A User-Centered Cabin Design Approach to Investigate Peoples Preferences on the Interior Design of Future Air Taxis

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Introduction

- Project HorizonUAM: combines the research into Urban Air Mobility (UAM) vehicles, the corresponding infrastructure, the operation of UAM services, as well as the public acceptance
- Costumer plays a crucial part in the development process
- Design Thinking Method
- Focus group research

Fig. 1: Project image of HorizonUAM
Background

- Conceivable own use of civil drones...

Fig. 2: Results of a DLR survey in 2018

- Civil protection
- First aid
- Parcel delivery
- Leisure activities
- Unmanned taxi

Percentage values
Background

• 84 percent of respondents would acknowledge an offering of Volocopter air taxis (Planing & Pinar, 2019)

• Essential comfort aspects in aircraft cabins: legroom, temperature, noise, entertainment, seats, hygiene (Ahmadpour et al., 2014; Vink et al., 2012)

• The factors seating space, noise and safety more important to 41-50-year-olds than to youngers (Hankovská, 2018)

• Elderly people particular tolerant to thermal sensation, but more sensitive with regards to acoustic comfort (Indraganti & Rao, 2010)

Our study pays attention to the age and residential location of people and their preferences on the cabin design of air taxis
Method

Sample
• 16 participants
• 11 male, 5 female
• Recruited via internet

Procedure
• Online focus groups in 2020
• General vehicle and cabin preferences
• preferences on air taxi cabins > Disney Method

Fig. 3: Participating groups of the survey
Disney Method

Fig. 4: Visualization of the Disney Method (https://i.ytimg.com/vi/FyOBk0filqs/maxresdefault.jpg)
Results

Vehicle preferences

• Flexibility
• Avoid traffic jams
• No searching for parking spaces
• Safety
• eco-friendliness
• Short travel times
• Punctuality
• Spend time in a useful way
Results

Vehicle cabin preferences

Legend:
- **Green** = very important (4 groups)
- **Blue** = important (3 groups)
- **Purple** = moderately important (2 groups)
- **Orange** = slightly important (1 group)
Results

Fig. 5: Air taxi cabin design concept of the group of the 18-39-year-olds
Results

18-39-year-olds

- High-quality seats
- Service robot
- Folding doors
- Solar roof
- AR-technologies

40-65-year-olds

- Enough storage space
- Legroom
- Bright ceiling
- Convertible seats
- AR-technologies
- Noise reduction
- Dark seats
Results

Small- and medium-town residents

- Large enough for families
- Comfort
- Bicycle stand
- Entertainment (for kids)

Inclusiveness
- Storage space
- Separate entrances

Metropolitans

- AR-technologies
- Entertainment
- High-quality seats
- Convertible seats
- Modular seating
- Snacks

Individual

Large enough for families

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Summary

Vehicle preferences

• Bycicle favorite means of transport > air taxis combinable with bycicles

• concept of air taxis has the potential to meet key travel demands (e.g. fast, flexible)

Vehicle Cabin preferences

• Similar findings as in Ahmadpours study (e.g. noise, room temperature, legroom)

• Further findings: lightning, storage space, windows, barrier-free entries
Summary

Preferences on air taxi cabins

• Similarities: separate compartments, hygiene, barrier-free, emergency button, large windows for panoramic view
• 18-39-year-olds: modern and futuristic technologies, eco-friendly
• 40-65-year-olds: modular set-up, multifunctional
• Small- and medium-town residents: inclusiveness, comfort, privacy
• Metropolitans: individuality
Conclusion

• There are central requirements significant to most participants, but also different priorities in the individual groups

• Future air taxi cabin design concepts should consider the most common and crucial demands

• Also address specific requests of certain user groups

• Further research should identify most relevant user groups of air taxis

• Include key customers in the development and design process
References


Thank you for your attention!