as the unfair trade imbalance between Taiwan and the USA. He has, however, remarked that President Xi had reassured him that the PRC would not invade while he (Trump) was in power.

It is possible that commercial considerations will prevail, as they have done in the past. The PRC is rapidly expanding its zone of influence beyond Southeast Asia to countries, such as India, Nigeria, Ethiopia and Brazil, partly because of US tariffs, and it probably won't want to disturb this geopolitical and







geoeconomic progress. Moreover, Taiwan could respond to a PRC attack by destroying its electronics manufacturing plants, apparently a policy suggested by the Pentagon. This would have dire consequences for the PRC's own electronics industry, which relies heavily of Taiwanese chips, and for the global economy.

Meanwhile, China Airlines and EVA operate quite extensive networks between the ROC and the PRC. This is despite the fact that there is no official ASA between the two Chinas. Direct regular flights between the ROC and the PRC have been allowed since 2003 but these are still officially charters. Before then all flights had to been routed through Hong Kong or Macau.

Even today PRC-ROC traffic volumes are relatively modest. For instance, in 2024 China airlines carried 1.1 million passengers to/ from the mainland and a further 1.0m to/from Hong Kong/Macao, together about 13% of its total traffic. EVA generates only 7% of its passenger revenue from the PRC and Hong King.

Flight routeings between the two Chinas are often circuitous because of M503. This is a north –south flight path down the Taiwan Straits imposed by the PRC in 2015. It connects Nanjing and Shanghai in the north with Guangzhou and Hong Kong in the south, which means that Taiwanese airlines have to negotiate narrow crossing corridors en route to mainland destinations, while avoiding various air defence zones controlled by the two national airforces.

Semi-conductors and the Phoenix phenomenon

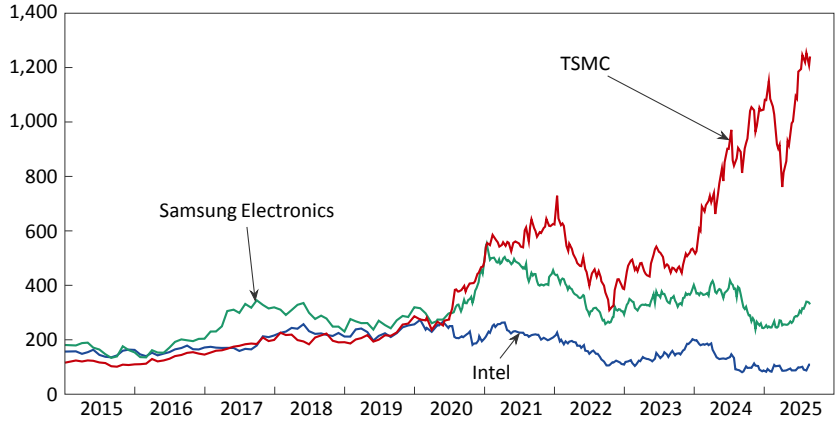
The USA is a key market for the Taiwanese airlines — accounting for about 20% of China Airlines'

passenger revenue and, perhaps more significantly, 64% of its cargo revenue. EVA has a higher passenger exposure, about 40%, and in the first quarter of 2025, when exporters were rushing to beat the Trumpian tariffs, the USA accounted for 71% of EVA's cargo revenues.

As the maps on pages 9–11 show, all three carriers operate to the principal gateways — New York, Chicago, San Francisco, Los Angeles, etc — but there is a slightly unusual city on China Airlines' and Starlux's network — Phoenix, Arizona. Because of developments in the semi-conductor industry, building air service to Phoenix from Taipei has become vitally important, as has the forming of alliances with the two main US airlines based at Phoenix — Southwest and American.

China Airlines will inaugurate its Taipei-Phoenix non-stop service in December 2025, and has announced an extensive codeshare agreement with Southwest. Starlux's direct service is due to start in January 2026, and it has signed a codeshare alliance with American. EVA does not (yet) operate to Phoenix, but it has also entered into another substantial codeshare agreement with Southwest.

The connection is TSMC, all three airlines' most important corporate client. Taipei-based TSMC (Taiwan Semiconductor Manufacturing Company) is the world's largest independent semi-conductor foundry, manufacturing integrated circuits for high-tech companies such as Nvidia, AMD, Alphabet, Amazon, Apple and Microsoft — in short, the modern US economy. According to *The Economist*, TSMC produces two-thirds of all chips made by foundries, and in the most advanced segment, including processors for smartphones, laptops and data centres, the company's share exceeds 90%. The AI revolution depends on TSMC.



Source: The Economist

In the cargo sector, TSMC uses a combination of bellyhold and dedicated freighter capacity (the three carriers operate 27 747F and 777F freighters in total with a further 10 A350Fs on order), though in fact a majority of the semi-conductor exports go by sea, which is particularly beneficial for EVA with its Evergreen parentage. TSMC integrates the airline capacity into its supply chains, which includes operating smart warehouses and real-time information platforms.

It is interesting to note that the share of cargo in total revenue is about 30% for the three Taiwanese carriers as against around 12% globally, according to IATA. In 2024 China Airlines carried 839,000 tonnes, EVA 713,000 and Starlux 44,000). It is also interesting that the combined stockmarket valuation of the three Taiwanese airlines, $13.5bn, is about 1% that of TSMC.

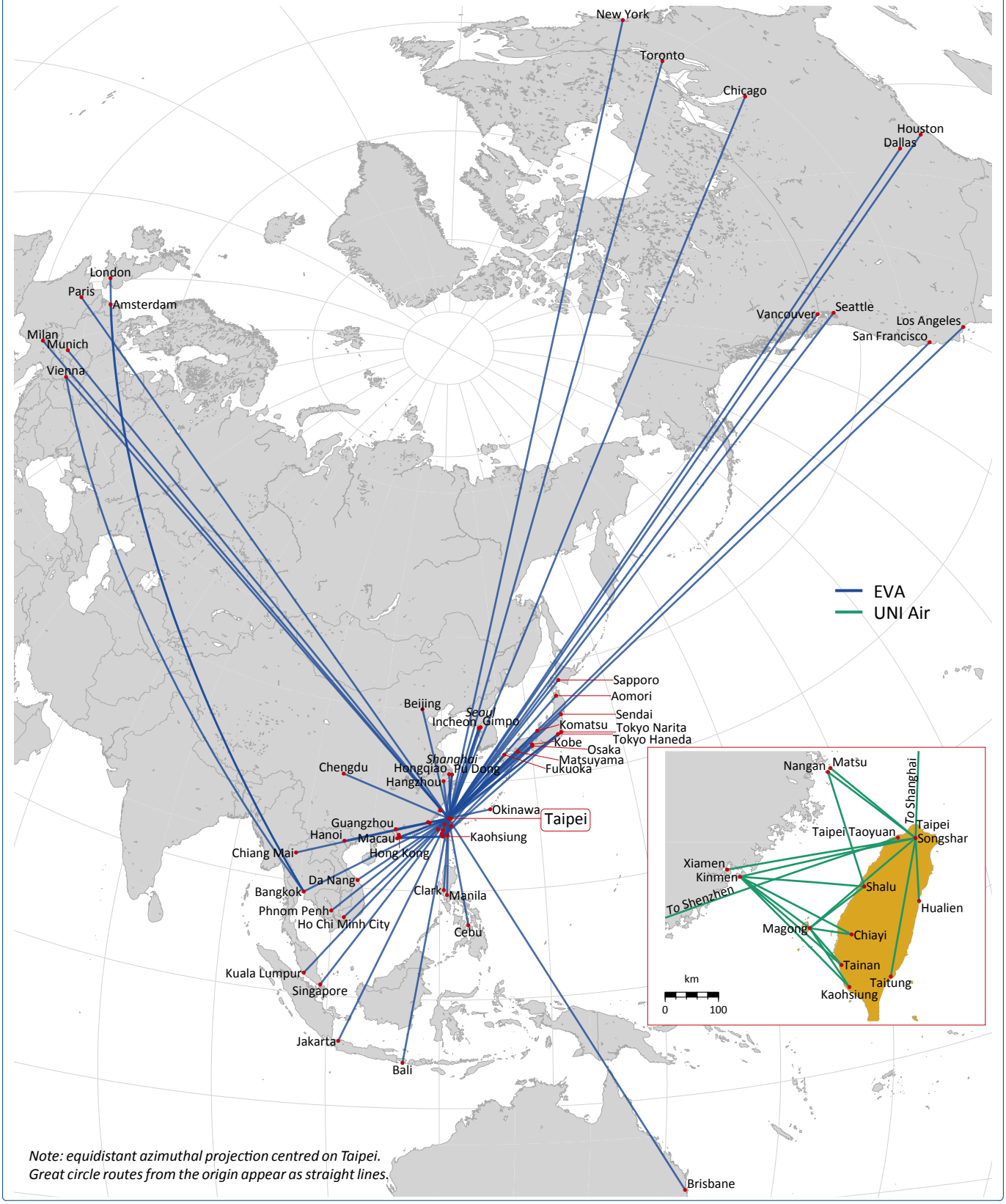
On the back of rapidly rising revenues ($88bn in 2024) and net profits ($34bn) TSMC's stockmarket value has hit $1.3tr this year, soaring above its South Korean rival Samsung and dwarfing the one-time global leader Intel (the US government has just had to buy 10% of its stock) — see chart above.

TSMC is in the process of transforming from being heavily concentrated in Taiwan to expanding into a global manufacturer, not entirely voluntarily. By far the most important expansion has been into Arizona where TMCS has committed to invest $165bn, maybe much more. President Trump started to complain about over-reliance on Taiwan-manufactured chips during his first Presidency, then President Biden's Administration passed the CHIPS Act in 2022, essentially subsidising US semi-conductor manufacturing. Returning to power, President Trump raised the stakes hugely, threatening Taiwan with various tariffs — 40% at one point, though the current level is 20% — and demanding that TSMC shift production to the USA (at the same time as blocking American IT investment in mainland China and imposing maga-tariffs of up to 145%). Faced with an economic catastrophe, the Taiwanese complied; indeed,

CHINA AIRLINES ROUTE NETWORK

Note: equidistant azimuthal projection centred on Taipei.
Great circle routes from the origin appear as straight lines.

EVA AIR ROUTE NETWORK



Note: equidistant azimuthal projection centred on Taipei.
Great circle routes from the origin appear as straight lines.

earlier this year the Taiwanese government suggested that it could invest $400bn in the USA. TSMC's firm plans are for six very high-tech Fabs (fabrication units) in Arizona, potentially operating a third of TSMC's advanced semi-conductor capability.

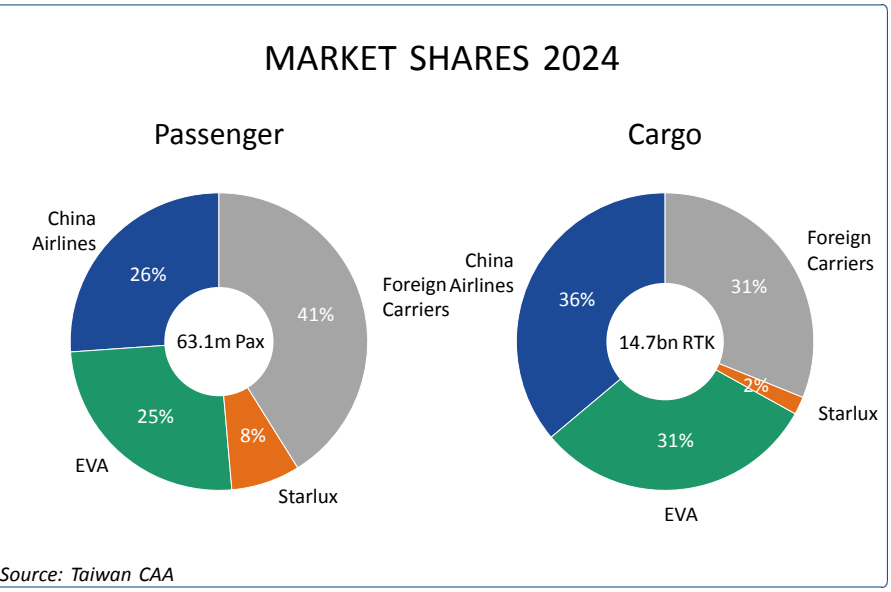
This new type of globalisation is also spreading to Europe where the EU has passed its own CHIPS Act. However, in this case the emphasis is on government support for new semi-conductor investment, designed to double Europe's share of the global industry from 10% to 20%. TSMC has started constructing a Fab in Germany, and is also investing heavily in Japan.

The impact on the airline sector is a little unclear. In the short-term, cargo volumes will probably be boosted as equipment and parts are shipped to the US to build up the Fabs; in the longer-term, there will probably be a depressing effect on cargo volumes as semi-conductor production is moved from Taiwan to consuming countries.

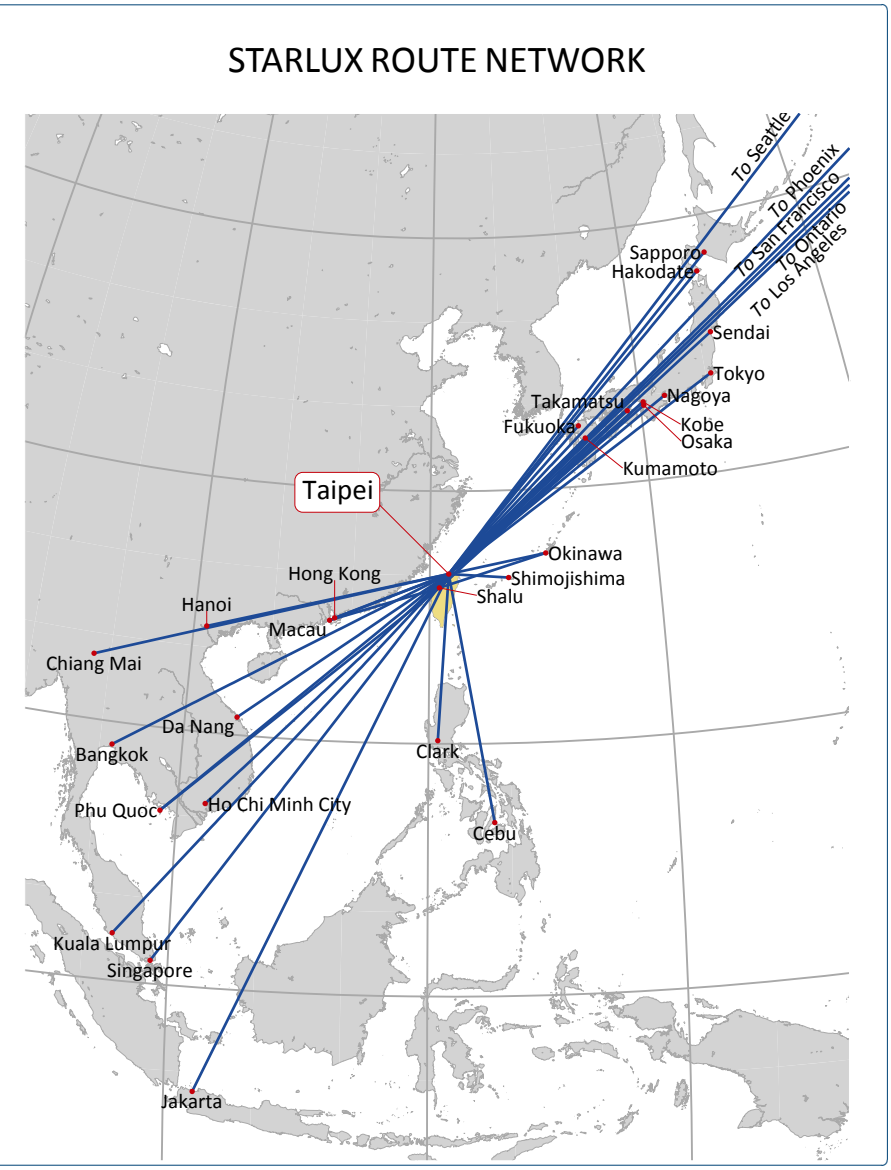
However, the new geo-economic structure should support growth in business travel. For example, in an attempt to transfer Taiwanese levels of efficiency to the USA about 1,000 Taiwanese technicians are being relocated to Phoenix (assuming that they don't have to pay the $100,000 visa fee proposed by the Trump Administration) and a similar number of Americans are moving to Taipei to attend year-long training programmes.

Domestic politics and powerful entrepreneurs

Measured as share of total Taiwanese carrier revenue, the positions are China Airlines, 44%, EVA 48%, Starlux 8%. The obvious question is: can the Taiwanese market sustain three



Source: Taiwan CAA



FLEET DATA

	China Airlines			EVA Air			STARLUX		
Fleet	**In service**	***Avg age***	**Orders**	**In service**	***Avg age***	**Orders**	**In service**	***Avg age***	**Orders**
Widebodies									
777	10	*10.4*	14	33	*12.3*				
787			24	20	*4.3*	10			
A350	15	*8.0*	10			24	10	*1.6*	18
A330	14	*17.4*		8	*10.1*		5	*3.0*	3
	39	***12.0***	**48**	**61**	***9.4***	**34**	**15**	***2.1***	**21**
Narrowbodies									
737	10	*10.0*							
A320ceo	9	*9.7*							
A320neo	8	*2.5*							
A321ceo				17	*10.2*				
A321neo	17	*2.4*	8			18	13	*4.1*	
	44	***5.6***	**8**	**17**	***10.2***	**18**	**13**	***4.1***	
Regional									
ATR42/72	11	*5.2*		14	*11.4*				
Freighter									
747F	8	*20.0*							
777F	10	*2.8*		9	*5.4*				
A350F									10
	18	***1.1***		**9**	***0.4***				**10**
Total	**112**	***7.2***	**56**	**101**	***9.0***	**52**	**28**	***3.0***	**31**

full-service network carriers? There is only JAL and ANA in the much larger Japanese market. In South Korea, Korean Air and Asiana have merged into one carrier, but there is a substantial LCC presence in that country. Independent LCCs have been unable to establish a foothold in the Taiwanese market; the last LCC, U-Land, went out of business decades ago, despite its reassuring name.

Any consolidation, however, is complicated by domestic politics and relationships among the island's leading entrepreneurs.

China Airlines is not simply Taiwan's flag-carrier, it is the KMT's national airline. The KMT founded the airline back in 1959, and throughout its history top managerial appointments have usually had close KMT connections. Its pilots were usually also ex-military or air force reserves, which was alleged to have created an autocratic culture and a poor safety record. The safety issues have now been solved.

The KMT is no longer in power (since last September 2025, the Democratic Progressive Party has held the Presidency and a majority in parliament), but it remains the single largest political party, with widespread influence. The China/Taiwan name-change controversy is indicative of continuing national sensitivities regarding the flag-carrier.

The Taiwanese state owns approximately 60% of China Airlines through the China Aviation Development Foundation and other state bodies, with about 40% floated on the Taipei stock exchange.

The China Airlines group includes Mandarin, which used to be the brand used to operate to countries that did not recognise the ROC, but is now an ATR72 regional operator, and Tigerair Taiwan, formerly a joint venture between China Airlines and Singaporean Tiger Airways but now a fully owned lower-cost subsidiary, flying A320s.

EVA Airways started operations in 1991, launched by the Evergreen Group, the main part of which is Evergreen Marine Corp, a container-line which generated NT$463bn of

CHINA AIRLINES FINANCIAL DATA

Year (TWDbn)	2020	2021	2022	2023	2024
Revenue	115.25	138.84	150.72	184.82	203.88
Net income	(0.28)	8.96	2.25	7.47	15.50
Operating cash flow	9.72	49.89	46.85	55.85	54.28
Capex	(25.05)	(16.67)	(20.18)	(30.66)	(7.27)
Free cash flow	(15.32)	33.22	26.67	25.19	47.02
Debt	13.33	(15.61)	(31.48)	(27.61)	(8.39)
Equity*	0.54	0.35	(5.20)	(2.20)	(3.74)
Total cash flow	**(1.46)**	**17.95**	**(10.02)**	**(4.63)**	**34.89**

end March	2025
Property	184.21
Other LT assets	49.08
Current assets	93.50
of which cash	*61.46*
Current liabilities	(85.12)
Debt and leases	(79.37)
Other LT liabilities	(67.96)
Equity	**94.35**

*Notes: * Equity raised minus dividends paid; * Equity raised minus dividends paid*

EVA AIR FINANCIAL DATA

TWDbn	2020	2021	2022	2023	2024
Revenue	89.05	103.87	138.07	200.36	221.01
Net income	(3.28)	6.68	7.82	23.10	30.42
Operating cash flow	5.37	34.97	63.15	68.20	58.05
Capex	(12.26)	(11.79)	0.96	(21.83)	(23.72)
Free cash flow	(6.89)	23.19	64.11	46.37	34.33
Debt	(2.55)	(15.80)	(41.82)	(42.69)	(16.96)
Equity*	(1.21)	0.00	(3.16)	(4.29)	(9.72)
Total cash flow	**(10.65)**	**7.39**	**19.13**	**(0.61)**	**7.65**

end June	2025
Property	222.09
Other LT assets	36.78
Current assets	95.95
of which cash	*73.25*
Current liabilities	(92.87)
Debt and leases	(58.14)
Other LT liabilities	(68.55)
Equity	**135.26**

*Notes: * Dividends paid*

STARLUX FINANCIAL DATA

TWDbn	2020	2021	2022	2023	2024
Revenue		0.80	3.36	22.47	35.55
Net income		(3.02)	(5.27)	0.15	1.32
Operating cash flow		(1.49)	(1.08)	8.19	10.97
Capex		(0.20)	(4.68)	(16.33)	(30.00)
Free cash flow		(1.69)	(5.76)	(8.15)	(19.04)
Debt		2.08	2.72	7.53	10.84
Equity		2.98	7.30	4.99	18.55
Total cash flow		**3.37**	**4.26**	**4.37**	**10.35**

end March	2025
Property	78.32
Other LT assets	27.21
Current assets	16.00
of which cash	*11.09*
Current liabilities	(17.35)
Debt and leases	(41.74)
Other LT liabilities	(31.96)
Equity	**30.47**

revenues in 2024, twice that of the airline. Evergreen Marine grew from a one-ship operation in the 1960s to the world's seventh largest containerline today under the leadership of Chang Yung-fa, chairman until his death in 2017. His son-in-law, Cheng Shen-chi, is the current chairman.

About 30% of EVA is owned by Evergreen companies, the rest of the shares traded on the Taipei stock exchange. EVA Air (including its regional ATR operator UNI Air) bypassed China Airlines as Taiwan's largest airline in 2023 (measured by revenue) and has been clearly outperforming its main rival on the stock market over the past four years.

Starlux was set up in 2019 by Chang Kuo-wei, a son of Chang Yung-fa and chairman of EVA Air until 2016 when his half-siblings staged a coup and dismissed him. The dispute apparently was over inheritance, which he received from Chang Yung-fa and they didn't. Starlux competes directly with EVA and China Airlines, with a strategy of providing high-quality service and building a global hub at Taipei — the "Emirates of Taiwan".

Indicating that it is more than a vendetta airline, Starlux carried out a successful IPO in October 2024, listing on the stock exchange and raising about $300m for about 20% of the stock. In addition, Chang Kuo-wei is reported to have invested $200m of his own funds in the project.

In 2024 the recovery from the pandemic showed up in the financial results of the two main carriers, but EVA outperformed China Airlines. While EVA's total revenues increased by 10.5% to NT$221bn (US$6.6bn) and China Airlines' revenues grew by 10.3% to NT$203bn, EVA reported a net profit of NT$30.4bn, representing a margin of 13.7%, while China Airlines net result was NT$15.5bn, equivalent to a 7.6% margin.

EVA has the stronger balance sheet, with shareholders' equity of NT$135.3bn against long term debt and liabilities of NT$126.7. China Airlines' balance sheet shows shareholders' equity of NT$94.4bn against long-term debt and liabilities of NT$147.4bn.

The recovery has continued in 2025 with EVA reporting a 2.8% increase in revenues and China Airlines a 5.4% increase for the first six months. But the results presentations more than anything reflected deep concerns about the impact of US tariffs, both directly on exports and indirectly on the global economy.

Starlux broke even for the first time in 2023 and last year was able to report a net profit of NT$1.3bn on revenues of NT$35.5bn, a net margin of 3.7%. After growing revenues by 55% in 2004 Starlux has continued its rapid expansion, with a 34% increase in revenues for January-June 2025.

By 2026 Starlux's revenues are likely to be close to 10% of those of the total Taiwanese airline industry, making it a serious player. However, despite the funds raised by the IPO Its balance sheet will be stretched by its ambitious fleet expansion programme — see table on page 12. EVA and China Airlines may well feel threatened by Starlux's investment in widebodies at the same time as the two main carriers are going through a major re-fleeting exercises. And Starlux has signalled its intentions in the cargo sector, which is currently dominated by EVA and China Airlines, by ordering 10 A350Fs.

All this suggests intensified competition in increasingly difficult markets. Maybe it is time for the Chang siblings to have a reconciliatory meeting.

Finnair: The Niche Vanishes

PRE-PANDEMIC, Finnair had a nice niche position among European airlines. A small, regional airline based in the far north east of the continent, and in a small country of a mere 5.5m inhabitants, Finnair was nevertheless able to market services through its hub in Helsinki as providing the shortest and fastest connecting flights between Europe and the Far East.

Situated on the great circle route between points in the US and India, it had the potential to access sixth freedom traffic between, for example, New York and Delhi.

Operating out of a small, single terminal, three-runway airport that could provide one of the shortest minimum connecting times in Europe, it did so efficiently and profitably.

Finnair is a well-run airline and manoeuvred its way through the two years of the pandemic, creditably raising €500m each in equity and debt plus €300m from asset sales net of capital expenditure. At the same time it pursued a cost savings programme to remove €200m annual running costs. While its traffic base virtually disappeared and annual revenues were only 27% of those achieved in 2019, it lost a total €(1.1)bn on €1.7bn of revenues over the two years to end 2021.

At the beginning of 2022, signs of recovery were in the air; and Finnair's then CEO Topi Manner felt comfortable enough to announce the opening of new long haul routes to Dallas, Seattle, Boston and Tokyo Haneda and predict by "next summer we will be closer to a normal operating environment".

But then, two weeks after the publication of that 2021 annual report, Russia invaded Ukraine. This led quickly to the closure of Russian airspace to European airlines at the beginning of March 2022.

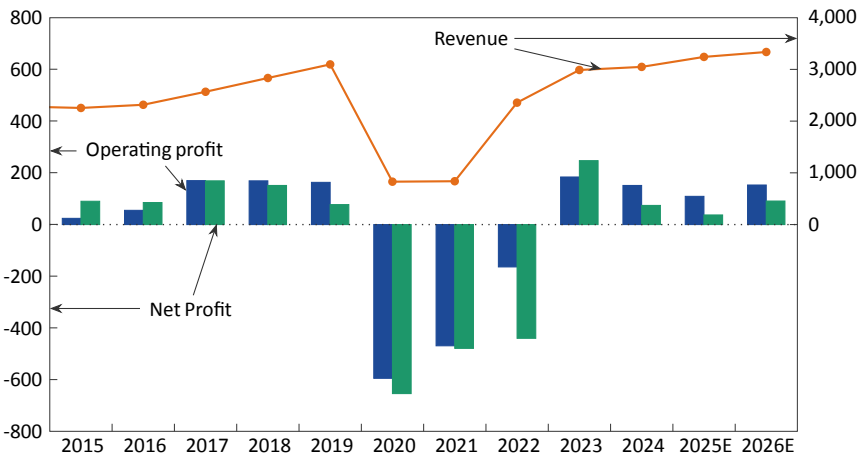
For Finnair, this was disastrous for what it considered its core market connecting passengers from northern Europe to North Asia through Helsinki and flying over Siberia. In 2019, for example, its route from Helsinki to Tokyo, a great circle distance of 7,850km, would have taken 9h-9h30 to fly — allowing it to be able to have a single aircraft to complete the return trip within 24 hours. Detours to avoid Russian airspace involve flying north over the Pole or south, avoiding Ukraine, over Turkey and Kazakhstan: the choice depending on weather conditions. This adds

LENGTHS TO AVOID RUSSIA

Helsinki to	Distance* (km)	Diverted	Δ
Tokyo	7,849	11,100†	41%
		11,750‡	50%
Seoul	7,050	10,600	50%
Delhi	5,229	7,000	34%
Singapore	9,271	11,100	20%
Hong Kong	7,820	10,500	34%
Shanghai	7,408	10,600	43%

*Notes: * Great Circle; † polar route; ‡ southern route*

FINNAIR FINANCIAL RESULTS (€m)



Source: Company reports; forecasts Barclays.

nearly 4,000km and over four hours to the trip time.

The map below highlights the impact using an equidistant azimuthal map projection based on Helsinki — an effect that is impossible to show on the traditional Mercator projection.

Strategic Reset

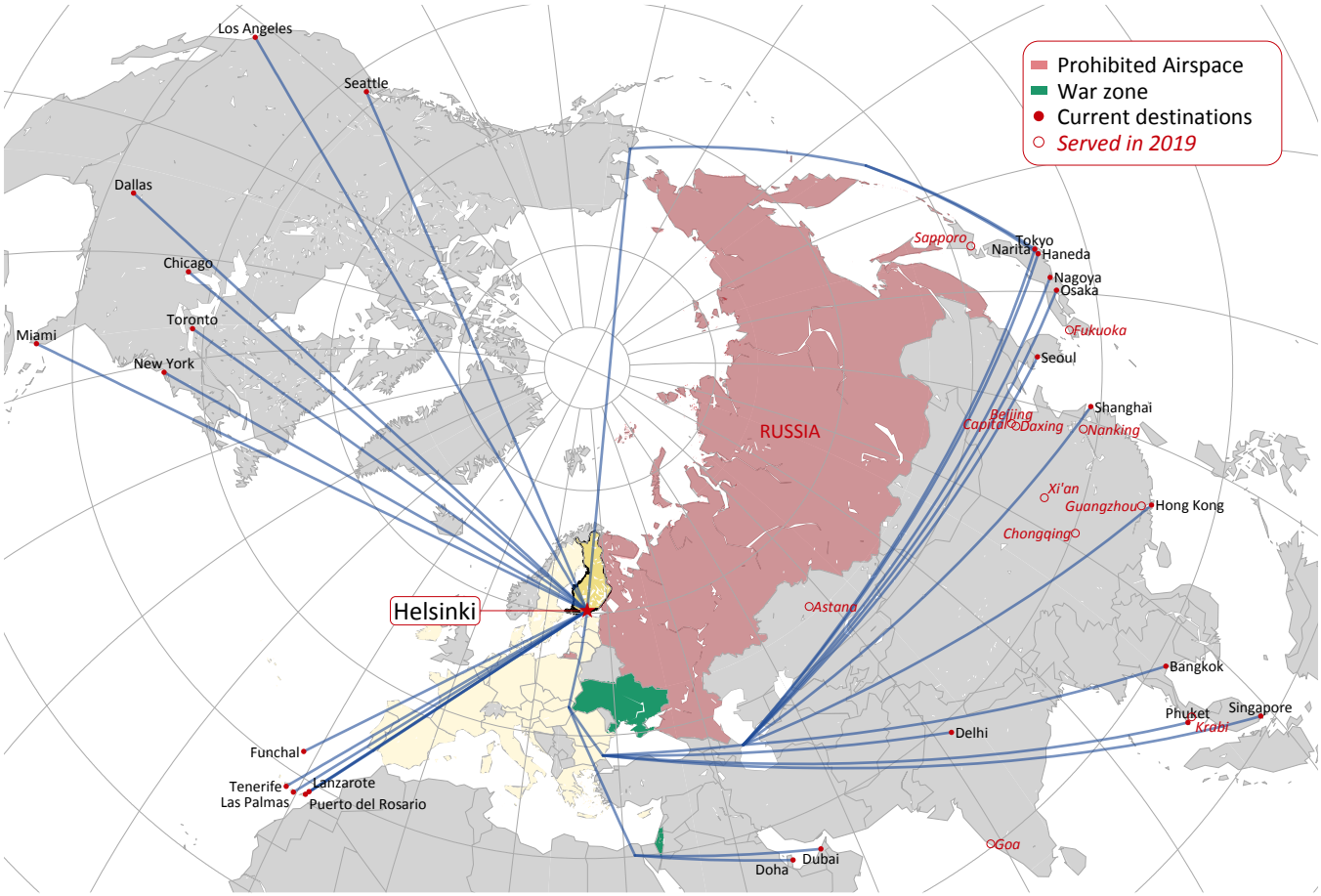
The company's Asian routes had been among the most profitable in the Network, but Finnair recognised that its unique geographic competitive advantage that made them so had disappeared overnight. The immediate reaction was to cancel most of its Japanese routes — pre-pandemic of all the European airlines Finnair had had the highest volume of flights to the largest number of destinations (Tokyo, Nagoya, Osaka, Fukuoka, and Sapporo) in Japan. It continued to operate to Tokyo, Seoul and Shanghai, despite the lengthy detours — routes supported, it said, by strong cargo demand. Southeast Asian operations were to some extent less impacted by the airspace closure and Finnair continued operations to Delhi, Bangkok and Singapore almost as normal.

It could have decided to shrink back to being purely a regional point-to-point airline serving the local Finnish needs. But it had invested heavily in developing its long haul fleet of A330s and A350s — and there was the hope that at some point it would regain the right to access Russian airspace.

In September 2022 it announced its new strategy designed to restore Finnair's profitability "regardless of Russian airspace".

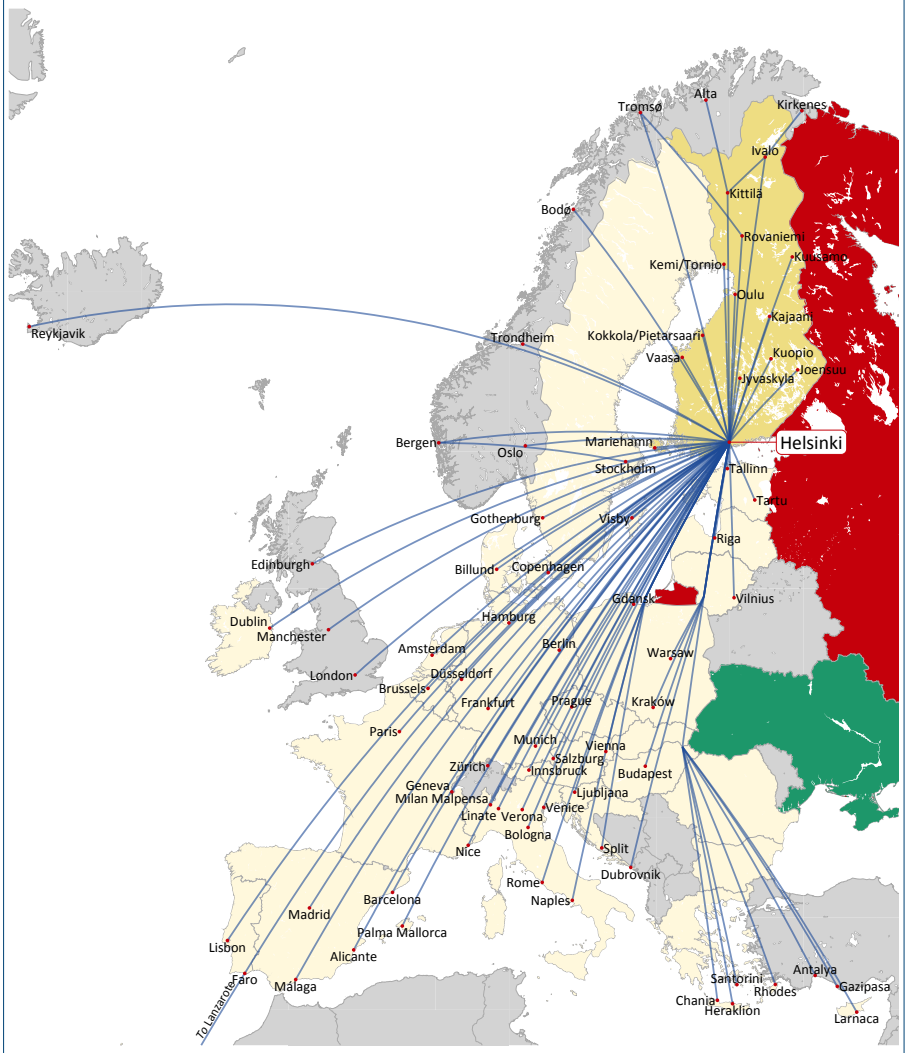
Key to the new strategy was an understanding that the markets now

FINNAIR LONG HAUL NETWORK



Notes: flights over 3,500km; equidistant azimuthal map projection based on Helsinki (great circle routes from the center appear as straight lines); routes from Helsinki to the east shown with diversions needed (sourced from FlightPath.com) to avoid Russian airspace, Ukraine and the war in Gaza.

FINNAIR SHORT HAUL NETWORK



FINNAIR FLEET

	seats	In Service	*Age*	On Order
A319ceo	144	5	*24.2*	
A320ceo	174	10	*23.1*	
A321ceo	209	15	*11.0*	
A330	279	8	*15.9*	
A350	278-321	18	*7.5*	1
E190†	100	12	*17.2*	
ATR72†	68-70	12	*16.2*	
Total		80	*14.8*	1

† Operated by Norra

available to Finnair are generally less regulated, with few barriers to entry, and highly competitive; low costs would be critical to be able to operate profitably. The main areas of the strategy were "a geographically more balanced network, leveraging the use of partners — especially those in oneworld — strengthening of unit revenues, reduction of unit costs and sustainability". It targeted a 5% operating margin (last achieved in 2019) by 2024.

Finnair was one of the first to join the oneworld alliance in 1998, and benefits from membership within the key anti-trust-immune joint ventures: the Atlantic Joint Business (alongside American, British Airways and Iberia) and the Siberian Joint Business (beside British Airways, Iberia and JAL).

It disposed of a handful of A321s and entered into wet-lease agreements with British Airways and Eurowings for other narrowbody equipment to avoid grounding idle aircraft and furlough crew. It also leased some of the A330 fleet to Qantas, and operated routes on behalf of and in cooperation with Qatar using the other six between the three Nordic capitals and Doha.

Results for 2024 showed revenues had almost recovered to the levels achieved in 2019, and Finnair just managed to achieve the targeted 5% operating margin.

A Difficult 2025

Finnair this year has been beset by industrial action. The company started intense negotiations with its pilots' union in August 2024. During the process the pilots initiated industrial action measures, implementing overtime bans, work-to-rule and restrictions on reserve recruitment that impacted the airline's operational flexibility. It also angered Qatar and

FINNAIR TRAFFIC: THEN, AND NOW

	Passengers (000s)				ASK‡ (m)				RPK‡ (m)			
	2025†	y/y %ch	2019	v'19	2025†	y/y %ch	2019	v'19	2025†	y/y %ch	2019	v'19
Europe	7,806	5%	9,151	-15%	16,746	6%	17,364	-4%	12,565	5%	14,024	-10%
North America	470	17%	457	3%	4,875	19%	4,068	20%	3,639	17%	3,470	5%
Middle East	320	-32%	113	183%	1,870	-36%	530	253%	1,437	-32%	448	221%
Asia	1,478	12%	2,556	-42%	14,068	5%	23,304	-40%	11,328	12%	19,329	-41%
Finland	1,740	4%	2,374	-27%	1,609	7%	1,923	-16%	1,051	3%	1,262	-17%
Total	**11,814**	**5%**	**14,650**	**-19%**	**39,167**	**4%**	**47,188**	**-17%**	**30,021**	**6%**	**38,534**	**-22%**

Source: Company reports.
Notes: † twelve months to August; ‡ based on great circle distances.

Qantas. It did not help that ground staff went on strike in the summer. Both disputes have been solved with medium term collective agreements. But the Qatar terminated its cooperation agreement on the six A330s effective February, and Qantas seems to be moving to dry-lease its two from October.

For the first half of the year Finnair reported revenues were slightly up year on year at €1.48bn, but operating profits of €25m in the first half of 2024 slumped to an operating loss of €34m for the same period this year.

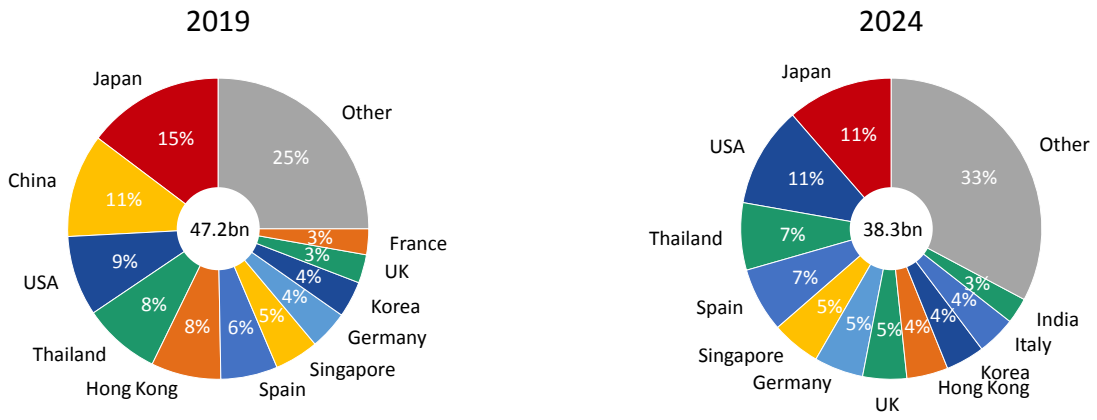
Finnair again had a surplus of long haul aircraft and this year has significantly increased capacity to American's hubs in North America. It has added two weekly rotations to to Chicago to provide a daily service, the same for Los Angeles to make five flights a week; and it has added five to Dallas giving 11 flights a week. It has also reopened services to Toronto for the first time in a decade.

For the twelve months to end August, Finnair's capacity on the Atlantic was up 20% year on year (and 20% higher than in 2019), but its load factors were 10 points lower than pre-pandemic at 74.7%.

Despite the problems with Russian airspace Finnair also added services to Japan, Osaka in particular.

Finnair has not tried to recover a meaningful position in China. Pre-pandemic it had operated to seven airports in the PRC — a larger number of destinations served than any other European airline. But its main competitors, the Chinese carriers, are not barred from flying over Russia.

FINNAIR: CAPACITY ON TOP 10 DESTINATIONS (ASK bn)



Note: based on great circle distances.

FINNAIR FINANCIAL DATA (€m)

	2019	2020	2021	2022	2023	2024
Revenue	3,098	829	838	2,357	2,989	3,049
Net Income	77	(654)	(479)	(440)	247	74
Operating cash flow	565	(1,043)	(25)	259	472	613
Net capex	(460)	(88)	378	(256)	(666)	(396)
Free cash flow	105	(1,131)	353	3	(194)	217
Debt	(190)	501	74	236	(1,046)	(210)
Equity	(36)	501	(1)		568	(10)
Total cash flow	**(121)**	**(129)**	**426**	**239**	**(672)**	**(3)**

@ end June	2025
Fleet	1,797
Other LT assets	679
Current Assets	1,059
of which cash	*175*
Current liabilities	(1,503)
Debt & leases	(1,386)
Other LT Liabilities	(95)
Equity	**551**

Return to prebellum status?

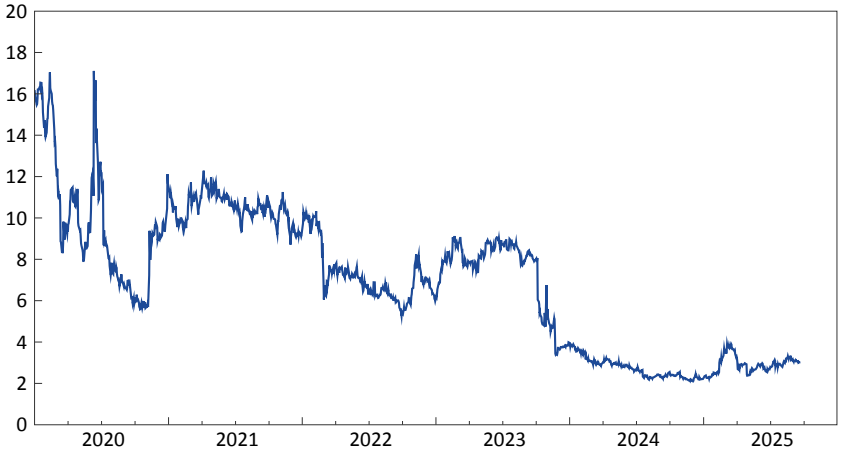
Should Finnair continue to hope that it can return to the prebellum position?

For years after the Winter War of 1939 (which Finland sort of won) and during the Cold War there had been a relative peace on the 1,340km border between it and Russia. While other European cariers periodically had difficulty then to access Russian airspace, Finland, treated as a "neutral" nation seemed to enjoy almost privileged access.

However, Finland has now joined NATO, and Russia no longer regards the country as neutral. A settlement to the war in Ukraine would be one of the prerequisites for Russia to start relaxing restrictions, let alone dismantling of sanctions against it. Russia would no doubt require reciprocal access to European airspace — and Europe will be worried about allowing in Russian aircraft (of Western design) that have spent years without officially documented maintenance.

Perhaps, sadly, Finnair needs to abandon ambitions and accept that it needs to shrink back to a point-to-point regional airline based in the far north east of the European peninsula.

FINNAIR SHARE PRICE PERFORMANCE



Note: adjusted for scrip elements of rights issues and share consolidation

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