

DECISION FAILS? DESIGNING A FLEET OF COMMERCIAL VEHICLES FOR SMART SHARING WITH AHP

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WHEN DO WE “SHARE” IN THE COMMERCIAL WORLD?

One will share his resources when they are idle and demand exists.

Why sharing trucks in Hong Kong:

Some daily operation costs of owning a fleet are fixed and significant in Hong Kong, e.g. parking, drivers' overhead, vehicle depreciation, maintenance.

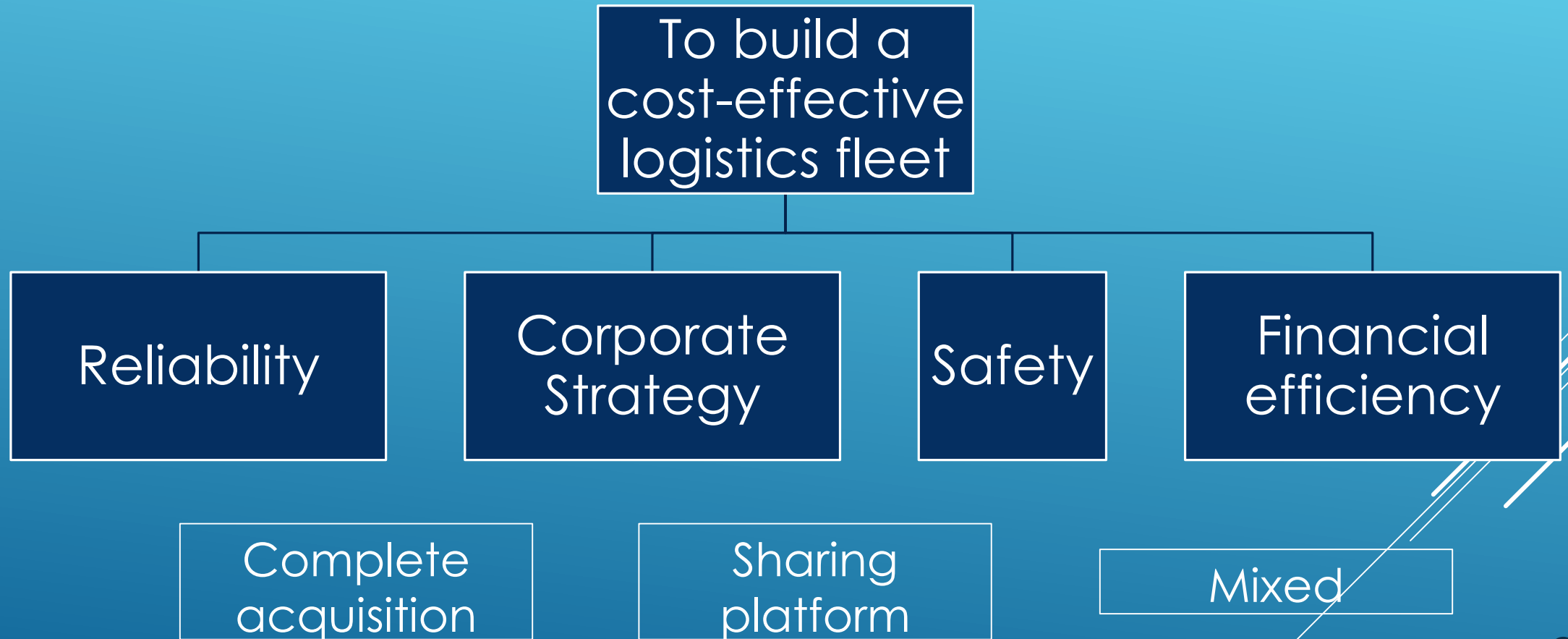
The truck fleet operation costs deserve more attention.

Trucks are more polluted than private cars (Table: Licensing of Private cars and Goods vehicles by fuel type in Hong Kong, 2017).

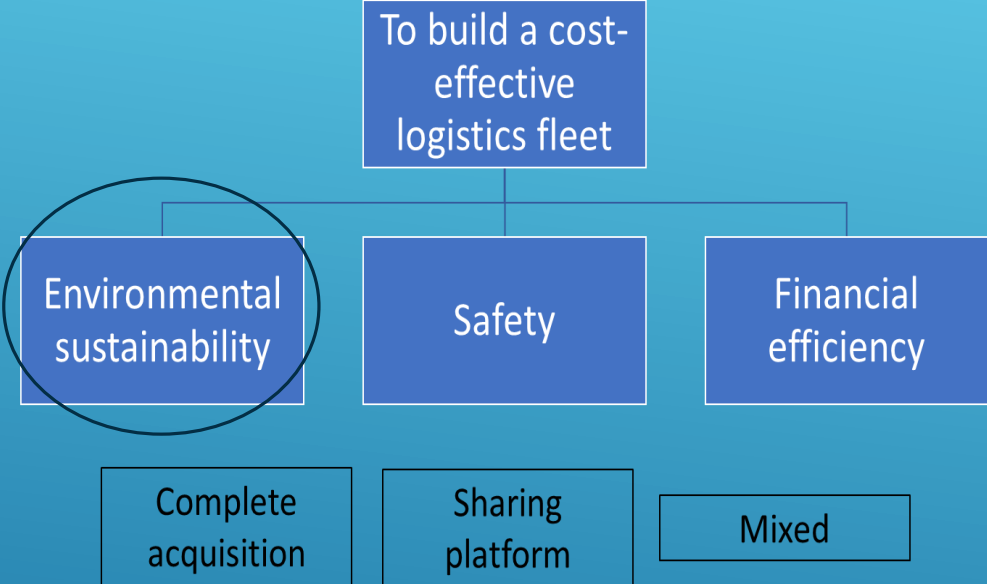
		Petrol (%)	Diesel (%)	Electric (%)	Total
Private cars		531,014. (96.1%)	11,238. (2.0%)	10,417. (1.9%)	552,669.
Goods vehicles	Light Goods Vehicles	739. (1.0%)	69,970. (98.9%)	73. (0.1%)	70,782.
	Medium Goods Vehicles	0 (0)	36,156. (100%)	0 (0)	36,156.
	Heavy Goods Vehicles	0 (0)	6,042. (100%)	0 (0)	6,042.

Research objective: To describe the factors that are critical to design a fleet of commercial vehicles for smart sharing with an AHP model

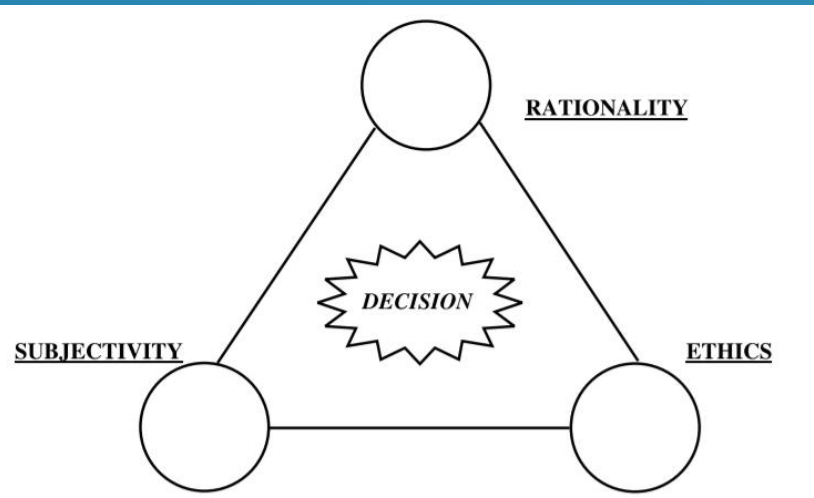
THE AHP MODEL FOR BUILDING A COST-EFFECTIVE LOGISTICS FLEET



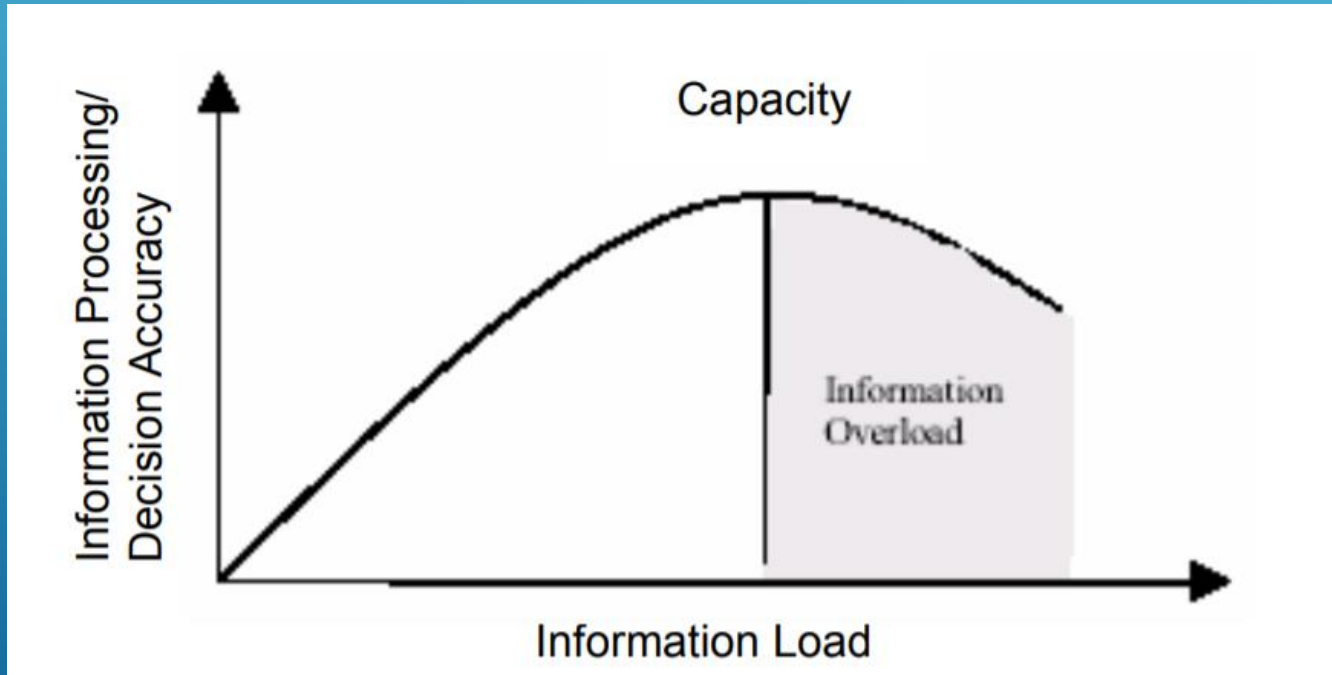
CAN ETHICAL CONSIDERATION BE ONE OF THE AHP CRITERIA?



- 1. AHP characteristics: Pairwise comparison. Can ethical value be traded off? Everybody's ethical value is different.
- 2. Other similar considerations: Loyalty, morality and personal position.
- 3. Decision making for human processes requires to take account of three poles of influences: the rational, the subjective and the ethical one. (Brans 2000)



INFORMATION OVERLOAD



1. The interviewee is an experienced logistics consultant. He is overloaded with too much information and knowledge. The information overload may override the AHP decision process.
2. Any information received beyond the overloading point will not be processed, may lead to confusion and could have a negative impact on the individual's ability to set priorities as well as remember previous information

FINANCIAL EFFICIENCY: UNCERTAINTY

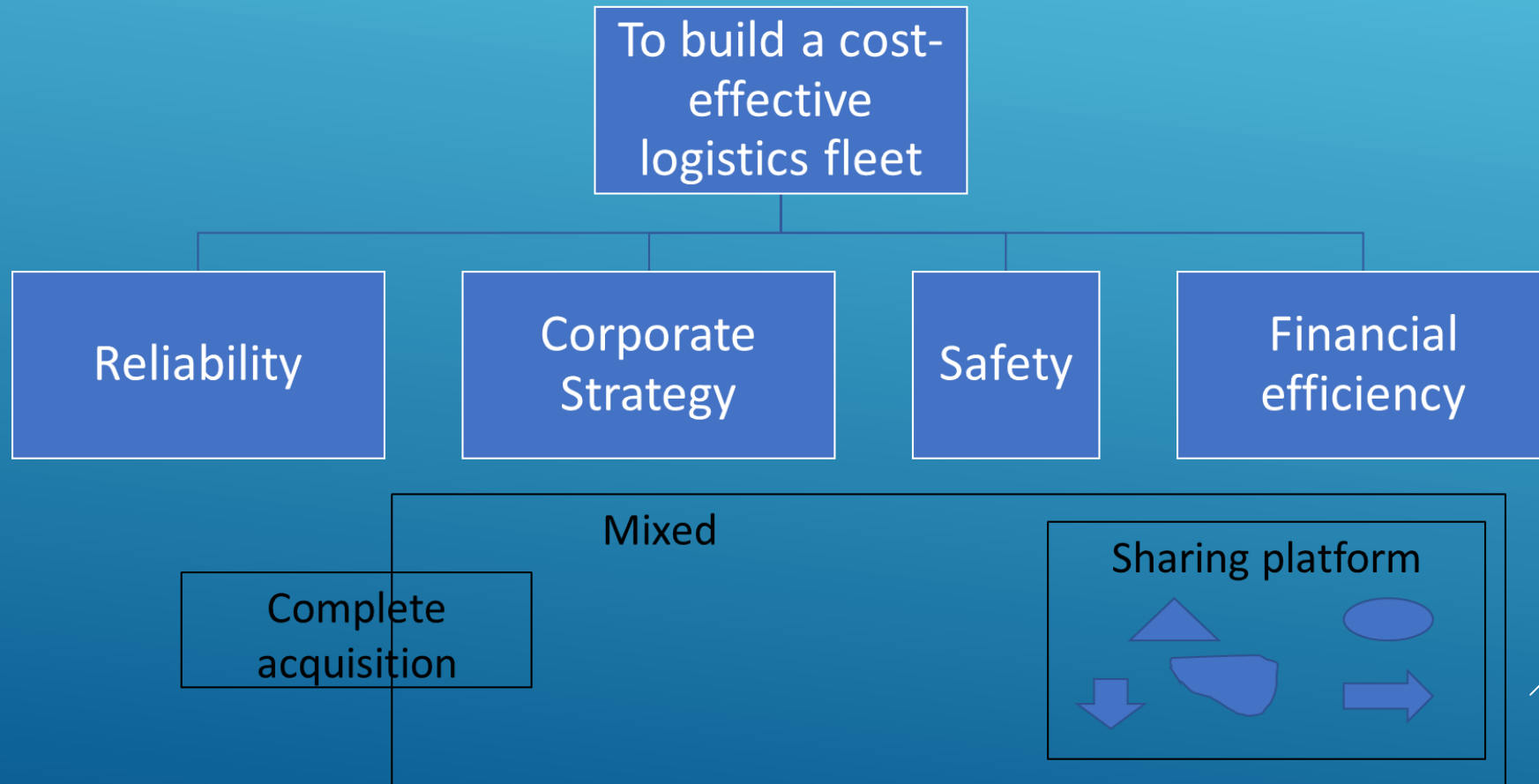
- ▶ 1. In a truck sharing model, all costs are distributed across use. Therefore, the marginal costs of each use are close to average costs. The more frequent the vehicle is used, the lower the total cost per ride (the sum of fixed cost and variable cost) is. It is uncertain how frequent a sharing truck will be called.
- ▶ 2. It depends whether the interviewee is optimistic or pessimistic.
- ▶ 3. Risk flows from uncertainties about future conditions.

RELIABILITY: DATA AND SERVICES SECURITY

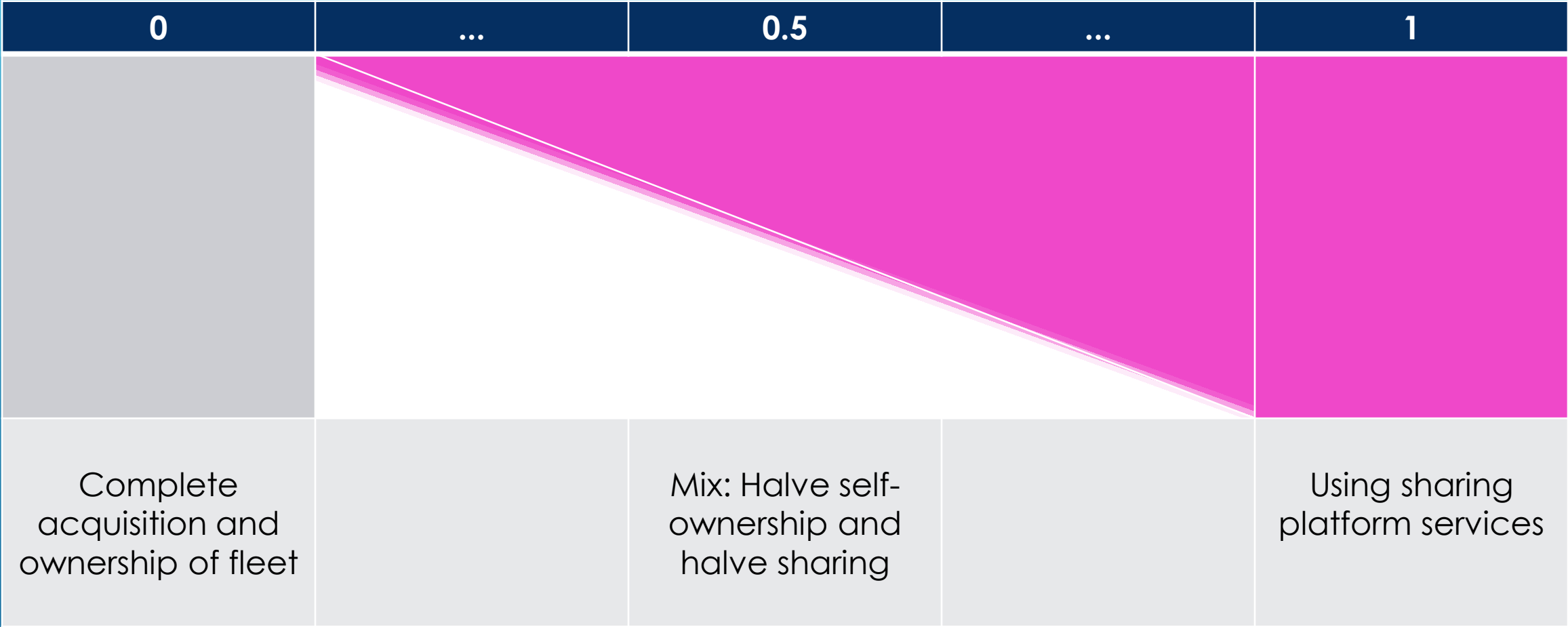
1. The investment on the smart technology for sharing platform may be significant (e.g. online security) though it is to be absorbed by the sharing platform owner. Finally, the users will bear the cost and probably the risk.
2. Truck sharing services will become unreliable during peak seasons.
3. AHP may be the best tool in such assessment through intuition and subjective evaluation.

INCOMPARABLE ALTERNATIVES: THEIR DIFFERENCE IN COMPLEXITIES/ NATURE

1. Vehicle sharing for logistics is new and complicated while owning a complete fleet through acquisition is much simpler. These two alternatives are very different in nature.



A SPECTRUM OF ALTERNATIVES



Scale of alternatives

THE "RESULTS"

Treeview

- **Goal: To build a cost effective fleet**
 - reliability (L: .212)
 - corporate strategy (L: .100)
 - **safety (L: .627)**
 - financial efficiency (L: .061)

Alternatives

complete acquisition	.504
mix	.286
sharing	.210

CONCLUSIONS

1. Decision makers with AHP may find information overload regarding developing a sharing platform. It is too technical to be handled by the logistic company. The same situation may appear for other industry when a new complicated technology is involved. Information may overload in different aspects.
2. Pairwise comparison is difficult when alternatives are very different in scales. Leasing vehicles through a sharing platform is much more complicated than acquisition.
3. It is also noted that decision makers may find it difficult when ethical value is involved in the criteria.