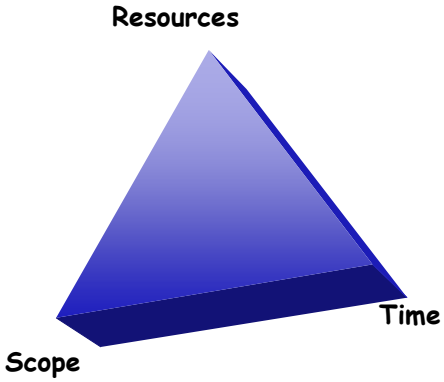

Understanding Project Value

Planning Session 4	Understanding what Value Is
Planning Session 7	Decision Making Strategies: Quantitative

Topic 2:
Understanding what Value Is

"To realize the value of one millisecond, ask the person who won a SILVER medal in the Olympics" -Anonymous

The quote above is part of a longer quote that deserves a special mention. The whole quote goes as such:

> "To realize the value of **ONE YEAR**, ask a student who failed a subject.
> To realize the value of **ONE MONTH**, ask a mother who gave birth to a premature baby.
> To realize the value of **ONE WEEK**, ask the editor of a weekly newspaper.
> To realize the value of **ONE HOUR**, ask the lovers who are waiting to meet.
> To realize the value of **ONE MINUTE**, ask a person who missed the train.
> To realize the value of **ONE SECOND**, ask a person who just avoided an accident.
> To realize the value of **ONE MILLISECOND**, ask the person who won a silver medal in the Olympics."

The quote as a whole shows the importance of time from the perspective of various people. To these people, time is valuable to them; but then again, what is value? Value refers to the importance a person give to something, someone or some situation. A simple object like a Number 2 Mongol pencil will be of little value to a grade school student but for a high school student who is about to take a college entrance exam and has lost his pencil, he might be desperate enough to pay twice the original amount just to get a hold of one.

From a business perspective, **value** is defined as how a customer perceives a product or a service by another entity and how much the customer is willing to pay for it. (Business Process Change, Harmon) The higher his perception, the higher the value of the system in the eyes of the customer, the higher the amount a customer is willing to shell out. It is the customer who defines value and it differs from customer to customer.

From an IT perspective, defining the value that an information system gives to a company has been the bane of IT managers. To demonstrate value, a good IT manager must be able to translate the benefits of the system he is proposing in business terms like cost savings, revenue gain, customer retention, employee empowerment, etc. He must also be able to determine if the system that he is recommending is appropriate for the company.

One way to demonstrate value is to identify the "perceived value" of the proposed system from the perspective of the stakeholders. To get the "perceived value" of the proposed system, the IT manager must ask those who will be impacted by the new system and gather qualitative information as to how the proposed system will benefit them. The stakeholders might say that the new system will help them make their work easier or faster or they might say that will be able to get the report faster. Sometimes though this "perceived value" is often misleading and should serve as a starting point for further investigation.

A more structured way to demonstrate value of an information system is to describe how the company do things now without System X — e.g. how long it took to generate reports, where are the bottlenecks in the process, how much manpower was wasted to execute the task — versus how they will do things with the introduction of System X.

Of course all of these benefits must outweigh the cost of developing the system. One must always ask, "Is the benefit that I will get out of developing this new system greater (in some way) compared to the cost of developing the system?" Generally, we want to know the direct or indirect, positive or negative, contribution of the information system to the company's bottom line. (http://www.customervaluecenter.org/bcva02b1.html).

Case Study 1: PDA for a Pizzeria

In an attempt to harness alternative revenue opportunities for the Society of Jesus, Fr. Nebres has decided to build a 25-seater pizzeria within the Ateneo campus. It is strategically located at the ground floor of the Pangilinan building to attract students, faculty and visitors of the Loyola Schools. Since Father Nebres was able to tap a Jesuit originally from Italy to head the kitchen staff, the pizzeria has become so popular that it has started to attract patrons outside the Ateneo.

A year after the pizzeria open, Fr. Nebres has been increasingly frustrated with the service in the restaurant. He noticed that wait staff took long to take customer orders. And he has frequently heard complaints from customers that they are getting the wrong pizza or one with missing ingredients. In fact, during a recent visit of Manny Pangilinan to the establishment, he received a Hawaiian pizza when in fact, he ordered a 4 Cheese pizza. Fr. Nebres struggled to hide his disappointment with the staff for mishandling the VIP's order.

Upon the recommendation of JGSOM Dean Rudy Ang, Fr. Nebres asked Mr. Chris Tiu to analyze the root cause of the problem. After a thorough investigation, Chris concluded that the wait staff lacked familiarity with the menu (and the choice of toppings available for the pizza). Moreover, the wait staff's handwriting is so bad that the kitchen staff often misread customer orders.

Fr. Nebres recalled the time when Dr. Queena-Lee Chua and himself dined at a casual dining restaurant where the wait staff used a PDA to take orders and transmit them to the kitchen. He believed that such a system is the solution to the pizzeria's issue. They could even roll out the system in the new branches in other Jesuit schools that they might open 2 years from now.

Fr. Nebres bumped into Mr. while walking along Edsa walk. Fully aware of Mr. Olpoc's expertise in MIS, Fr. Nebres asked Mr. Olpoc to lead the development of the PDA order taking system for the restaurant.

Q1: Do you think that there is value to having a PDA order taking system for the restaurant?

What are your thoughts?

Case Study 2: Creating a Payroll System

Mrs. Tantoco started a tutorial service for grade school students five years ago. She had seven employees then; and most of the administrative processes, including payroll, was done manually. Due to the success of her tutorial business, Mrs. Tantoco decided to open a pre-school in the same property. This has increased the number of employees under payroll, which now stands at 100. Mrs. Tantoco's accountant has started using Microsoft Excel to processes employee payroll, but finds it still very cumbersome. Mrs. Tantoco has asked your group to develop a payroll system for the company.

Q2: Is there value to having a payroll system for Mrs. Tantoco's company?

What are your thoughts?

Case Study 3: An Online Job Posting System for Blue Collar Workers

A group of recent Ateneo JGSOM graduates wants to establish an online job posting service (ala Jobstreet.com) for blue collar workers – household help, construction workers, maintenance crew, salespeople and factory workers. They plan to charge potential employers PhP 4,000 per job posting, while applicants can avail of the service for free. In order to ensure applicants' accessibility to the system, they will be installing kiosks (computers) in Barangay Halls. They will be responsible for providing the computers in each of the barangays as well as technical support. 50 Barangays will be selected for this service's first year of operation. Some barangays have already expressed interest in the idea.

Q3: What are your thoughts?

What are your thoughts?

Topic 3:
Decision Making Strategies: Quantitative

"To realize the value of a second, as the runner who came in second place (or something like that)" -Anonymous

Let's assume that for being a wonderful student, the university president offers you a PhP 10,000 cash award. You have two options, to receive the cash now or two years from now. Which would you prefer? Almost all of you would rather receive the money now. Why would you defer the payment when you can have it now, right? Is it just because you are cash-strapped or selfish? There's actually a more fundamental reason behind it.

Putting complex economic theory aside, PhP 10,000 today may not be the same as PhP 10,000 two years from now. For one, you could invest the cash today and earn interest over time, thereby increasing its value in the future.

Example. Assume that Pedro received PhP 10,000 today. If he chose to deposit the money in a savings account that earns 1% interest per annum, he would have 10,100 a year from now – that's 10,000 * 1.01. Had he chosen to receive PhP 10,000 a year from now, it would have resulted to an opportunity loss of PhP 100.

Future Value

Knowing how much an investment is worth after a certain period of time is the same as knowing its future value. Let's try to arrive at the formula for future value…

Suppose you are to invest PhP 10,000 in a certain fund that earns an interest of 4% per annum. To know how much your investment would be four years from now, you would perform the following calculation:

PhP 10,000 * 1.04 = 10,400 * 1.04 = 10,816 * 1.04 = 11,248.64 * 1.04 = 11,698.59

Simplifying the calculation, it's PhP 10,000 * $(1.04)^4$ = 11,698.59

Formula. Future Value = Present Value * (1 + Interest Rate per Period) $^{\text{Number of Periods}}$

In Short. $FV = PV * (1+r)^t$

Present Value

Now suppose someone asks you how much money he needs to invest at a fund that earns an interest of 4% per annum if he wants to have PhP 11,698.59 in four years? PhP 10,000, you say. This is the concept of present value at work – determining how much

you need to invest today, or at year 0 in financial lingo, to realize a certain monetary value after a certain period in time.

Going back, of course, it's PhP 10,000 because of the example presented earlier. But how do you solve for it mathematically?

Recall the formula for future value:

$$\text{Future Value} = \text{Present Value} * (1 + \text{Interest Rate per Period})^{\text{Number of periods}}$$

Now let's plug in what we have:

$$\text{PhP } 11{,}698.59 = \text{Present Value} * (1 + 0.04)^4$$

Doing some mathematical manipulation we can arrive at:

$$\text{Present Value} = \frac{\text{PhP } 11{,}698.59}{(1 + 1.04)^4} = \text{PhP } 10{,}000$$

Formula.

$$\text{Present Value} = \frac{\text{Future Value}}{(1 + \text{Interest Rate per Period})^{\text{Number of Periods}}}$$

In Short.

$$\text{Present Value} = \frac{FV}{(1 + r)^t}$$

This proves that present value is actually just the reverse of future value. Said another way, when computing for the present value, you are actually subtracting the accumulated interest from the future value. Using more financial terms, you are discounting the future value by the interest rate for the period.
From time to time, you'll be encountering the term discount rate. Simply put, it's just the "interest rate" used when computing for present value. So interest rate is for future value, while discount rate is for present value. The interest rate increases the present value to a future value, while the discount rate decreases the future value to a present value.

Let's check for understanding: If by some stroke of luck, you have PhP 10,000 in your wallet right now. What is its present value? PhP 10,000 of course, as that is its value if you spend it right now!

But if you are to receive PhP 10,000 two years from now, and if you understood the concepts, you should be able to conclude that its value is not PhP 10,000 today. For one, you do not have the cash in your hands today. So to arrive at its present value, you would have to pretend that you need to invest a certain sum now to realize PhP

10,000 two years from now. Rephrasing it a little, it's how much you need to invest today to receive PhP 10,000 in two year's time. Assuming a prevailing interest rate (or discount rate, since we are computing for present value) of 5% and applying the present value formula, you should arrive at the following calculation:

$$\text{Present Value} = \frac{\text{PhP } 10{,}000}{(1 + 1.05)^2} = \text{PhP } 9070.30$$

Now let's revise the basic scenario a little. Suppose the university president gave you these two options: you can have PhP 12,000 two years from now or PhP 10,000 today. Which would you choose? Consider that even if you invest the entire PhP 10,000, there is a possibility for you to have less than PhP 12,000 two years from now.

This is more challenging: how can you do an accurate comparison if one figure is in future value and then the other is in present value. You then have to ensure that both amounts are in future value or in present value. Let's follow financial analysts, and go for present value. Some justify the decision of going through the present value route saying that after all, we are always living in the present.

What's lacking before we can proceed with the calculation? The interest rate we'll use. And where do we fish this discount rate (notice that I'm starting to use the correct terms this time) from? More likely than not, from the prevailing market interest rate, simply because at the average, that would be the one used if we were to invest the money in most investment vehicles (e.g. savings accounts, bonds, etc). Let's assume a rate of 3%.

$$\text{Present Value of } 12{,}000 = \frac{\text{PhP } 12{,}000}{(1 + 1.03)^2} = \text{PhP } 11{,}311.15$$

This means that at prevailing interest rates, we would need to have PhP 11,311.15 today to have PhP 12,000 two years from now. A present value of PhP 11,311.15 is higher than PhP 10,000. In effect, with a 3% discount rate, you're better off then waiting for the PhP 12,000 grant two years from now than receiving the PhP 10,000 today.

Net Present Value

Now let's do one final modification to our basic scenario. Suppose the university president told you that for being a wonderful student, he's offering you an exclusive investment opportunity. If you will place PhP 10,000 in the University Growth Fund, you will have PhP 12,000 two years from now. The discount rate is 3%. In chart form, it is as follows:

Year	0	1	2
Costs	10,000	0	0
Benefits	0	0	12,000

Is it a worthwhile investment? For those of you who have understood the concepts previously discussed, your answer would be yes, not only because it's a trustworthy Priest (or Father or Brother) doing the sales talk, but because it makes sense from a present or future value perspective. From a present value (PV) perspective, the present value of the total benefit of 12,000 is 11,311.15, which outweighs the present value of the cost, which is 10,000. In fact, your net gain, that is the difference between the present value of benefits and costs, is 1,311.15. In this case, 1,311.15 is the net present value!

Formally defined, net present value (NPV) is the expected net monetary gain or loss of an investment, calculated by discounting all projected future cash inflows and outflows to the present point in time.

Projects are investments – you incur a certain cost expecting that you will be reaping a substantial benefit that is often spread over a period of time. Cash inflows are the projected monetary benefits; cash outflows are the projected monetary costs. The higher the net present value, the more the benefits outweigh the costs in a project. And connecting this to the cost-benefit analysis, only investments that have a positive NPV, that is those in which the benefits are greater than the costs, should be pursued.

Some might be wondering why net present value is used, instead of net future value for investments, therefore for projects as well. One answer is that almost all projects have an initial investment, or a large cost, at year zero – and this cost is often the main financial hurdle towards starting a project, and the reason why project proposals are subject to much scrutiny. It makes sense then to compare all future benefits and costs against this initial cash outlay, and hence present value is preferred.

Example. Suppose project proposal Alpha has the following projected costs and benefits. Assume a discount rate of 10%.

Year	0	1	2
Costs	5,000	100	0
Benefits	0	3,000	5,000

Note that:

Total Costs = 5,100
Total Benefits = 8,000

Compute for its net present value: First, get the present value of the costs and benefits.

Year	0	1	2
PV of Costs	5,000	90.91	0
PV of Benefits	0	2,727.27	4,132.23
PV of Benefits – Cost	-5,000	2,636.36	4,132.23

Then, get the difference between the present value of total benefits and total costs. Total PV Benefits – Total PV Cost = 1,768.60. This is the net present value.

Other pertinent figures include:

Total PV Costs = 5,090.91
Total PV Benefits = 6,859.5

How do you interpret this calculation? Basically, at the prevailing market interest rate of 10%, assuming you won't do the project and invest the money somewhere else, you would need 6,859.50 worth of investment today to realize the 3,000 and 5,000 gains for years 1 and 2 respectively promised by the project. Compare it to the 5,090.91 actually required in present value to implement the project. The opportunity cost for implementing the project is defeated by the project cost, and hence the project is financially sound.

Who provided the 10% discount rate, some might ask? It's usually provided by the finance department – and for the curious, it is usually provided to you during exercises and examinations. The discount rate is the interest rate in which the finance department is confident it can safely get for cash via its assortment of investment vehicles. For a project to seem more financially appealing than the other investment vehicles considered by finance, it should 'beat' this discount rate. Hence, the discount rate is sometimes called the hurdle rate as well. Going back to the example above, finance believes that it can get an interest rate of 10% for the companies' cash, thus it set 10% as the discount rate. The project proved, however, that its returns are higher than the hurdle rate – as finance would have required 6,859.50 of investment at a 10% rate whereas the project only required 5,090.91 to deliver the same projected benefits, spread over two years at 3,000 and 5,000 respectively.

At this point, some of you might also be wondering why the present value of both costs and benefits, not just the benefits, are needed. Again, this is so we can do an accurate comparison. If we want to compare projected costs and benefits versus the initial investment or cost (at year zero), then all projected amounts must be converted to present terms or value, regardless of whether they are benefits or costs.

Formula.

$$\text{Net Present Value} = \text{Summation of } \frac{\text{Future Value}_{\text{period number}}}{(1 + \text{Interest Rate per Period})^{\text{period number}}}$$

where future value is the net of cash inflow and outflow for the period.

Restating the formula, net present value is the difference between the present value of benefits and the present value of costs.

Suppose then your available cash allows you to choose only between one of two project proposals to approve. If you are to use the concept of net present value, you would choose the proposal with the higher NPV.

Return on Investment (ROI)

Now that you've calculated the net present value of a project, you already have an idea whether its benefits outweigh the costs, meaning the net gain the project brings in present value terms. If you want a better gauge of how high the net gain is compared to the cost of the project, then this ratio is for you.

Formula.

$$\text{Return on Investment} = \frac{\text{Total PV Benefits} - \text{Total Discounted Costs}}{\text{Total Discounted Costs}}$$

For project alpha, the return on investment calculation is as follows:

$$\text{Return on Investment} = \frac{6{,}859.50 - 5{,}090.91}{5{,}090.91} = 0.35 \text{ or } 35\%$$

Note that a lot of companies have a minimum acceptable rate of return for projects.

Payback Period

One last financial measure to consider is the payback period – how long does it take to recover the monetary investment (cost). Or at what year in the project does the benefits-to-date become greater than the costs-to-date. By benefits-to-date, we mean the total benefits from the start of the project; while by cost-to-date, we mean the total costs incurred from the start of the project. Of course, all amounts must be in present value terms.

For project alpha, the payback period calculation is as follows:

Year	**0**	**1**	**2**
PV of Costs	5,000	90.91	0
PV of Benefits	0	2,727.27	4,132.23
PV of Benefits – Cost	-5,000	2,636.36	4,132.23
PV of Benefits – Cost To Date	-5,000	-2,363,64	1,768.60

Therefore the payback period is 2 years. Payback occurs at year 2.

Note that the primary weakness of the payback method is that it doesn't give a complete picture of the total benefits and costs of the project, as it does not look beyond the payback period.

A Word of Caution. Financial measures should not be the only criteria used to assess projects. Ideally, it should just be one in a set of weighted criteria.

Prepared by Wilson Gan. Latest revision: 25 June 2005.

Discussion on Future Value and Present Value adopted from http://www.investopedia.com/articles/03/082703.asp

Case Study: Mooradian Corporation

You are the project manager of Mooradian Corporation, a venture capital firm, whose mission is to fund start-up companies in the software and IT industry in the Philippines. For the month of August, your company received 3 project proposals with brief description and financial projections as follows:

PROJECT FINDING NEMO: A database that will account and classify all species of sharks, turtles, barracudas and mantas in the open water. This database will help Marlin and Dory find Nemo, a kindergarten clown fish, who was apparently caught by divers in the open seas.

Projected Annual After-Tax Cash Flows	Year 1	$ 50,000
	2	$ 60,000
	3	$ 30,000
	4	$ (5,000)

PROJECT LXG: Mr. M, a very powerful man, wants to recruit team members to his league of extraordinary gentlemen to save the world form evil attacks. The Invisible Man, Mina, Dorian Gray, and Tom Sawyer submitted their resume. Mr. M wants to put up an interactive website where all applicants can post their profile and Mr. M can directly review their credentials .

Projected Annual After-Tax Cash Flows	Year 1	$ 40,000
	2	$ 30,000
	3	$ 25,000
	4	$ 15,000

PROJECT CHARLIE'S ANGELS: Charlie wants to set up an e-learning website for his angels Dylan, Natalie and Alex. This way he can send notes, conduct seminars, track the activities of his 3 angels.

Projected Annual After-Tax Cash Flows	Year 1	$ 55,000
	2	$ 50,000
	3	$ 45,000
	4	$ (1,500)

PROJECT HARRY POTTER: Harry wants to set-up an online social networking service for Squibs to meet, share experiences, spells at the same time ensuring their privacy.

Projected Annual After-Tax Cash Flows	Year 1	$ 30,000
	2	$ 50,000
	3	$ 60,000
	4	$ (10,000)

Assumptions

- Initial investment for all 3 projects is $100,000; required rate of return is 15%
- All projects meet and are integrated with the strategic plan of Mooradian Corporation.
- There are available resources and capital from all projects.

However, the problem is that your project priority team cannot agree on which financial model to employ. Half of the team,"TEAM PybM", suggests using the payback model. The other team, 'TEAM NPV", strongly recommends using the NPV model.

Questions

- Compare the computations of each model and analyze.
- Which project will "Team PybM' choose?
- Which project will "Team NPV' choose?
- As a project manager of Mooradian Corporation, which recommendation on the financial model will you take ? Why? Justify your answer.

Your answer to the questions.