WHY IS RATIONAL DECISION-MAKING
IN NPD PROCESSES SO DIFFICULT?

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"Traffic signals in New York are just rough guidelines."

[David Letterman, US comedian & television host]

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1   INTRODUCTION

According to Cooper (Cooper, 2001), there are at least two ways to win at new products. One way is to do the projects right. Another way is doing the right projects. In recent literature on new product development (NPD), doing the right projects, which is also closely related to portfolio management, has been subjected to more focus. Many senior managers have recognized that their company portfolios suffer from too many low-value projects and equally important, too many projects altogether. Empirical research indicates that there is a lack of ability in many companies to make the tough go/kill decisions (Cooper, 2001, p. 215).

In Cooper's Stage-Gate model, the process that takes place at the gates is in abstract the same as decision-making in theory. First, go/kill decisions upon projects should be made. Then the remaining projects should be put in order of priority and resources should be allocated to them according to their priority. Cooper believes that in order to get the right output of these gate meetings, it is important to base gate decisions on objective rational decision-making, supported by gathered information and predefined checklists. Other authors (e.g. Christiansen & Varnes, 2005a; Feldman & March, 1981; March & Olsen, 2004) question if rational decision-making is really what is going on at gate meetings. Taken this into account, why is it so difficult to carry out rational decision-making in practice at these meetings? Are we at all talking about the fact, that decisions take place within these gate meetings, or has the output of the meetings more or less been decided in advance?

In this project, we will focus on the decision-making that takes place at gate meetings. We find this aspect of NPD interesting and important. From a company survival point of view, it is of course important to focus on the development process and the concept of the new products to be developed, but this is simply not enough to keep a company running.

In companies that have entered the competitive market of new product development, there needs to be projects at different stages of their lifecycle, otherwise companies will not be able to fund newly discovered ideas and projects that are interesting and could give a potential competitive advantage in the future. In long term, a neglect of decision-making and portfolio management can lead to bankruptcy of a company, even though it might have some superior ideas and products on the market.

2 PROBLEM

In this project, we will discuss a selected part of a case that describes a real gate meeting at a company, in the following named PLASTIC. It seems that the output of the gate meeting at PLASTIC is neither predictable nor based on rational decision-making, even though the company states that the Stage-Gate framework and tools are applied. We will try to answer the following two questions based on the PLASTIC case:

- o Why is rational decision-making in NPD processes so difficult?
- o What are the reasons that it is so difficult to make go/kill decisions at gate meetings?

2.1 Approach

We will answer these questions by discussing some of the incidents that take place at this PLASTIC gate meeting:

- o First, we give a short description of Cooper's perception of how a rational decision at a gate meeting should be made.
- o Second, we will discuss and analyze whether the participants at the PLASTIC Company gate meeting behave according to Cooper's rational approach. The identified deviations from the Stage-Gate framework and Cooper's rational approach will be explained through the concepts of rules, rule breaking and guidelines.
- o Third, we approach the PLASTIC gate meeting from a situational perspective and discuss what could be the reasons why decision-making at the gate meeting is not rational in the way Cooper defined it.
- o Finally, we examine the managerial implications that we have identified at the PLASTIC gate meeting and sum up the important conclusions of our project.

2.2 The PLASTIC case

This project is based on a typical gate meeting at PLASTIC. The company employs approximately 5000 people, among them 500 working in R&D. Its main product is polyolefin, plastic raw materials consisting of polyethylene (PE) and polypropylene (PP). PLASTIC is a market leader with a competitive strategy focusing on value adding through innovation in plastic properties and customer services.

PLASTIC has introduced a Stage-Gate process several years ago while just recently a new version of the Stage-Gate model with emphasis on portfolio management for the innovation projects has been introduced (Christiansen & Varnes, 2005a). Gate meetings take place quarterly, and "are formally required to make decisions on single projects and on the portfolio-level of decision-making, including setting priorities between the individual projects" (Christiansen & Varnes, 2005a).

The company uses a status system, which indicates the delay status of every project. The projects are marked red for 2 month or more delay, yellow for delay less than two months and green if on time (Varnes, 2005, pp. 229-232). A rule has been developed which indicates that at gate meetings, only "red" projects are discussed (Christiansen & Varnes, 2005a). To give a picture of the decision-making and the procedures, observations from the meeting are analyzed. The full transcript can be found in the "Selected readings" (Varnes, 2005, pp. 147-159).

3   THE RATIONAL APPROACH TO DECISION-MAKING

Cooper's Stage-Gate Model introduces a framework of tools and rules. However, rules are only half of the truth. In everyday life, there is a distinction between rules and guidelines. While a rule is seen as unbreakable, guidelines give room for interpretation (Olin & Wickenberg, 2001). Rule breaking (or deviation) often occurs because individuals regard rules rather as guidelines. Furthermore, rules can be either general rules or situational rules. General rules form frameworks and are applied for several (reoccurring) situations, where situational rules only apply for one specific situation. Cooper's Stage-Gate Model can hence be seen as a set of general rules, while guidelines and the situational aspect of rules are not addressed in this model.

3.1   Rational decisions at gates

"Gates must work!" (Cooper, 2001, p. 214). A normative approach to select the most promising projects from a given set of new product development projects is proposed by Cooper in the context of the Stage-Gate model. At each gate that separates the previous stage from its successor, go/kill decisions are to be made for every single project individually. This is to ensure that available scarce resources are used effectively for rather fewer but promising projects than being wasted on additional, marginal or even probably unsuccessful projects. Hence, gates are the quality-control checkpoints in the new product development process (Cooper, 2001, p. 214).

At gate meetings, major decisions about the composition of a company's project portfolio are taken. Required inputs are predefined deliverables to provide information that senior management needs in order to make the right decisions on the projects (go/hold/recycle/kill). Actual decisions made at these meeting are based on objective decision criteria, which can be regarded as a set of formal rules. These criteria can be divided into must-meet and should-meet criteria. Must-meet criteria can be verified by simple checklists, while should-meet criteria can be handled with scoring models. For each project, it is to be decided if the project should be stopped or continued. Besides go and kill decisions, projects can be placed in hold status meaning that despite it met the formal criteria, there are currently no resources available. Projects can also be placed in recycle status, meaning a regression to the previous stage (because that stage has not been completed satisfyingly or deliverables are simply incomplete).

To sum up, gates implement a rational choice model that is applied in the new product development process (Varnes, 2005, p. 200). As the basic decision model for gates only focuses

on each project individually, portfolio management techniques like bubble diagrams or portfolio maps must be used to prioritize projects and to avoid pipeline gridlocks due to lack of resources. A criterion for prioritizing projects can be the net present value (NPV) or the expected commercial value (ECV) of the projects. To avoid ineffective use of resources, some active projects might then be moved to hold status. There are different possible approaches to include portfolio management in the new product development process. One is to introduce a two-part decision process at the gates, taking pass/kill decisions on individual projects first, then prioritizing the remaining projects and subsequently take go/hold decisions considering the entire set of projects (Cooper, 2001, pp. 243-251).

3.2   A rule breaking perspective

In this chapter, focus will be on how the gate meeting participants behave according to the rational approach mentioned above. The normative Stage-Gate model defines a framework based on a set of general rules. Unconditional decisions (go/hold/recycle/kill) are to be made at the gate meetings. Comparing Cooper's model with the current practice at PLASTIC, severe deviations can be observed. In this particular meeting, clear decisions other than approbation are rarely taken. None of the discussed projects is actually unconditionally killed. Formal tools like checklists and scoring models are rarely used. The whole meeting resembles more an unstructured discussion than a formal decision process. The usage of portfolio techniques can not be observed, as only single projects are discussed independently from each other. Most strikingly, the time spent on each single project is not sufficient to make any structured decisions (Varnes, 2005, pp. 229-232).

Apparently, this specific gate meeting does not take place in the structured way Cooper has proposed. Some rules are not even known to all participants of the meeting. As an example, the chairman is not even aware of the rule for securing manufacturability (Varnes, 2005, p.148) and therefore he is about to break it. In the rational approach, it is expected that all participants know the rules and follow them. Different knowledge about rules among individuals is of course a problem facilitating deviation, but the biggest problem seems to be that no projects are killed at the meeting.

Most rules at PLASTIC can be discussed and can easily be broken. Defined by Olin & Wickenberg (2001), "a rule is made and maintained by an authority with the purpose of directing behavior and without official acceptance of deviation (rule breaking). A guideline, on the other

hand, differs from a rule in that the authority officially accepts deviation". Hence, many rules at PLASTIC are treated like guidelines that can even be questioned at the gate meetings.

Projects pass the gates even if they do not fulfill the formal criteria. The formal rule of ensuring manufacturability for one new product should have been addressed on the earlier stages (Varnes, 2005, p. 150). This is another sign that the gate meetings at PLASTIC take place in an unstructured way. In previous meetings, formal criteria have been overlooked, because they have not been discussed. According to the Stage-Gate model, the formal criteria of manufacturing should have been met prior.

The color system, which draws attention to delayed projects, also conflicts with the need to do extensive test-runs, which leads to a longer time-to-market (Varnes, 2005, pp. 150-151). According to Cooper, important tests should not be skipped. In the eyes of Cooper, it is never worth compromising quality and increasing risk for the sake of having a shorter time-to-market (Cooper, 2001). On the other hand, skipping these tests can save a lot of time and money, which makes it tempting to break this rule.

To sum up, Cooper might not condone the way the gate meeting at PLASTIC is conducted, because rules are broken here, and this makes the company success random. The decision process at PLASTIC does not seem to be rational.

4   A SITUATIONAL APPROACH

As discussed in the previous chapter, PLASTIC breaks the rules according to Cooper. However, there are other ways to perceive the situation at the gate meeting. March and Olsen (2004) state that rules are not just to be followed, but can be interpreted according to the situation. This perspective explains deviation more from a behavioral point of view. Olin & Wickenberg (2001) recommend that participants should be involved in the rule making process. These situational rules are more likely to be followed because the participants explicitly commit themselves to them.

The situational perspective does not see rationality in the way Cooper does. The behavior of people is explained from the situation, the individuals, personal roles and the rules that apply to a role (March & Olsen, 2004). The result is that you must understand each person's interests and identity in the context in order to explain both the individual and the group behavior. Therefore, there is an explanation for people to break general rules and behave objectively irrational. Breaking rules must not always be seen as inappropriate behavior.

Bearing that in mind, rules are not just rules. Therefore, it is necessary to consider rules, the way they are implemented (Olin & Wickenberg, 2001), and how appropriate they are in a specific situation (March & Olsen, 2004) to ensure rules have the intended impact on the behavior.

4.1   Discussing the PLASTIC case

It is apparently quite difficult for the participants at the PLASTIC gate meeting to make rational decisions according to Cooper and the Stage-Gate approach. If we look at the before mentioned alternative perspectives, some can give an explanation to this.

The Situation

The gate meeting scenario surely gives evident that different individuals apply different identities and roles based on what they find appropriate in that given situation (March & Olsen, 2004). At the meeting, the chairman is unfamiliar with more than one general rule and during the meeting he takes on the role of interpreting these. The rule for securing manufacturability (Varnes, 2005, pp. 148-150) is interpreted in the way that this criterion might exists to make sure that only 'no one can produce it' projects are not continued. For the chairman an appropriate way to act upon this general rule is to interpret the rule, because the rule is not a situational rule and

therefore leaves room for interpretation (as guidelines do). Moreover, the rule is interpreted as a hurdle, which might indicate to his inner motive that he has no interest in killing the discussed project right before the launch stage. The motivational reasons for not killing the project can only be guessed upon, but it is clear, that the chairman applies the rules of appropriateness (March & Olsen, 2004) when acting in this situation.

The rule for manufacturing test runs, which must be addressed in stage 1 or 2, is an obvious example of the fact that some participants perceive this rule as a general rule while others rather consider this a guideline. An example of the former is given below:

> ...*Unidentified participant: "It will require a number of test runs before we accept it as a commercial product…"*
>
> (Varnes, 2005, p.149)

One way of looking at this situation can be that the participant, who actually wants this rule to be followed, has different motivational reasons for doing this. For the citation above, one interpretation of this statement could be that the participant follows the rule to avoid the complexities and confusing environment that could follow by not doing so. It is easier to follow the rules and then blame the rules if something goes wrong. Following rules reduces personal risk of being labeled as a deviant by others (Olin & Wickenberg, 2001). In this case, the rule would then function as an instrument of protection for the participant, who insists on this rule being followed, because of a personal interest in this.

To sum up, whether the individual chooses to follow the rule or not, one way of perceiving this situation is that the individual actually makes a rational decision based on his or her personal belief, goals and political agenda. What Cooper considers a rational decision does not necessarily seem rational to the individual facing a given situation.

Rules

Some rules are more or less appropriate, others need balancing and interpretation. The rule of the color system and the rule concerning the need for three test runs are competing in the way that it is impossible to follow both of them exactly. It is actually impossible for the participants in this situation to make a rational decision. The two rules need interpretation in order to solve the conflict and interpretation is neither rational nor objective. Here these general formulated rules

are rather applied as guidelines with room for interpretation. Another reason for conflicting rules may be that rules become outdated over time, as the rule system is not updated regularly.

Another example is the rule of killing projects with expected NPV below € 2 million. The first estimate is too low for one of the projects to be approved, which leads to the following statement:

> *Business unit manager: "We can easily increase it [the value]"*
>
> (Varnes, 2005, p. 158)

This indicates that even calculative rules that seem very rational at first glance are based on incomplete or inaccurate information. The underlying tacit assumptions also leave room for interpretation. In this perspective, it is not the calculation in itself, but the behavior of the business unit manager using the ambiguity in the information to bend this rule because he wants to support this project.

Individuals and Groups

Individuals and groups can have a personal interest in keeping projects alive. Therefore, each person in the board meeting can be seen as stakeholder with internal motives to keep a project status green. These could be for example to secure a salary bonus or other kind of tangible or intangible reward. A kill decision taken by senior management could also affect the motivation of the employees from external, and this makes kill decisions difficult for management.

> *Chairman: "…you are continuing, I think we will approve the project"*
>
> (Varnes, 2005, p. 149)

In this gate meeting, senior management seems to be very concerned about the motivation of the staff. Even though critical issues have been addressed, the chairman wants to approve the discussed project. At some other points in the discussion, this seems to be the 'default decision'. Senior management shows trust in the staff, and they do not want to interfere too much with the motivation of the employees. It seems that management in this company takes the line of the least resistance and important decisions are often postponed.

4.2 Are the decisions made at the gate meeting?

A general observation in the case is that many decisions are not made at the gate meeting. This raises the question where the decisions are made.

> *Chairman: "We shall take this up outside the forum – it is a very important point..."*
>
> (Varnes, 2005, p.151)

In the Stage-Gate approach, decisions are based on objective decision criteria. As not many objective criteria are used in this gate meeting, what else determines which projects survives and gets the needed resources? Another way to look at this kind of decision-making is taking the project manager's social network into account.

Christiansen and Varnes investigated this case deeper (2005a) and found out that most of the decisions are not made at the gate meetings, but rather at the stages where project managers already create a stable actor network to support their projects. Hence, little decisions are left for the gate meetings. While the Stage-Gate model builds up a strict framework where rules exist to control the progress of the projects and rule breaking is not even considered to exist, practice at PLASTIC suggests that senior management has much more trust in their skilled and experienced project managers. Management at this company relies on the staff to take the right decisions. At gate meetings, these decisions are then only to be officially approved.

If this is the case, the gate meeting can be seen as a signal or a metaphor of following the Stage-Gate model. The interpretation would be that the decisions are made elsewhere than at the gate meeting, and the meeting therefore functions only as a symbol of competence (Feldman & March, 1981). This can lead us in a direction to understand why some rules are not followed.

In an efficiency perspective, making decisions outside the meetings, and senior management approving them afterwards, is much more efficient than discussing every topic at the gate. Even though more efficient, the problem in this process remains that PLASTIC has too many active projects for their available resources.

5 MANAGERIAL IMPLICATIONS

What implications can be made regarding this case at PLASTIC? Bear in mind that the company's biggest problems lie not in how the gate meeting takes place and if it could or should be organized in a more rational way, but that resources are blocked due to a large number of simultaneous active projects. Though management is already aware of this problem and recently introduced portfolio management together with a new Stage-Gate version, apparently the portfolio management part is not yet working. Hence, portfolio management must be enforced in the future.

One way to do so could be to split up the gate meeting into two meetings, one concerned only with pass/kill decisions, the second dedicated to go/hold decisions according to the priority of a given project. So event if few projects are killed in the first meeting, only a predefined number of projects should receive a go in the second portfolio meeting.

Rules for prioritizing and selecting projects must be communicated to every meeting member in advance, so only a small set of situational meeting rules might be used for every portfolio meeting. A limited number of common situational rules are always better than lots of general rules that single members are not aware of, though some general rules may still be needed for these meetings. Furthermore, the importance to focus and to select projects must be communicated to all decision makers so they understand why this is important for the company and can agree on that.

Projects in a hold status are approved and will therefore be continued in the future, even though currently no resources are available for these projects. One should be aware that when a project receives no go during several subsequent portfolio meetings, this could in fact be a kill decision as it then might be too late for this project to be a success because of changed environmental conditions. However, we believe that projects with a strong supporting network will not be in a hold status for a long time. So, this approach introduces competition among all active projects, but in order to use the company's scarce resources effectively, there seems to be no other way.

6 CONCLUSION

It has been shown that a decision situation can be analyzed from different angles. The normative approach with rational choice models like Cooper's Stage-Gate model can only describe how decisions *should* be taken. In realistic situations, *deviation* from these normative rules can be observed. These deviations can be explained by using situational or behavioral approaches.

What are the reasons that it is so difficult to make go/kill decisions at gate meetings? With project members and researchers also being stakeholders in their projects, it is hard to make kill decisions as long as they believe that the project will be a success. Project managers build the supporting networks right at the stages, so that at the gates there is little space left for decisions other than go. Killing project with strong support by an external authority could lead to a profound loss of motivation among employees. As long as a project has a supporting network, it seems that at this company, senior management avoids to make kill decisions. Trust in skilled and motivated staffs as well as conflict avoidance by senior management are therefore the main reasons why kill decisions are so difficult to carry out.

Why is rational decision-making in NPD processes so difficult? Normative approaches do not consider how humans make decisions. Often, individuals are not rational according to these models. So how can one expect that group decisions will be made in a rational way? Group members often find their way around noncompliant rules by questioning them, regarding them as guidelines rather than rules. Conflicting or outdated general rules and ambiguity in information ease this interpretation, as it is impossible, inefficient or at least inappropriate to follow all of these rules strictly. Furthermore, a lack of situational rules and therefore a lack of common conscience among meeting members can lead to unpredictable and unstructured decision situations, as one can not expect that all general rules are known to each group member.

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