Can Intel make a competitive chip in 2024?

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Key Takeaways

- Intel's Lunar Lake chip shows promise with better battery life and improved AI performance, but whether this will be enough for Intel to remain competitive is uncertain.
- Qualcomm continues to dominate the 2024 AI storyline, creating significant pressure for Intel to maintain relevance in the AI-enabled device market.
- Intel's foundry operations within the US have strategic importance, especially as geopolitical tensions rise, making Intel a valuable asset in the national defence supply chain.

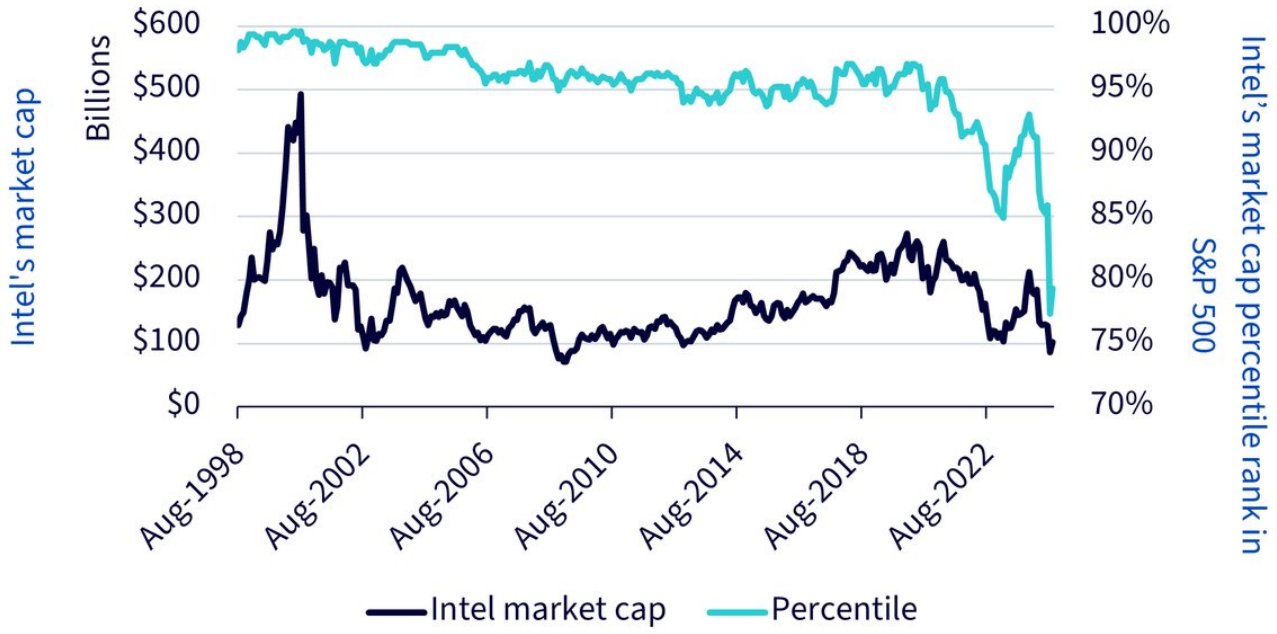
We have been writing a lot about how AI is experiencing a revolution and that 'AI-on-devices' is a major part of this megatrend's advance. We are beginning to see 'AI-enabled' devices (smartphones, laptops, and tablets), and then there are the other, usually older versions of the same devices.

It seems like 'AI-enabled' currently represents an avenue to charge a premium price for a new device. Still, we predict that almost all devices will be equipped with these capabilities in a few years at numerous price points.

The fall of Intel

We can look back through history at Intel, a storied company that at one point was in discussions to possibly be the world's highest market capitalisation stock. We look at this history in Figure 1:

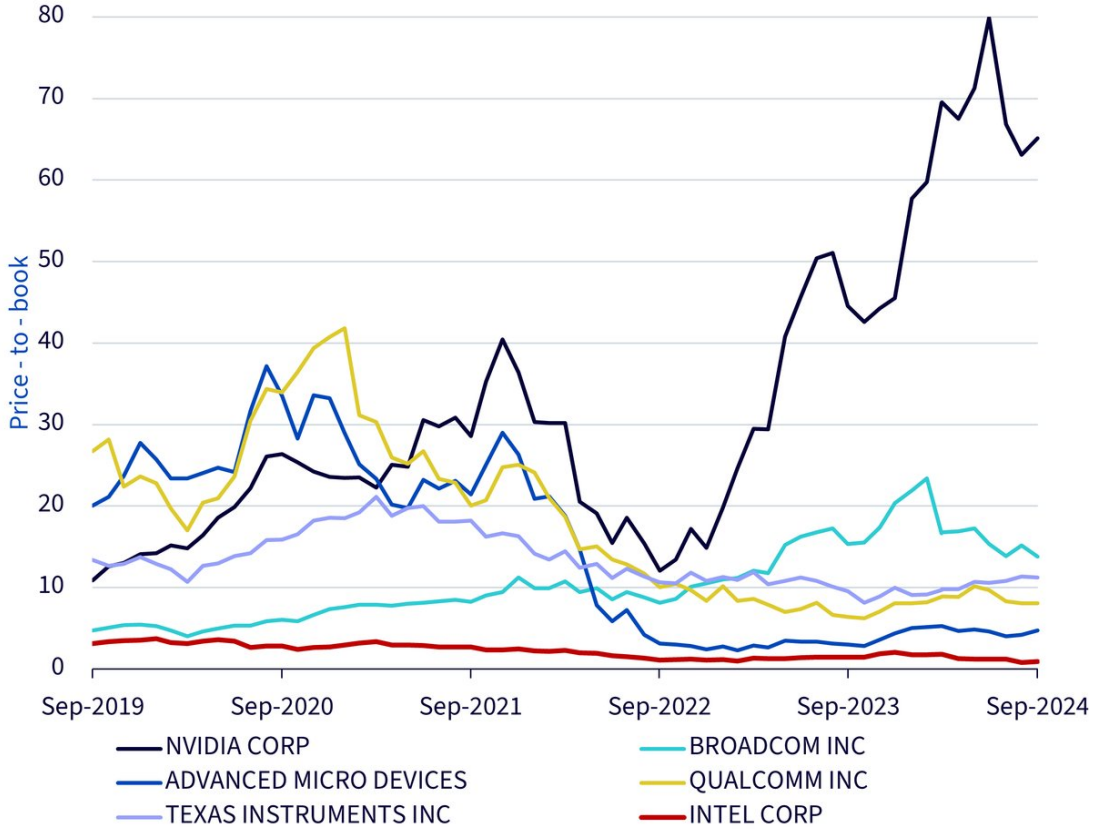
Figure 1: Intel's market capitalisation and percentile rank back to IPO



Source: WisdomTree, S&P, FactSet, Bloomberg. Monthly end data as of 30 September 2024. **You cannot invest directly in an index. Historical performance is not an indication of future performance, and any investments may go down in value.**

At the time of writing, market participants are assessing various data points threatening Intel's further existence as an independent company. Companies like Qualcomm are even reported to be approaching Intel with offers to buy different company business lines. Figure 2 shows the evolution of Intel's price-to-book ratio vs. the top five semiconductor companies in the S&P 500 Index. We note the price-to-book ratio because it was widely publicised that Intel's valuation was getting close to the 1.0x level during the summary of 2024.

Figure 2: Intel's price-to-book ratio vs. other large semiconductor firms



Source: WisdomTree, FactSet. Monthly end data as of 30 September 2024. "Other Large Semiconductor Firms" were the five largest semiconductor companies from S&P 500 as of 30 September 2024 by market cap. **You cannot invest directly in an index. Historical performance is not an indication of future performance, and any investments may go down in value.**

Can Intel still make a chip?

Semiconductors take years to develop, so while we may be swamped with speculations and considerations as to whether Intel will remain an independent company, chips are still coming out. We saw that, during the week of 23 September 2024, Intel's new 'Lunar Lake' processor received a strong reception.

In the world of 'device-enabled-AI', Qualcomm has been dominating the 2024 storyline with its Snapdragon processors. We sought to compare Intel's new Lunar Lake chip to Qualcomm's chip to see if what Intel is releasing should at least be viewed as competitive.

Speed and performance

- **Intel Lunar Lake:** The Intel Core Ultra 7 258V "Lunar Lake" processor offers significant performance improvements over previous generations. It features integrated Intel Arc graphics and an Intel AI Boost NPU, which enhances AI performance. Initial benchmarks suggest that Lunar Lake CPUs deliver improved performance compared to older Meteor Lake laptops[1].

- **Qualcomm Snapdragon:** The Snapdragon X Elite X1E-80-100 processor is also powerful, with integrated Qualcomm Adreno graphics and a Qualcomm Hexagon NPU. It is designed to handle everyday tasks efficiently and provides excellent performance for AI-related tasks[2].

Battery life

- **Intel Lunar Lake:** Intel claims that the Core Ultra 9 288V processor in the Lunar Lake series promises up to 14 hours of battery life on the UL Procyon Office Productivity benchmark[3]. This is a significant improvement over previous Intel processors.
- **Qualcomm Snapdragon:** In the same test, the Snapdragon X Elite processor delivered around 9.5 hours of battery life[3]. While this is impressive, it falls short compared to the Lunar Lake processor.

Memory and storage

- **Intel Lunar Lake:** The Dell XPS 13 with Lunar Lake comes with 16GB of RAM and 512GB of SSD storage. It also offers configurations with up to 32GB of RAM and 2TB of SSD storage[4].
- **Qualcomm Snapdragon:** The Dell XPS 13 with Snapdragon X Elite also comes with 16GB of RAM and 512GB of SSD storage. It offers configurations with up to 32GB of RAM and 1TB of SSD storage[4].

Graphics and AI performance

- **Intel Lunar Lake:** The integrated Intel Arc graphics and Intel AI Boost NPU provide enhanced graphics performance and AI capabilities, making it suitable for tasks that require high computational power and AI processing[1].
- **Qualcomm Snapdragon:** The integrated Qualcomm Adreno graphics and Qualcomm Hexagon NPU also offer strong graphics performance and AI capabilities. The Snapdragon processor is optimized for AI tasks and provides efficient performance for such applications[2].

Overall comparison

- **Intel Lunar Lake:** Offers better battery life and slightly higher performance in benchmarks. It is well-suited for users who need long battery life and strong AI performance.
- **Qualcomm Snapdragon:** Provides excellent performance for everyday tasks and AI-related applications. It is a strong contender but falls slightly short in battery life compared to Lunar Lake.

Both processors have their strengths and are suitable for different use cases. The choice between them would depend on specific needs, such as battery life, performance, and AI capabilities.

Conclusion: Intel cannot be fully counted out

Admittedly, when we think of the Intel story in October 2024, we are thinking a lot about the national defence implications in the US and the fact that Intel is one of the most capable foundry operators with facilities within the continental US if tensions are picking up around Taiwan, the US Government is not going to want to lose a major foundry player within its borders.

We think the initial reports on the Lunar Lake chip are promising, and we are most interested to see what happens with Intel's attempt at a contract foundry business where Intel's facilities could be making chips from other firms. So far, Taiwan Semiconductor Manufacturing Co. (TSMC) has been a successful player in this space, and Intel will have difficulty competing head-to-head. Maybe a piece of Intel's business could be sold to another US chip firm, while Intel's overall effort could remain independent.

[1] Intel Lunar Lake benchmarks — here's how it compares to Snapdragon X and Apple M3

[2] Dell XPS 13 (Lunar Lake) vs. Dell XPS 13 (Snapdragon X Elite): Which laptop should you buy?

[3] Intel Lunar Lake vs Snapdragon X Elite: x86 Makes a Comeback

[4] Dell XPS 13 (9350) Lunar Lake vs Dell XPS 13 (9345) Snapdragon X Elite: Do you want Qualcomm or Intel inside?

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