

Future Today

HOW PROBLEMS LEAD TO UNEXPECTED SOLUTIONS

Charles Bedwick waded deep in the underground through the tunnels of the "Peters Hill" copper mine in Wales. The year was 1767. Bedwick, a mine foreman, was on an inspection tour to ensure the safety of his men. The expansion of the tunnels had been impeccable, only the seeping water worried him. Despite constant pumping, the water stood ankle high throughout the passage and in some places even reached up to his calves. He would have to address this issue with Mr. Portman, the mine owner.

At the same time, a 31-year-old maker of scientific instruments in Glasgow, Scotland, was working on a significant improvement to the steam engines used at the time. The steam engines had been invented by the blacksmith Thomas Newcomen but achieved an efficiency factor of only 0.5%.

At Steve Portman's office, mine foreman Bedwick addressed the water problem. Portman, who owned the mine, was aware of the situation. Ten "Newcomen" steam engines worked incessantly to pump water out of the mine. They devoured enormous quantities of expensive coal which had to be transported from far away. "I am well aware of the risk to the miners. To solve the water problem, I would have to acquire at least ten more steam pumps and we would need double the amount of coal. The additional cost would be higher than the profit of the mine. Unfortunately, that is out of discussion, Bedwick." The foreman knew that Portman was right and for his men it was more important to earn money for their families, no matter the risk they took.

Two years later, the now heavily indebted young instrument maker had achieved a technological breakthrough, and he had also found a financier in the form of entrepreneur John Roebuck, who covered the cost of the patent application in exchange for a generous stake in future profits. On April 29, 1769 – exactly 250 years ago, in other words: a quarter of a millennium ago, patent No. 913 "A New Invented Method of Lessening the Consumption of Steam and Fuel in Fire Engines" was granted. The now 33-year-old inventor was James Watt. The industrial age had begun.

In the "Peters Hill" mine, foreman Bedwick waded through the knee-deep water every day. Three days previously, a water slump had occurred at a mine just seven miles away claiming the lives of eight miners. Bedwick thought intensively about how he could raise the issue again with mine owner Portman ...

James Watt was extremely happy with his patent. But he was still worried as his steam engine was very expensive to purchase. While he could rely on Roebuck's funding, how would he find buyers for his expensive invention? He, too, had to come up with an idea ...

One evening in August, Steve Portman sat on the terrace of a friend's house who also ran a mine. Three other entrepreneurs were also invited. They had known each other for a long time and met regularly to share the latest information and discuss issues. When the discussion came to the water problems, Peter Frazer, the owner of the neighbouring mine, said: "I've heard about a new steam engine invented by a young Scotsman, there are 60% coal savings compared to the latest "Newcomen" machine.



That is enormous as it is the cost of coal that is the ruin of us all! Has anyone heard any more about it?" The host waved him off "Even if it is true: I don't want to know what these machines cost. Each of us would have to buy a whole series of these new steam engines in order to solve the water problem. Even if the cost of coal is dramatically reduced – then the acquisition costs of the machines would bankrupt us!" "Well" added Steve Portman, "We should send someone to this Scotsman – James Watt is his name – to talk to him. Maybe it's not as unattractive as it first seems. Frazer's general manager should talk to him then we can meet again and see what comes of it."

Two weeks later, the gentlemen met again and Arthur Harris, who worked as general manager for Peter Frazer's mining company, reported: "I spoke to Watt. He immediately identified the problem of the investment costs and said that he had the perfect solution: he would not charge for the machines themselves, only for their use." The entrepreneurs frowned; they had never heard anything like it before. And before any of them could say anything, Harris continued: "The machines will still be owned by Watt's company and he will claim 1/3 of the amount that we would have spent on the coal."

The faces of the gentlemen darkened, but Harris began to calculate "If we currently spend £1,000 on coal, that means paying £333 to the company of James Watt. At the same time, however, we save 60% of the coal required, reducing our coal bill to £400. So our total cost drops from £1000 to £733, which means a saving of £267. Also, the machines are much more powerful and can pump out the water safely. The risk of loss of production and loss of life due to flooding is significantly reduced." That same evening, the mine owners decided to send Harris back to Watt to conclude a contract.

Technological progress was always an important prerequisite for economic success, even 250 years ago. But added to an innovative business model, the foundation was laid for a new era as rapid market penetration was achieved and as a result, James Watt became a very famous and wealthy man.

Tailor-made structures often support the implementation of innovative business models, especially if they are to be used internationally.

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