ROI and Payback Period

Before a company spends money on equipment, software or a new shop, someone asks two simple questions: how much will we gain, and how long will it take to get our money back? Return on investment, or ROI, answers the first question, and the payback period answers the second. Both are quick and easy to explain, which is why they are also easy to misuse. In this video, Majed, operations manager at a food-distribution company, uses them to choose between two cold-storage systems.

1. Return on Investment

ROI compares the gain from an investment with its cost. We take the total benefit over the period, subtract the cost to find the net gain, and divide the net gain by the cost, usually shown as a percentage. An ROI of fifty percent means that every dollar invested came back with fifty cents more. The period must always be stated, because fifty percent over five years is a very different return from fifty percent in one year. The benefit should be real cash, such as lower costs or extra margin, and not a hopeful guess. We also count only the extra profit or savings that the investment creates, because counting all revenue overstates the ROI.

Example: A shop spends ten thousand dollars on a new display system and gains fifteen thousand dollars of extra margin over two years. The net gain is five thousand dollars, so the ROI is fifty percent over two years, or about twenty-five percent per year on average. That is exactly what ROI means.

At work: Majed compares two systems. The first costs one hundred thousand dollars and saves fifty-five thousand dollars a year for two years, and then it must be replaced. The second also costs one hundred thousand dollars and saves thirty thousand dollars a year for five years. The first returns one hundred and ten thousand dollars in total, a net gain of ten thousand and an ROI of ten percent. The second returns one hundred and fifty thousand dollars, a net gain of fifty thousand and an ROI of fifty percent.

2. The Payback Period

The payback period is the time needed for the cash coming back to equal the cash spent. When the yearly flows are equal, we divide the cost by the yearly cash benefit. When they are uneven, we add the benefits year by year until the total reaches the cost, and then we estimate the fraction of the last year by dividing what is still missing by that year's benefit. Payback is popular because it is easy to explain and it measures how long our money is at risk: the shorter the period, the sooner we are safe if the forecast fails. Many companies set a maximum payback, such as three years, for small projects. The maximum should be compared with the life of the asset: a machine that lasts two years and needs three years to pay back is a loss, however simple the calculation looks.

Example: A cafe buys a second coffee machine for nine thousand dollars. The machine adds three thousand dollars of profit a year, so the cafe has a third of its money back after one year and all of it after three. The payback period is three years. That is exactly what payback means.

At work: For the first system, Majed divides one hundred thousand by fifty-five thousand and gets a little under two years. For the second, he divides one hundred thousand by thirty thousand and gets about three and a third years. His director, who likes quick answers, says to buy the first system, although that system lasts only two years.

3. Where They Mislead

ROI and payback tell different stories, and neither tells the whole story, so we do not rely on one alone. Payback ignores everything that comes after the money is recovered, so a project that pays back fast and

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then stops can beat one that pays back slowly and earns for years. ROI shows the size of the gain but ignores its timing, so ten thousand dollars received in the first year looks the same as ten thousand received in the last. Neither measure recognizes that money today is worth more than money later. One repair is the discounted payback period, in which every yearly benefit is first discounted at the return the company requires, usually its cost of capital. Both measures also depend completely on forecasts, so a project should be tested with a worse case.

Example: A mobile-app project pays back in eighteen months but loses its customers in the third year, while a platform project pays back in four years and then earns for ten years. Payback alone favors the app, which recovers its money first. But the platform earns for ten years, so the quick answer is the weaker one. That is exactly where payback misleads.

At work: Majed discounts the savings at eight percent a year. The savings of the first system are worth about ninety-eight thousand dollars in today's money, which is less than its price, so it never pays itself back in present value. The savings of the second system are worth about one hundred and nineteen thousand eight hundred dollars, almost twenty thousand more than its price, and its discounted payback is a little over four years. The faster option is the weaker one.

4. Using Them Well

In practice we use both measures, with a few rules. We define the benefit and the period before the calculation. We include all costs, such as installation, training and replacement, and count only the benefits that happen because of the project. We test the numbers in a case where the savings are lower. We use payback as a filter for risk, and ROI, or better a present-value measure, to compare the size of the gain. Finally, we remember what numbers cannot see, such as safety, quality or strategic value, and we say openly when a decision rests on them.

Example: A hospital must replace an old safety system that protects patients. The payback is long and the ROI is low, because the system saves little money. But the decision rests on the risk of harm, and the finance team records that reason openly. That is exactly why numbers must be used well.

At work: Majed's report shows both systems side by side, with ROI, payback and discounted payback, and with a cautious case in which the savings are ten percent lower. The second system still returns more than its price in today's money, about one hundred and seven thousand eight hundred dollars, while the first falls further behind. The director agrees to buy the second system.

Conclusion

ROI shows how large the gain is compared with the cost, and the payback period shows how long our money is at risk. Both are quick and clear, but neither sees the timing of the money or what happens after the payback, so discounting and a worse-case test make them more reliable. A faster payback is not always a better investment. A last check uses three questions: how much, how soon and how sure? The examples here are invented illustrations, so facts and figures should be checked before they are applied.

Sources

- Corporate Finance Institute: Return on Investment (ROI) (definition, time-period limit, different definitions, annualized ROI) – https://corporatefinanceinstitute.com/resources/accounting/return-on-investment-roi/
- Corporate Finance Institute: Payback Period (calculation with uneven flows, advantages, limits such as ignoring cash after payback and the time value of money) – https://corporatefinanceinstitute.com/resources/accounting/payback-period/
- Corporate Finance Institute: Net Present Value (NPV) (decision rule for discounted cash flows) – https://corporatefinanceinstitute.com/resources/valuation/net-present-value-npv/
- The cold-storage systems, prices and savings are invented for teaching. The discounted figures were calculated by us at an eight percent rate and are not statistics.

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