Chapter 25

They started early. By eleven, Rick had finished his presentation. There was no doubt that Don Pederson was impressed. He even said that this know-how will be of great value to UniCo.

Then Jim took the lead, and gave a presentation on the design of a computer system for project management. His presentation centered around the think tank's warnings about the ease with which a too sophisticated system can throw project teams into a nightmare. When he finished, Don did not hold back his praise.

They didn't go out for lunch. Johnny arranged for sandwiches.

Don is not entirely pleased. What he heard this morning dealt with only one aspect of projects. An important aspect, but not the most important one. In Don's opinion the most costly mistakes are made before the execution starts. They are made in the decisions; the decisions about which project to choose, the decisions defining the scope of a project. What he heard this morning was good, exceptionally good. But everything presented was geared to the work of the levels from the project leader down. What about helping the decision process of top managers?

He hesitates. He thinks about how to bring it up, if at all. These people have done an exceptional job, and he doesn't want to say anything that will be interpreted as criticism.

Besides, he already found what he wanted. This group can be trusted to develop new know-how. It would be nice if they were not restricted to just the logistical arena, if they were capable of covering also the financial aspects. Nice, but not mandatory. He decides to raise the issue of investment justification, but if they try to defend conventional methods, he is going to drop it.

"I'm going to spend the rest of the week with the team putting up our new facility here. I certainly can and will use what you have taught me," Don prepares the stage. "Let me ask your advice. Knowing project team leaders, they are going to ask for additional investments."

"Without a doubt," Rick agrees.

"Suppose they ask me for an additional ten million dollars for something that will help us start operations three months earlier. How should I evaluate it?"

"I'm sure that by adopting what we've talked about you can cut more than three months, without any additional investments," Rick says confidently.

"You are probably right," Charlene agrees, "but the question still holds. Suppose that an additional investment can bring forward the completion time of a project, how does one go about evaluating whether or not to invest?"

Don nods. Charlene, being a financial professor, is familiar with this problem, but he doesn't expect much. He has been involved in numerous discussions about investment justification, and nothing came out of them. As a matter of fact, he sometimes found himself frustrated by the inability of financial experts to recognize why he is not satisfied with the conventional methods.

"Why not judge by a payback calculation?" Rick asks.

Don is preparing to answer when, to his surprise, Charlene does. And she hits the nail right on the head. "Payback calculations do not properly take into account the most important factor, the scarcity of money."

Rick is puzzled. So are Jim and Johnny. Don just smiles to himself, waiting for Charlene to continue.

Charlene, being a good teacher, first clarifies the problem. "Rick, when do we face the problem of choosing between two projects? If one of the two alternatives, or both, don't eventually bring more than the investment there is no problem making a decision. So the difficulty is choosing between two good alternatives."

"Correct."

"Now, if both alternatives are good, why do we have to choose? Why not do them both? You see, the need to choose arises only when availability of money is a constraint."

Don is pleased with Charlene's clean explanation. He leans back in his chair waiting to hear more.

"Back to payback period," Charlene continues. "Rick, suppose that you face two alternatives. Both will give you two years' payback, but one requires an investment of one million dollars and the other ten million. Judging by the payback period, these two alternatives look the same, one is no better than the other. But when money availability is the constraint we know that the two alternatives are vastly different."

"For me they aren't," Rick jokes. "One million dollars is out of my reach to the same extent that ten million is." And then, without a smile, he adds, "And I think that for a conglomerate like UniCo, it also doesn't make any difference. One million or ten million does not represent any problem in terms of money availability."

"It does," Don corrects him. "We always have more investment opportunities than available money. Charlene, would you recommend using net-present-value as a criteria?"

"No," she answers. "It is a more sophisticated method, but I'm afraid that it's conceptually wrong."

Don straightens in his chair. That is also his opinion, but up until now, every financial expert tried to persuade them that

net-present-value was the only prudent way to justify investments.

"Net-present-value is the way to translate future investments and income into terms of current money," Don repeats the arguments he's heard so many times. "This method takes into account that interest and inflation exist; that one hundred dollars invested or earned next year are not equal to one hundred dollars invested or earned today. What's wrong with it?"

"You just said it," Charlene answers. "To estimate the value of investment this method uses interest, but we just said that as long as availability of money is a constraint, interest is not the appropriate measure."

"But isn't that what interest is all about." Rick doesn't understand. "If the bank charges me ten percent interest per year, isn't that the price I have to pay for holding the money?"

"Rick, go to the bank, offer to pay them, not ten percent, but twenty. Will they lend you a hundred thousand dollars?"

"Not without collateral," Rick admits, not revealing that is exactly what happened to him yesterday. Before Judith finishes the medical procedures, he may need more than one hundred thousand. Where can he possibly get it?

"You see," Charlene concludes. "The availability of money, which is at the heart of Don's question, has little to do with interest."

"Agreed," says Don. "We at UniCo are not pleased with either payback or net-present-value methods." With little hope, he asks, "Do you have a better alternative?"

"I think so," Charlene answers. "But I'm afraid you won't like it."

"Why not?"

"Because it necessitates developing new intuition."

Everybody waits for her to explain.

"We've just agreed that the availability of money is key for judging between investment alternatives. It is not difficult to prove that time is as important. If time were not part of the equation, if the return were immediate, we would not face any problem. We would invest in one alternative, get the immediate payback, and then invest in the other. We are dealing here with a two-dimensional problem, time and money."

"That's obvious," Don says.

"It is," Charlene agrees, "but we think in terms of time or money. We are not used to thinking in terms of time-money. Look at the methods we just rejected. Payback period is trying to give the answer in terms of time—two-years, three-years payback. Net-present-value is trying to give the answer in terms of money, of dollars. I'm afraid that the answer can only be expressed in terms of time and money, together, not separate."

"I don't understand," Don says.

"Let me give you an example from another field. There are things in reality that are very important. Nevertheless, since they involve summation of multiplications of two different dimensions, we have a hard time understanding them."

"I definitely have a hard time," Johnny interrupts. "Can you repeat that please?"

"Physicists know that one of the most important rules is conservation of momentum. They know that the summation of the masses of all the parts in a system, each multiplied by their corresponding velocity, is conserved, no matter what happens inside the system. Still, people outside physics have a hard time understanding this concept."

"I'm afraid that doesn't help me much," Don grins. "Can you give us a simpler example?"

"Suppose you have a field scattered with rocks. Do you agree that it is interesting to know the effort required to clean the field?"

"For some people . . ."

"How can we evaluate the efforts? We have to know the weight of each rock and the distance of each rock from the nearest border of the field. The effort to remove one rock is represented by multiplying the weight of the rock times the distance to the nearest border. Something we don't have a name for. The effort to clean the entire field is the summation of those multiplications.

"You see, here we have an example of something that can be presented only through a summation of the multiplications between two different dimensions."

"I see," says Don. "And I even vaguely see how it can be tied to the subject of investments. But can you please do it for us."

"Suppose you invest two dollars," Charlene prefers to explain in tiny steps. "After one day, you are invested for two dollar-days. After five days you are invested for ten dollar-days. Does this multiplication of money-time make sense to you?" She is ready to drop the issue in case of a negative response.

"Perfect sense," Don answers. "Please, continue."

"Now suppose that at the beginning of day eleven you invest another three dollars. For how much are you invested at the end of the day?"

"Let me see," Don tries to decipher. "My original two dollars are invested for eleven days, that gives us twenty-two dollar-days. On top of it I invested three more dollars for a day, which means another three dollar-days. In total I'm invested for twenty-five dollar-days. You are right, it is a summation of multiplications. But what's the point?"

"The point becomes clear when I tell you that on the morning of day twelve you got your five dollars paid back. Assume no inflation or interest. Are you satisfied?"

"No, I'm not," Don smiles. "I tied up my money for a period of time, I got back my money, but I didn't get any value for the fact that the money was tied up."

"Exactly." Charlene talks to him as if he is one of her students. "You invested twenty-five dollar-days. You got back your five dollars, but you are still twenty-five dollar-days in the hole. As long as this investment is not returned, you rightfully are not satisfied."

"I got my money back and I'm still in the hole?" Don doesn't get it at first.

They all think about it. "You are right," Don says after awhile. "My investment is actually the summation of dollar-days. By the way, do you have a name for it?"

"I call it 'flush,'" Charlene almost giggles. "To be satisfied, you must make sure that you at least flushed out your investment. I stress it because at the end of the payback period, when everybody tells you to be satisfied that you got your money back, that's exactly the point in time that you are invested the most, when you are the deepest in the hole in terms of dollar-days."

"Now I also understand your warning about not having the intuition," Don says. "We regard money and investments as almost synonymous, but now I see how vastly different they are. They don't even have the same unit of measure. Money is measured in dollars, investment in dollar-days. I have to think about it, it may change our entire investment program."

He looks at his watch. "It's a pity I have to leave now, but I'm sure we'll have many more fruitful discussions. Johnny, can you please show me the way to your president's office? By the way, what does B.J. stand for?"

For much more information on the
Theory of Constraints (TOC)
please visit the web site at:
http://www.goldratt.com

E [illegible] entist, philosopher, a [illegible] nd foremost he is a t [illegible] think. Often characterized as being unconventional and stimulating, Dr. Goldratt exhorts his readers to examine and reassess their business practices with a fresh new vision.

CRITICAL CHAIN, a gripping fast-paced business novel, does for Project Management what Eli Goldratt's other novels have done for Production and Marketing. Dr. Goldratt's books have transformed the thinking and actions of management throughout the world.

If you have read THE GOAL and IT'S NOT LUCK you will want to read CRITICAL CHAIN because you understand how Eli Goldratt's books can change how you think about business.

If you have not read THE GOAL and IT'S NOT LUCK, this book will introduce you to Dr. Goldratt's Thinking Processes, and you will understand why Fortune Magazine calls him "a guru to industry," and BusinessWeek describes him as a "genius."

"Like Mrs. Fields and her cookies, THE GOAL was too tasty to remain obscure. Companies began buying big batches and management schools included it in their curriculums. It was eventually translated into 13 languages and sold 1.2 million [now over 2 million] copies."

Fortune Magazine

"The difference between Goldratt and the new age business authors, I guess, comes down to one fundamental element: Goldratt is simply amazing and the others are amazingly simplistic."

Assembly

"A factory may be an unlikely setting for a novel, but the book has been wildly effective."

Tom Peters

"...The only book that [managers] have actually read through over the years is THE GOAL...and the reason they have read it is that it is written as a pacy novel."

Financial Times

"Let me recommend one of the most outstanding business books I have ever encountered. It is called THE GOAL. The book is different from anything I have ever encountered before. Trust me and read it."

Punch Magazine

"...A small but growing number of managers at some of the world's biggest manufacturers are agreeing with him."

BusinessWeek

The North River Press
P.O. Box 567
Great Barrington, MA 01230
(800) 486-2665

$19.95

ISBN 0-88427-153-6
51995>
9 780884 271536