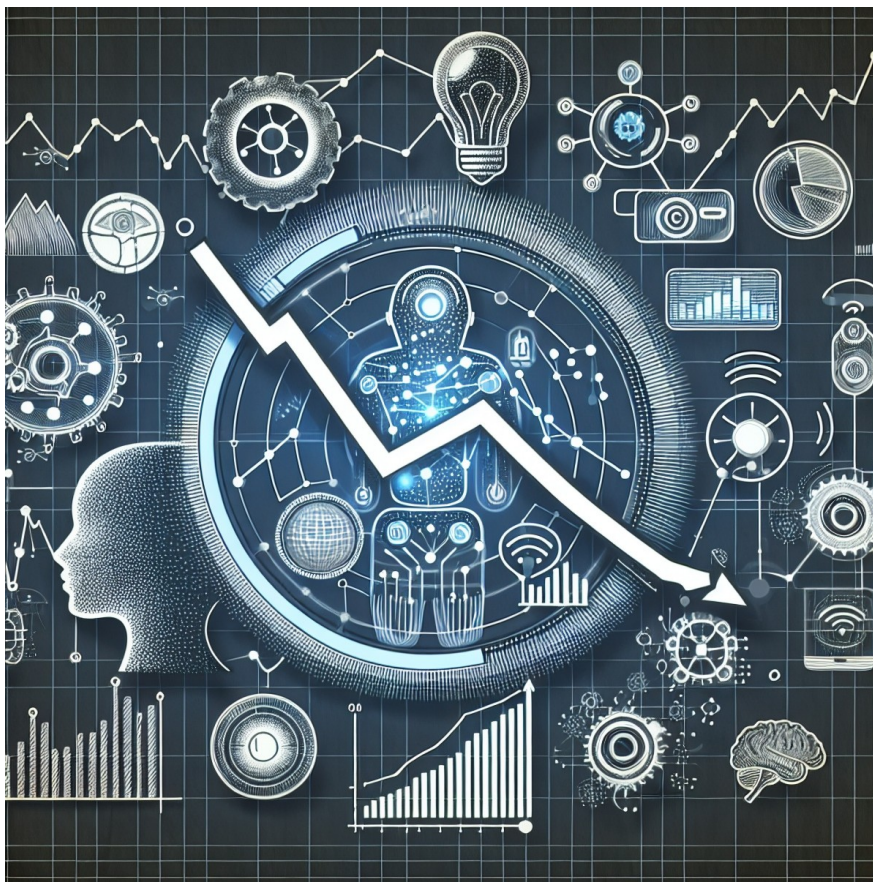


## AI services will become more affordable over time

Today, some Generative AI services are rather expensive. We expect the prices of these services to come down, in line with historical developments of ICT hardware prices



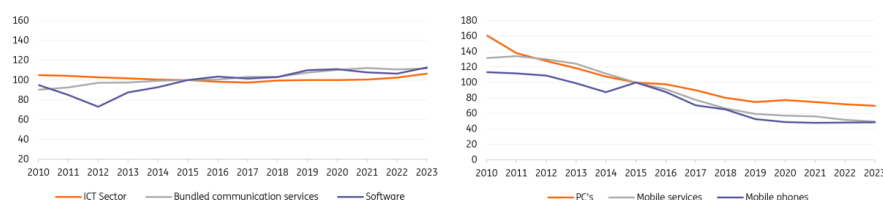
### Declining prices are common in the ICT sector

When evaluating the historical evolution of the ICT sector, there is one important aspect that stands out. Prices have come down in substantial segments of the sector. This especially holds true for hardware such as phones and PCs but also for prices of mobile communication. One of the other notable aspects in this context is the provision of free services, through open-source projects or advertising driven models. Nevertheless, the main cause of falling prices is the advancement in

semiconductor manufacturing capabilities, in line with Moore's Law. Because of this, semiconductor prices have come down, leading to lower prices for end-products, such as PCs, tablets, and mobile phones. Because microchips are an important cost component of AI models, we expect the replacement cost of the existing infrastructure needed to run AI models to come down over time as well.

In a November 2023 blog post, OpenAI introduced a new model GPT-4 Turbo. Interestingly, compared with GPT-4, OpenAI will offer "GPT-4 Turbo at a 3x cheaper price for input tokens and a 2x cheaper price for output tokens". Although one should be careful about generalising from one statement (possibly the initial price was too high to attract enough volume), it fits with trends of falling prices in parts of the ICT sector. Moreover, note that the news on GPT-4 Turbo is already outdated because OpenAI now plans to release GPT-5 around the summer of 2024. This shows that companies keep developing better, more complex, and more expensive, models over time. We do therefore expect that spending on AI infrastructure will continue for some time to come.

## Prices are falling for some products in the ICT sector



Source: CBS, ING

## Expect downward price trend for AI, like many product and software categories

The graphs above show that the costs of computing equipment have come down substantially over time. Although one could argue that a smartphone today is a completely different product than 10 years ago, most of us would agree that there are many more affordable devices around today than in the past, with better capabilities. This will also happen with Generative AI, as the costs to make calculations will come down, but also because engineers will find ways to optimise these. Also, Generative AI will likely bring costs down for software engineering, customer support as well as administrative tasks. Of course, quality will also improve, which may cost somewhat extra. The same holds for products that rely on proprietary data or knowledge. Also, other effects have an upward effect on prices, such as oligopolistic market structures and strategies making it difficult for customers to switch suppliers (vendor lock-in, product bundling). Nevertheless, we believe in a downward trend for many product and software categories.

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