

# **BUSINESS MODEL AND COMMERCIALIZATION STRATEGIES FOR NANOSATELLITE-BASED DISASTER FORECASTING SERVICES**

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**Abstract:** The fast commercialization and development of aerospace technologies have changed completely the global space sector economy, especially with the development of devices such as nanosatellites. These nanosatellites are effective and precise when it comes to forecasting hurricane activity and other extreme weather events which represent a great impact area that provides safety for the society and a viable way to commercialize these services. This article aims to analyze different business models in this field in the space area and realistic strategies which can be used to commercialize the use of such nanosatellites for specifically forecasting services with the goal of preventing bigger disasters such as the loss of lives and damage of infrastructure.

**Key words:** business model, hurricane forecasting, nanosatellites, space economy, commercialization, safety.

## **БИЗНЕС-МОДЕЛЬ И СТРАТЕГИИ КОММЕРЦИАЛИЗАЦИИ УСЛУГ ПО ПРОГНОЗИРОВАНИЮ СТИХИЙНЫХ БЕДСТВИЙ НА ОСНОВЕ НАНОСПУТНИКОВ**

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**Аннотация:** Быстрая коммерциализация и развитие аэрокосмических технологий полностью изменили мировую экономику космического сектора, особенно с появлением таких устройств, как наноспутники. Эти наноспутники эффективны и точны в прогнозировании ураганов и других экстремальных погодных явлений,

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представляющих собой серьезную проблему, обеспечивающую безопасность общества и перспективный способ коммерциализации этих услуг. Цель данной статьи, проанализировать различные бизнес-модели в этой области космической отрасли и реалистичные стратегии, которые можно использовать для коммерциализации применения таких наноспутников, в частности, для прогнозирования с целью предотвращения более масштабных катастроф, таких как гибель людей и повреждение инфраструктуры.

**Ключевые слова:** прогнозирование стихийных бедствий, коммерциализация, наноспутники, космическая экономика, стратегическое управление, бизнес-модели.

### **Introduction**

The space sector has been transformed and developed a lot over the last 2 decades. Before this was an area completely dominated by governments, it is now being rapidly growing by private organizations which focus on providing specific services for each country. Thanks to nanosatellites, there are now new applications for the observation of Earth's atmosphere which can come in very handy for forecasting hurricane movements and being able to predict their future behaviors so that people could be prepared better and beforehand for such events.

For a country such as Mexico that faces threats constantly by hurricanes, the ability of being able to predict such events is not only a matter of public safety but also a new way for business opportunities and a new way to grow technologically.

### **Research progress**

This articles is combines strategic ideas with practical experiences from the current space sector in the commercial area. The methodology is based on a few important elements:

1. The analysis of a business model that includes the value of the project, the suitable clients or partners, new and current revenue streams, the needed resources, and a projection of realistic alliances.
2. A detailed comparison between current commercial services in the space sector and existing public warning systems.
3. A detailed market study to select potential clients not only in the public sector but in the private sector too, an understanding of their needs and goals to create a solution.

Once all these elements are in place, the study seeks to find a path for a nanosatellite-based forecasting system in Mexico which can be accurate and commercially viable.

### Commercialization Strategies.

The better approach is the usage a marketing strategy in phases so there can be minimal risks and being able to build trust in the market:

Phase 1: It is important to choose the correct partners to conduct such projects in the public or private sector, verify all information. This will provide a strong foundation for the project's development.

Phase 2: Being able to close deals such as long-term contracts with the public sector or a private organization. These clients will be able to provide financial stability to the project and will send a strong signal of confidence to the market.

Phase 3: Once we have established the service, it can be scaled to a bigger degree. The next step would be to design the nanosatellites, test them, and launch them with the correct geographical coverage and orbit. Publish risk reports for hurricane seasons would come in handy when using this nanosatellites.

Table 1 – Comparison of business model options for nanosatellite-based disaster forecasting services [1]

<b>Business Model</b>	<b>Main Customers</b>	<b>Value Proposition</b>	<b>Revenue Characteristics</b>
Data service	Research groups and tech companies	Raw data access	Low margins, high volume of costumers
Information service	Governments, insurers, utilities	Forecasts and alerts	Moderate margins, repeat income
Results based services	Large companies, insurers	Loss reduction and performance outcomes	High profit, complex deals

### Scaling and Sustainability Challenges.

In order to scale a project like this, it is very important that the technology is of a high quality, the data is precise, and the financial model is effective. Several obstacles might be encountered in the way such as:

- The chance of a satellite failure would create gaps in critical information, but it won't shut down the service.
- The idea of having a public interest service without making it inaccessible to those who need it most, especially in remote areas.

The most efficient solution to these problems is generally to combine the public and private sectors. In this way, we can leverage government funding along with the innovative capacity of businesses.

### **The results and conclusions (Conclusion)**

Nanosatellite forecasting services represent a very promising section of the space economy. When supported by the right partners and business models, these services can shine in their areas by delivering significant economic and social benefits.

For hurricane-prone countries such as Mexico, such systems help with disaster resilience, data based early decision making and create opportunities for sustainable commercial development. Future research should focus on quantitative impact assessment, cross-border service integration, and long-term governance models.

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