Space Mission Lancuhes Analysis

Summary

- Top countries with most launches: **Russia** (1395), **USA** (1344), **Kazakhstan** (701)
- Launch Trends Over Time: Consistent growth since **1967**.
- The USA alone accounts for **46% of total launch expenditure**.
- Cost Evolution: Early missions were highly expensive; some modern launches are more cost-effective.
- Mission Reliability: Failure rates have **decreased** over time, indicating **improved safety and technology.**

Conclusions

The evolution of space missions over the decades reflects a dynamic interplay between geopolitical motivations, technological advancement, and commercial innovation. While the early years were dominated by political rivalry, the modern era is increasingly driven by cost-efficiency and private sector involvement — setting the stage for a more accessible and sustainable future in space exploration.

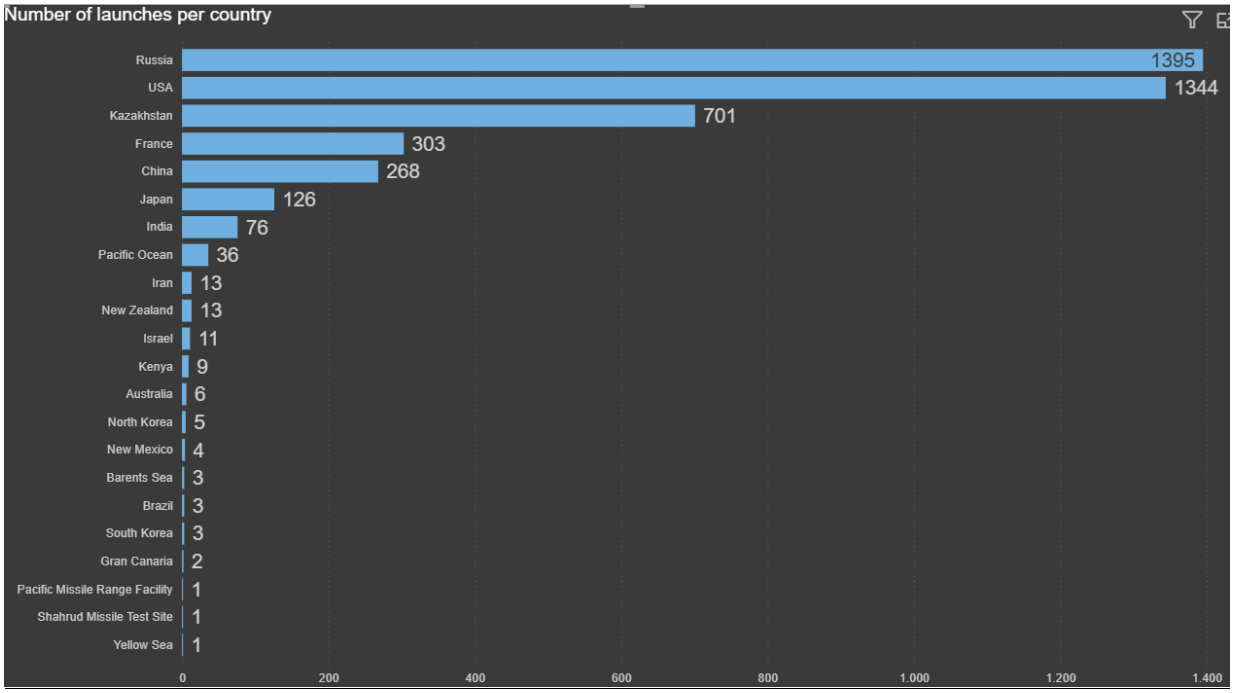
Evidence

- Top countries with most launches: **Russia** (1395), **USA** (1344), **Kazakhstan** (701)
- The USA alone accounts for **46% of total launch expenditure**. (190.361.000 $)
- Successful missions represent **89.72%** of total launches
- Three distinct periods can be identified in the evolution of space mission activity: **1st Period (1957–1978), 2nd Period (1979–2015), and 3rd Period (2015–2020).**

Detailed Analysis

1. Which country launched the most space missions

Top countries with most launches: **Russia** (1395), **USA** (1344), **Kazakhstan** (701)



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2. How has the cost of space missions varied over time?

Three distinct periods can be identified in the evolution of space mission activity:
1st Period (1957–1978), 2nd Period (1979–2015), and 3rd Period (2015–2020).

First Period (1957–1978): Rapid Growth

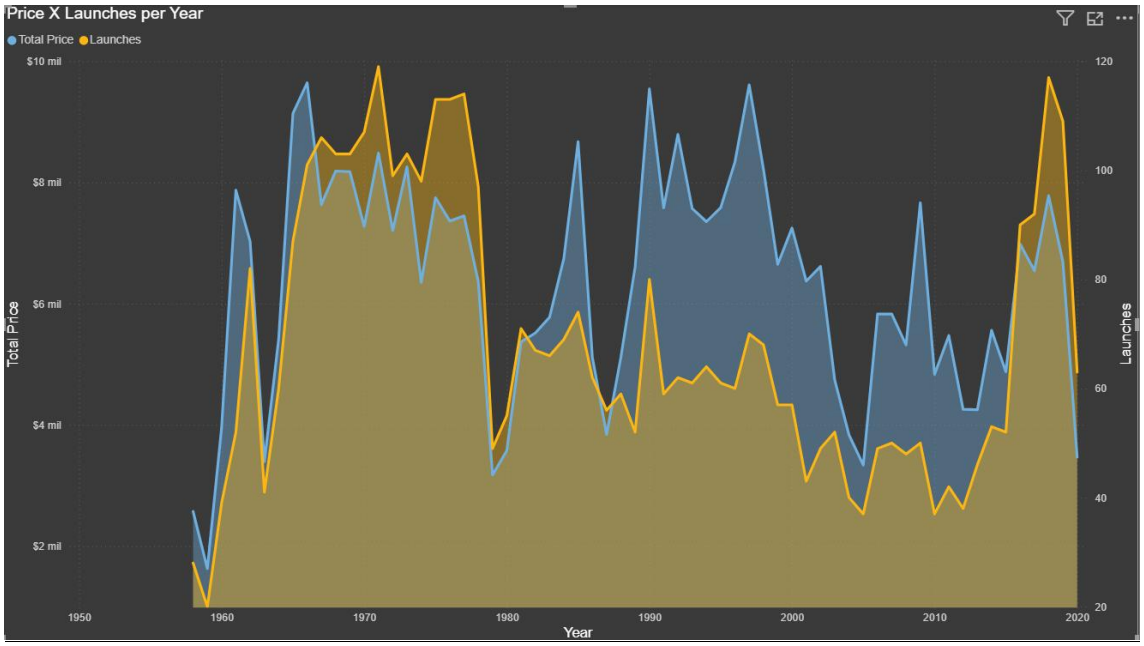
This phase was characterized by a steep increase in launch activity — from around 20 launches in the early years to a peak of 119. This growth reflects the intense competition of the Space Race era, with major investments from both the United States and the Soviet Union.

Second Period (1979–2015): Decline and Stabilization

Following the historic Apollo-Soyuz mission, which marked the first international crewed spaceflight between the US and the USSR, a new era of cooperation emerged. This led to a significant drop in the number of launches.
Despite the decline in missions, the total annual costs remained high — suggesting increased complexity and technological advancement in spacecraft, resulting in higher per-mission costs.

Third Period (2015–2020): The SpaceX Revolution

A turning point occurred with the successful launch and landing of **SpaceX's Falcon 9** in 2015. This milestone proved that rocket reusability was feasible, significantly reducing launch costs. As a result, space missions became more accessible, sparking a resurgence in launch frequency and opening new commercial opportunities in the space industry.



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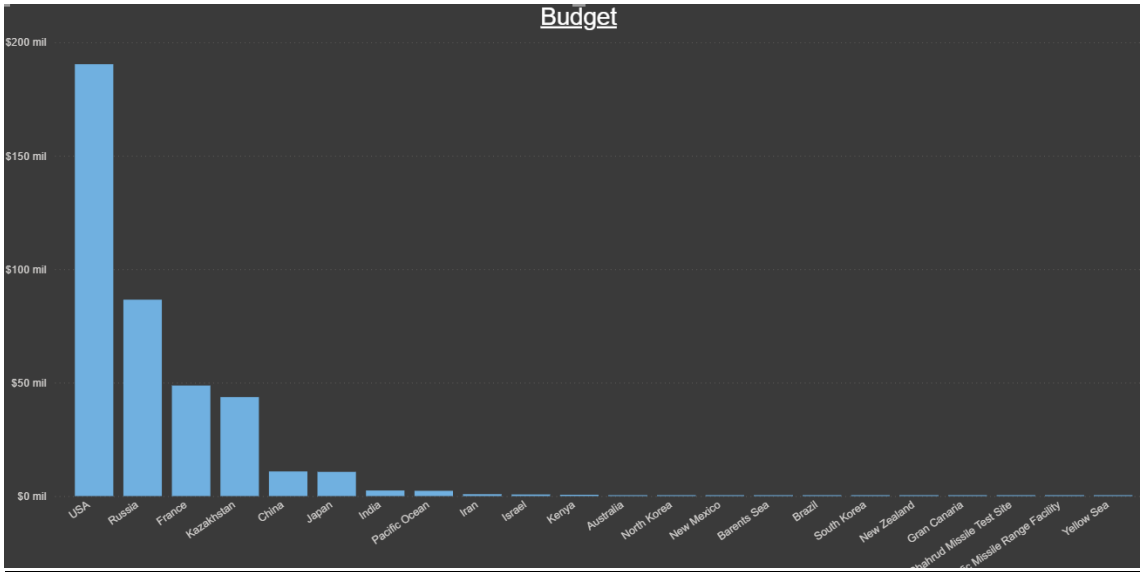
3. What is the total cost of launches per country?

The USA alone accounts for **46% of total launch expenditure**. (190.361.000 $)



4. Have space missions become safer, or have failure rates remained constant?

Successful missions represent **89.72%** of total launches