What will it cost us? - Factors that influence ticket pricing for UAM

Bachelor‘s Thesis of Danel Serikbayeva

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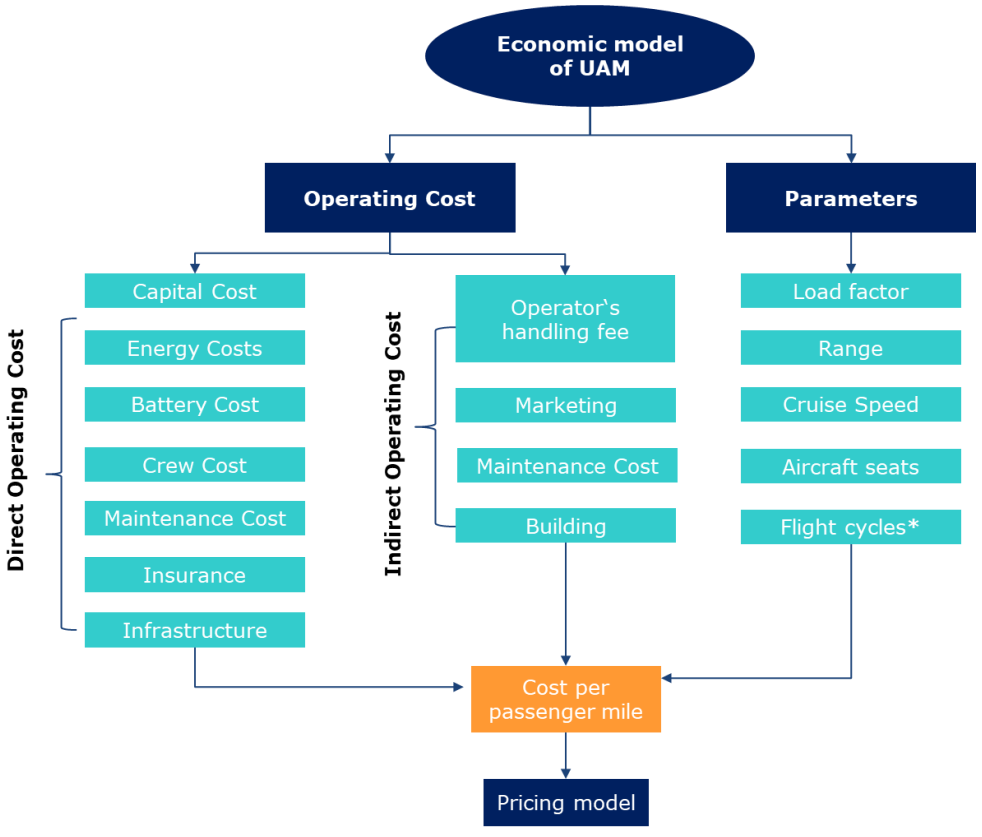


Maintenance cost, Energy Cost, Capital Cost and Crew Cost account for around 60-70% of the total operating costs. In addition, as the size of the aircraft increases, Energy and Battery cost component increases, whereas other components drop.

As the **vehicle's seat count** increased, the median operating cost per passenger mile dropped thanks to economies of scale for capital, indirect, and mainte-nance costs. It was observed that a 2-seat eVTOL will cost around $11 per passenger mile, whereas a 5-seat eVTOL - $6.25.

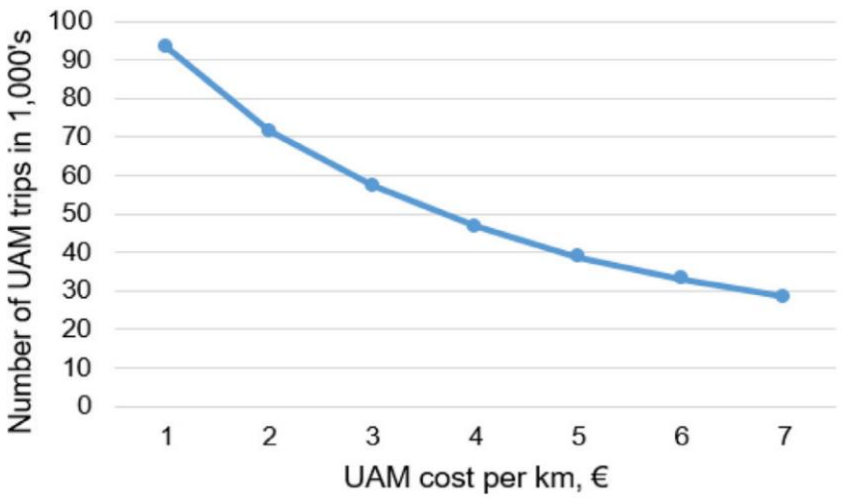
Changes to the **Load Factor** have a higher effect on the direct operating cost (DOC)

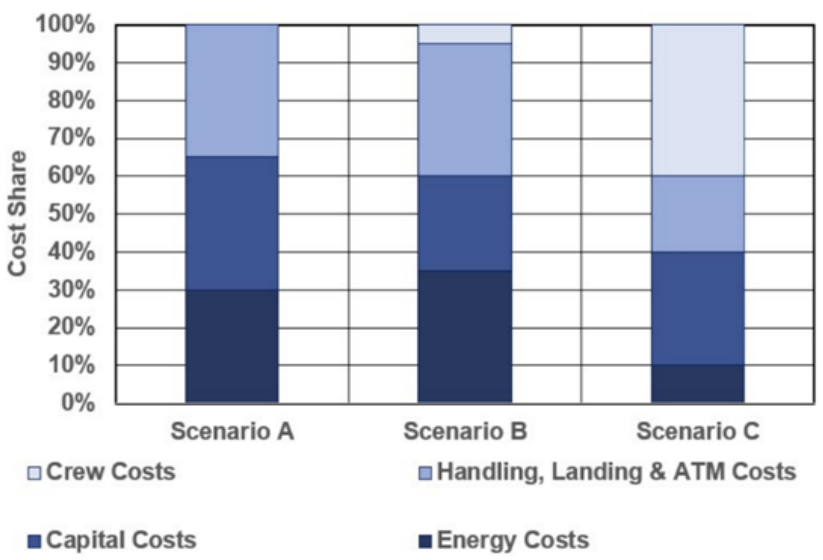
Many UAM vehicle producers claim varying **ranges and cruise speeds** for their UAM vehicles. Volocopter, a German-based UAM vehicle manufacturer, claims that the air taxi has a top speed of approximately 110 km/h and a range of 35 kilometers.

Number of flight cycles: For instance, decreasing from 5000 to 1000 cycles will result in a 50% reduction in direct operating cost (DOC), as will decreasing from 1.5 to 1 cycle each flight hour. variation of flight cycles (FC) affects the crew and capital costs with regard to the DOC.

Autonomy: The elimination of a pilot reduces costs since pilot salary and training may be costly. Autonomous systems can increase eVTOLs' safety, reducing accidents, congestion and minimizing damage to infrastructure and aircraft. Fuel consumption and maintenance expenses are decreased as a result of the increased autonomy. Handling, landing, and ATM costs, along with capital costs, account for the majority of expenses. The Figure shows that low automation (Scenario C) causes high crew costs which make up 40% of overall cost, whereas a high automation (Scenario A) excludes crew costs

Demand: UAM cost from 1 € to 7 € per km reduces UAM demand by 70%. UAM price and demand are interconnected: an increase in price leads to a decrease in demand. Apart from cost components (operating costs, energy costs, maintenance costs), market attractiveness for passengers should also be considered when suggesting a ticket price to compete with ground transportation. Otherwise, when a high-ticket price is proposed, it leads to lower demand and the UAM system is no longer economically beneficial





Economies of scale: Tesla is an outstanding example of economies of scale. Its success is predicated on economies of scale with advanced production techniques and technologies. Due to cost savings on battery production such as building gigafactories that manufacture batteries, Tesla reduced the total cost of its vehicles. Tesla expects to drive down the cost per kilowatt hour (kWh) of its cells by 56%.

Vertical integration: integration has a potential to optimize manufacturing process through supply chain control. Thus, automotive manufacturers have more control over their budget and profit from cost savings. This leads to greater output (vehicle production) as well as lower cost per unit. Based on the examples of EV companies which became successful through vertical integration, it can be assumed that vertical integration is a key factor for UAM ticket price