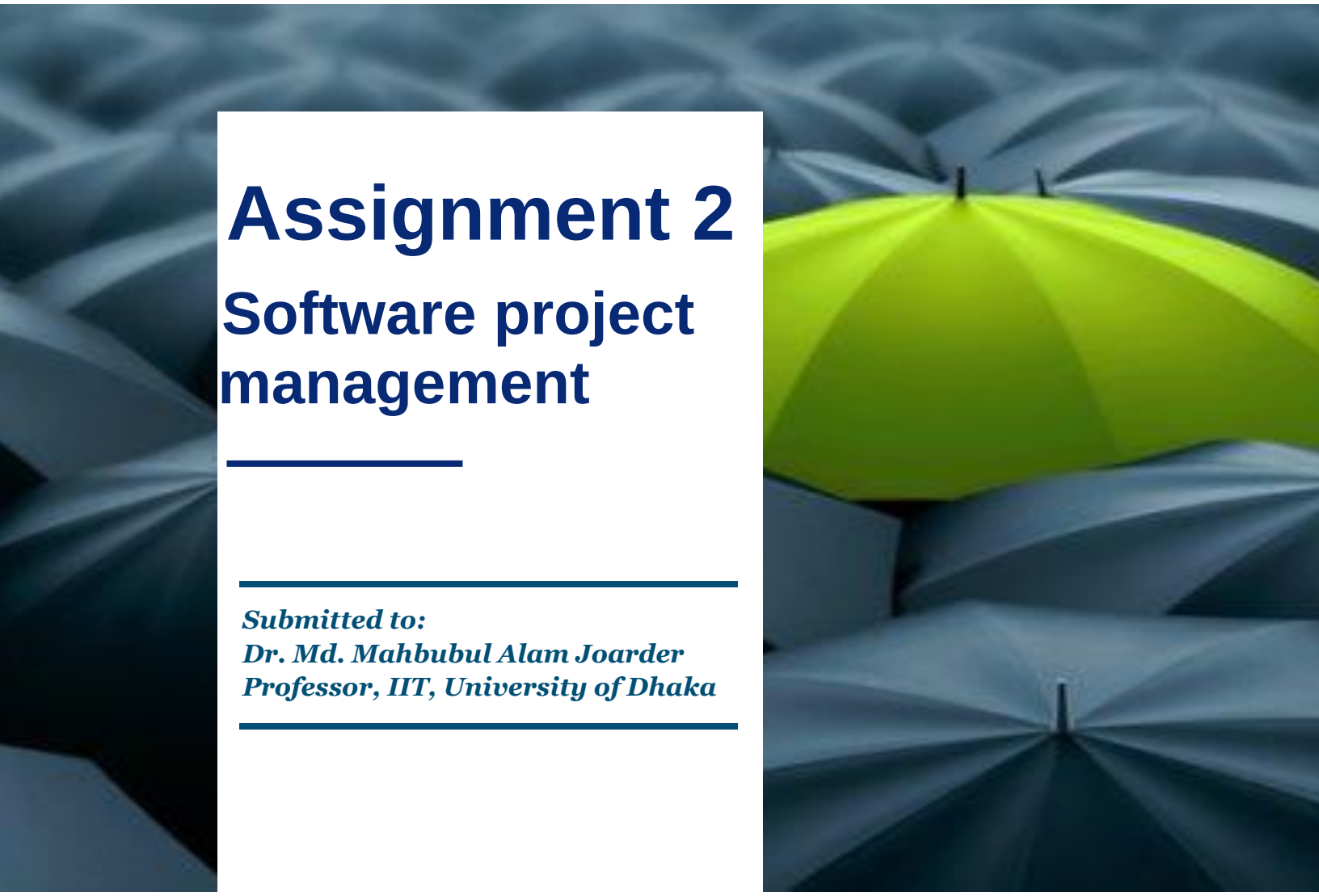

Assignment 2

Software project management

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Q1: Why timevalue is not considered in payback period?

Answer: The payback period refers to the amount of time it takes to recover the cost of an investment. It is the cost of the investment divided by the annual cash flow. The shorter the payback, the more desirable the investment. Conversely, the longer the payback, the less desirable it is. For example, if solar panels cost $5,000 to install and the savings are $100 each month, it would take 4.2 years to reach the payback period.

But there is one problem with the payback period. It ignores the time value of money (TVM), unlike other methods of capital budgeting such as net present value (NPV), internal rate of return (IRR), and discounted cash flow. It is determined by counting the number of years it takes to recover the funds invested. For example, if it takes five years to recover the cost of the investment, the payback period is five years. Some analysts favor the payback method for its simplicity. Others like to use it as an additional point of reference in a capital budgeting decision framework.

As a tool of analysis, the payback method is often used because it is easy to apply and understand for most individuals, regardless of academic training or field of endeavor. When used carefully to compare similar investments, it can be quite useful. As a stand-alone tool to compare an investment, the payback method has no explicit criteria for decision-making except, perhaps, that the payback period should be less than infinity. The time value of money can be rectified by applying a weighted average cost of capital discount. An implicit assumption in the use of the payback method is that returns to the investment continue after the payback period. The payback method does not specify any required comparison to other investments or even to not making an investment. The analysis is focused on how quickly money can be returned from an investment, which is essentially a measure of risk. Thus, the payback period can be used to compare the relative risk

of projects with varying payback periods. It is especially useful for a business that tends to make relatively small investments, and so does not need to engage in more complex calculations that take other factors into account, such as discount rates and the impact on throughput.

Q2: When is Net Present Value (NPV) and the Economic Value Added (EVA) are equal?

Answer: NPV is simply the sum of present values of the cash flows of a financial project. Let CF_0, CF_1, ..., CF_n be the cash flows of a project to be paid or received in s = 0, 1, ..., n, and let i be the opportunity cost of equity. EVA is defined as the period (yearly) operating profit net of the cost of all the capital needed to produce those earnings. in calculating the discounted EVA, do not count the principal cash flows, i.e., ignore the capital outlays and paypacks. Capital is accounting for by a per period "rent", while NPV does not charge explicitly for the capital other than through the differences between the value of cash today vs. cash tomorrow. The similarities between these metrics is that, **discounted EVA is equal to NPV. Not approximates, equals.**

Assume an initial capital outlay c_0, and payment receipts p every period until time T, discount rate r, and a return of the initial capital outlay. The NPV is thus the following:

$$NPV = -c_0 + \sum_{t=1}^{T} \frac{p_t}{(1+r)^t} + \frac{c_0}{(1+r)^T}$$

EVA is simply:

$$EVA = p - c_0 r .$$

The formula for discounted EVA, is:

$$discounted\ \text{EVA} = \sum_{t=1}^{T} \frac{p_t - c_0 r}{(1+r)^t}$$

Proof of discounted EVA=NPV:

$$\sum_{t=1}^{T} \frac{p_t - c_0 r}{(1+r)^t} = -c_0 + \sum_{t=1}^{T} \frac{p_t}{(1+r)^t} + \frac{c_0}{(1+r)^T} \qquad \text{SVA} = \text{NPV}$$

$$\sum_{t=1}^{T} \frac{-c_0 r}{(1+r)^t} = -c_0 + \frac{c_0}{(1+r)^T} \qquad \text{eliminate common } p_t$$

$$\sum_{t=1}^{T} \frac{-r}{(1+r)^t} = -1 + \frac{1}{(1+r)^T} \qquad \text{cancel } c_0$$

$$-r\sum_{t=1}^{T} \frac{1}{(1+r)^t} = -1 + \frac{1}{(1+r)^T} \qquad \text{factor out the r on the LHS}$$

$$-r\left(\frac{1}{r} - \frac{1}{r(1+r)^T}\right) = -1 + \frac{1}{(1+r)^T} \qquad \text{use the annuity formula on LHS}$$

$$-1 + \frac{1}{(1+r)^T} = -1 + \frac{1}{(1+r)^T} \qquad \text{multiply through by r on the LHS}$$

QED

Q3: What is the physical significance of Economic Value Added (EVA) especially in decision making?

Answer:

Economic value added (EVA) is an internal management performance measure that compares net operating profit to total cost of capital. Stern Stewart & Co. is credited with devising this trademarked concept.Economic value added (EVA) is also referred to as economic profit.

The formula for EVA is:

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EVA = Net Operating Profit After Tax - (Capital Invested x WACC)
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As shown in the formula, there are three components necessary to solve EVA: net operating profit after tax (NOPAT), invested capital, and the weighted average cost of capital (WACC) operating profit after taxes (NOPAT) can be calculated, but can usually be easily found on the corporation's income statement.

The next component, capital invested, is the amount of money used to fund a particular project. We will also need to calculate the weighted-average cost of capital(WACC) if the information is not provided.

The idea behind multiplying WACC and capital investment is to assess a charge for using the invested capital. This charge is the amount that investors as a group need to make their investment worthwhile.

For example, Assume that Company XYZ has the following components to use in the EVA formula:

NOPAT=$3,380,000 Capital Investment = $1,300,000 WACC = .056 or 5.60%

EVA = $3,380,000 - ($1,300,000 x .056) = $3,307,200

The positive number tells us that Company XYZ more than covered its cost of capital. A negative number indicates that the project did not make enough profit to cover the cost of doing business.

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Economic Value Added (EVA) is important in decision making because it is used as an indicator of how profitable company projects are and it therefore serves as a reflection of management performance. The idea behind EVA is that businesses are only truly profitable when they create wealth for their shareholders, and the measure of this goes beyond calculating net income. Economic value added asserts that businesses should create returns at a rate above their cost of capital The economic value calculation has many advantages. It succinctly summarizes how much and from where a company created wealth. It includes the balance sheet in the calculation and encourages managers to think about assets as well as expenses in their decisions.

However, the seemingly infinite cash adjustments associated with calculating economic value can be time-consuming. And accrual distortions can still affect the measure, particularly when it comes to depreciation and amortization differences. Also, economic value added only applies to the period measured; it is not predictive of future performance, especially for companies in the midst of reorganization and/or about to make large capital investments.

The EVA calculation depends heavily on invested capital, and it is therefore most applicable to asset-intensive companies that are generally stable. Thus, EVA is more useful for auto manufacturers, for example, than software companies or service companies with a lot of intangible assets.