

mobil.TUM 2024 – The Future of Mobility and Urban Space, April 10-12, 2024

Business Model Innovation in Urban Air Mobility: An Application of Business Model Innovation to Vertiports

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Keywords: *Business Model Innovation, St. Gallen Business Model Navigator, Urban Air Mobility, Vertiport*

This work addresses the following topic(s) from the Call for Contributions:
(Please check at least one box)

- Placemaking to integrate urban spaces and mobility
- Promoting sustainable mobility choices in metropolitan regions
- Governing responsible mobility innovations
- Shaping the transition towards mobility justice
- System analysis, design, and evaluation
- other: _____

Problem statement

In recent years, technological advancements in urban air mobility (UAM) have gained significant attention. However, the assessment and development of viable business models for vertiports and their operation, which will constitute an integral part of the UAM ecosystem, have received less attention. Given the imminent entry of this innovative mode of transport into the market and the substantial investments from investors, careful consideration of societal needs and requirements should take place (Straubinger, et al., 2021). Furthermore, the level of service offered to potential travelers should be considered (i.e., luxurious services or just basic needs of business travelers, tourists, etc.). The purpose of this work is to develop appropriate business models for vertiports. Scrutinizing UAM services indicates that there are a lot of uncertainties about the needs and volume of travelers. Especially at the start, significant variables, such as the demand or investment costs, are based on estimates rather than experience. Therefore, developing an innovative business model idea is essential to establish a profitable business.

Research objectives

Building capabilities for the UAM ecosystem requires as much organizational innovation as technological or product innovation (Schulte, 2013). Therefore, an increasing number of academics and industry professionals are focusing on the concept of business model innovation (BMI). The business model serves as the framework for outlining how a business generates, delivers, and captures value (Teece, 2010). BMI for the UAM ecosystem aims to uncover ways of providing value to stakeholders (e.g. passengers, airlines) and exploring economic value along the products' life cycle to systematically boost resources efficiently and effectively. To address those challenges, this study aims to apply a novel methodology for vertiports to develop innovative business opportunities.

Methodological approach

Aviation experts from academia and industry, including representatives from an aircraft manufacturer, the U-space, business development, an airport operator, an architecture company, analysts of passengers' behavior, mobility as service providers, and economists, were invited to participate in a workshop, which took place in July 2023, to explore the Business Model Innovation capabilities for the UAM ecosystem. The selected methodology for the workshop is the St. Gallen Business Model navigator book (Gassmann, et al., 2014) since it focuses on an interactive collaboration of different participants. It was developed by the Institute of Technology Management at the University of St. Gallen and adapted by BMI Lab AG. To accurately follow the proposed method, we invited BMI Lab to guide us through the workshop. The first step of the workshop is the initiation phase, which aims to

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identify a common starting point for the UAM ecosystem. To achieve this, it is important to understand all the entities within the ecosystem. These entities are classified and illustrated on the left side of **Figure 1**. The second step, the ideation phase, is the most creative part of the overall method. 21 business model patterns are introduced during the ideation, to identify novel pattern combinations. In a brainstorming session, the patterns are used as triggers to improve the creative process of the participant. Each ideation session yields a minimum of five ideas for each pattern card, which are then assessed, merged, and chosen before advancing to the next stage. The resulting pattern combinations will then be further detailed and integrated into four dimensions, which describe the framework of a business model. Those dimensions are:

1. The customer – ‘Who are the target customers?’
2. The value proposition – ‘What is offered to the customers?’
3. The value chain – ‘How are the offerings produced?’
4. The revenue model – ‘Why does the business model generate profit?’

Results

About potential vertiport business models, the ideation in the workshop phase generated a multitude of new business model ideas. A selection criteria matrix was provided to the groups to structure and evaluate their ideas. Two criteria were identified for this evaluation: the potential of each idea for implementation and the time required to implement an idea. Each group selected the ideas from the ideation phase and then clustered the results according to the mentioned two criteria. To develop more detailed business model ideas, the groups would then try to form coherent business models out of the most promising ideas. Each group came up with two ideas, and they were subsequently asked to conduct a more in-depth analysis of the one that had the potential for quicker implementation and a higher likelihood of success in the market.

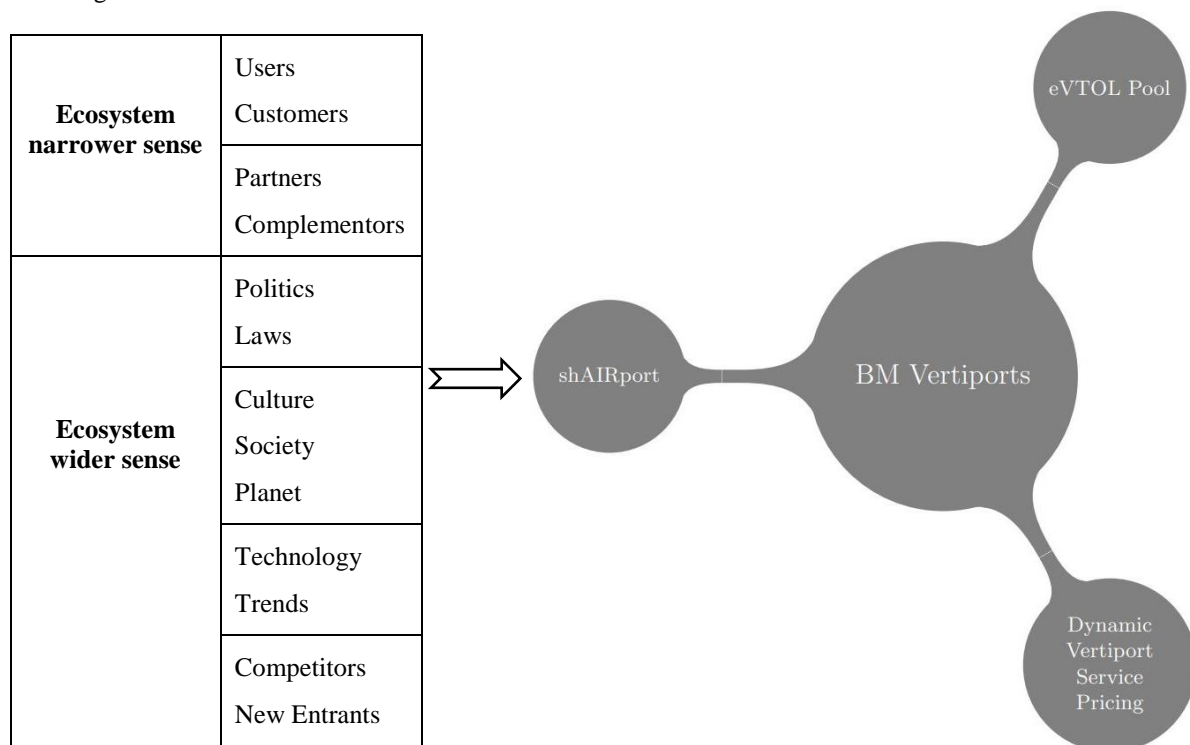


Figure 1: Development of Business Models for Vertiport based on the Ecosystem

Group 1 suggested developing a vertiport that will allow the fleet operator to choose the configuration of ground services. More precisely, they could choose the level of service for landing, charging, and parking to optimize their cost structure according to their needs. The model idea of **Group 2** addresses the challenge of a seamless, easily accessible, and Door-2-Door travel experience by closing the gap from the travelers’ door to the aircraft seat. The business model idea, developed by **Group 3**, the synergies concepts, addresses the opportunity for public investors who want to profit from neighborhood UAM developments. This business model idea will allow everyone to invest in and profit from UAM and will be characterized by regional and decentralized ownership. In summary, the entire innovation process proved very valuable in the sense that people from diverse backgrounds gathered a broad range of innovative business model ideas. Each group’s top-ranked models, shown on the right side of **Figure 1**, provide solutions with three different focuses. The first solution focuses on flexibility and optimization of costs through the definition of levels of service. The second one aims to minimize the time spent searching for travel options by

providing an application with a holistic overview of transport modes from origin to destination. The last solution focuses on enabling everyone to profit.

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