

# **Request For Proposal Management**

## **Ask the right questions and choose wisely!**

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### **Abstract**

*Worldwide, many Requests for proposals (RFP's) are sent out every day to even more potential suppliers. In modern RFP's, clients are trying to gather objective criteria, with which they can analyze and evaluate bids from different suppliers. However, the questions asked in these RFP's are often hard to answer for immature organizations, but sometimes even harder to answer by more mature organizations.*

*Sogeti Nederland B.V., a large IT software supplier in the Netherlands, is often struggling to answer RFP questions like:*

- *What is your productivity rate for .Net projects?*
- *What is your standard duration for a project of 1.000 function points?*
- *What is your price per function point for a Java project?*

*Of course, these questions seem like good questions, but in fact these questions are 'unanswerable'. We believe that there is no such thing as a standard productivity rate, but that there are a number of factors, like duration, size and complexity, that together lead to a realistic productivity rate. We could answer a question like: 'What is your productivity rate for a moderately complex java project of 500 function points and a duration (low-level design – acceptance test) of 20 weeks?'. However, these are not the questions that are asked in RFP's, so we have to improvise.*

*This also means that in the software industry, quotations of suppliers are often not realistic. Client organizations should become aware of the questions they should ask in RFP's and they should learn how to evaluate the quotations from the suppliers. In this paper, both topics will be discussed. Participants on the demand side will learn which questions they should ask in RFP's and how to identify the quotations from suppliers that are not realistic. Participants on the supply side will learn about the future in RFP management and the questions that they should be able to respond to in the (hopefully) near future.*

### **1. Introduction**

In Sogeti Nederland B.V., the department of 'Sizing, Estimating & Control' is responsible for the answering of 'Request for Proposals (RFP's)' when the questions involve some kind of metrics based on size. Typical questions involve price per function point and productivity in hours per function point. In today's world, most medium and large companies in the world are involved in some kind of outsourcing. Many organizations believe that outsourcing is the perfect solution for managing a part of the (usually 'non primary') functions in the organization in an efficient and effective way. This may be true for certain tasks that are relatively easy to understand, like for instance catering or security of an organization. In these cases, knowledge transfer from the outsourcing company to the service supplier is relatively easy and the characteristics of the service to be delivered and its price are easy to agree on. IT development projects however are usually very complex. Knowledge transfer from the outsourcer to the supplier is often a difficult task. Outsourcing companies try to select the

right outsourcing partners by trying to compare the different suppliers based on quantitative data. Although this idea is very good, the way it's done in practice is unfortunately quite the opposite. The purpose of this paper is to show the fact that modern RFP management should take into account laws and best practices from software metrics literature. Selecting the best supplier, based on the comparison of objective comparable data, can be the start of a successful relationship between the two organizations.

## **2. Request for proposals (RFPs)**

The Wikipedia definition of Request for Proposal is:

*An invitation for suppliers, through a bidding process, to submit a proposal on a specific product or service [1].*

In many cases, RFP's are also submitted to select outsourcing partners (or 'preferred suppliers') for a period of time. During this period of time, the supplier may or may not do any work agreed upon in the contract. In this paper we will investigate the RFP management for a single software development project, not for a period of time.

In general, the company that sends out the RFP has to provide all the necessary information to the potential suppliers for them to be able to draw up a sound proposal. In general, the following information has to be submitted for an RFP on a specific project:

- Client corporate information
- The bidding process – like deadline for the definitive proposal, but also possible scheduled sessions for asking and answering questions
- The functional requirements that have to be delivered in the system to be delivered
- The non-functional requirements that have to be satisfied, like for instance security requirements and development language to be used
- Decision criteria that the client organization is going to apply to select the most appropriate proposal

It is very important that the information provided is up-to-date and detailed. Especially in the case of fixed-price bids, the proposal offered by the different suppliers usually also have a legal status. This means that when the client selects a specific proposal, the supplier is obligated to deliver the proposal against the price stated in the proposal. Needless to say that more detail in the description of the functional and the non-functional requirements lead to better proposals (as the supplier can reduce its risk percentage due to unforeseen requirement creep) and therefore to better prices.

In Sogeti Nederland B.V., the department of Sizing, Estimating & Control is involved in answering RFP's. The first step is always to size the functional requirements delivered in a RFP in one of the Functional Sizing Methods NESMA [2] or COSMIC [3]. In order to be able to understand the risk in the particular bid, we have developed a method to rate the functional documentation provided by the client from 0 to 10 (10 being 'perfect documentation'). This client documentation rate tells us the applicability of the documentation to the next phase in the project lifecycle. So, when the documentation provided is a functional design, the rate shows us how easy or difficult it will be to draw up a technical design, build it and test it. Sogeti SEC has implemented the client documentation rate in the estimation model that is used to estimate the cost of the project under investigation.

The lower the rate, the more effort we have to estimate in order to complete the documentation.

Practice shows that most of the documentation provided by our clients (which could be considered to be the market average) score below average. For illustration, in table 2.1 you can see the results from the last 10 bids processed in Sogeti before December 2009.

*Table 2.1: Client Documentation Rates for the last 10 Sogeti RFP bids before December 2009, measured with our methodology, rated from 0 (low) to 10 (high)*

<b>Project</b>	<b>Rate</b>
1	<b>4</b>
2	<b>3</b>
3	<b>1</b>
4	<b>1</b>
5	<b>1</b>
6	<b>2</b>
7	<b>4</b>
8	<b>4</b>
9	<b>5</b>
10	<b>5</b>
Average	<b>3</b>

So, although it's absolutely crucial in outsourcing contracts to provide the potential suppliers with a complete and detailed set of requirements, the average Client Documentation Rate is only 3! Needless to say that the different suppliers to these bids are already difficult to compare, as the assumptions made by the different suppliers about the requirements that are missing or not complete are likely to differ enormously.

### **3. Client Issues**

For the party that submits the RFP it's crucial to select the right outsourcing party, and to do so in a legal acceptable way. Of course, the client organization should provide general information like:

- *Schedule of the bid process.* Are there going to be any information sessions for suppliers to ask questions? What date is the submission deadline for the quotation? When will the decision be communicated? What date should the project start?
- *Organizational information.* Who are the responsible persons in the client organization and how is the organization organized?
- *General requirements that a supplier has to meet in order to be allowed to be in the bid process.* An example could be a requirement that the organization must hold a CMMi level 3 certification.
- *Solution details.* Are there any limitations to the solutions that the suppliers have to take into account, like architecture or programming language?
- *Decision criteria.* Which are the criteria that will select the winning bid in an objective way.

When preparing an RFP, the client organization also has to think of the criteria on which it will judge and select the most appropriate outsourcing party. This usually means that they will

have to think of the most important characteristics of the project itself and of the party that will realize it. Characteristics that are usually considered are (not limitative):

- Price
- Quality
- Productivity
- Duration
- Supplier creditability
- Supplier references
- Solution details

To be able to compare the different supplier quotations in an objective way, the questions are usually as quantitative as possible. Typical questions that we encounter in many RFP's are:

#### Price

- What is the price per function point that you offer for the realization (technical design, functional design, coding, unit testing, system testing) of this system in Java?
- What is the price per function point that you offer for the realization of change requests during the projects?
- What is the price per function point that you offer for the maintenance of the system after implementation?

#### Quality

- What is the number of defects per function point that is expected to be detected during systems testing?
- What is the number of defects per function point that is expected to be detected during user acceptance testing?
- What is the number of defects per function point that is expected to be detected during the first three months in production?
- What is the number of defects per function point that are expected to be detected per year after the first three months in production ?

#### Productivity

- What is your productivity in the realization (technical design, functional design, coding, unit testing, system testing) of Java projects?

These questions are impossible to answer if one is familiar with certain models from software metrics literature models. The remainder of this paper will explain why.

## **4. Supplier Issues**

Supplier organizations compete against each other to score the highest on the client's decision criteria, in order to win the contract. As most of the typical questions asked in RFP's are related to metrics expressed in function points, it's important for supplier organizations to have an experience database with historical project data sized in NESMA or COSMIC function points. Without this database, it's quite difficult to answer the questions above, and it's even impossible to defend the answers given objectively.

Depending on the decision criteria that is submitted in the RFP submitted, the commercial people of the supplier will try to ‘bend’ the bid in a way that they think suits the decision criteria best. It’s important however to understand that according to McConnell [4] there is a distinction between target, estimation and commitment. The supplier should be very careful first to estimate the project very thoroughly, before handing over the results to the commercial organization that is going to translate the estimation into a quotation.

## 5. Software Metrics ‘laws’

There are a number of important and relevant software metrics ‘laws’ that are published in numerous books over the years. These laws give us more understanding in the way certain metrics behave. There is for instance the law that indicates that duration of a project is a very important variable that defines the effort needed and therefore the metrics productivity (hours/FP) and cost/FP (figure 5.1) [5].

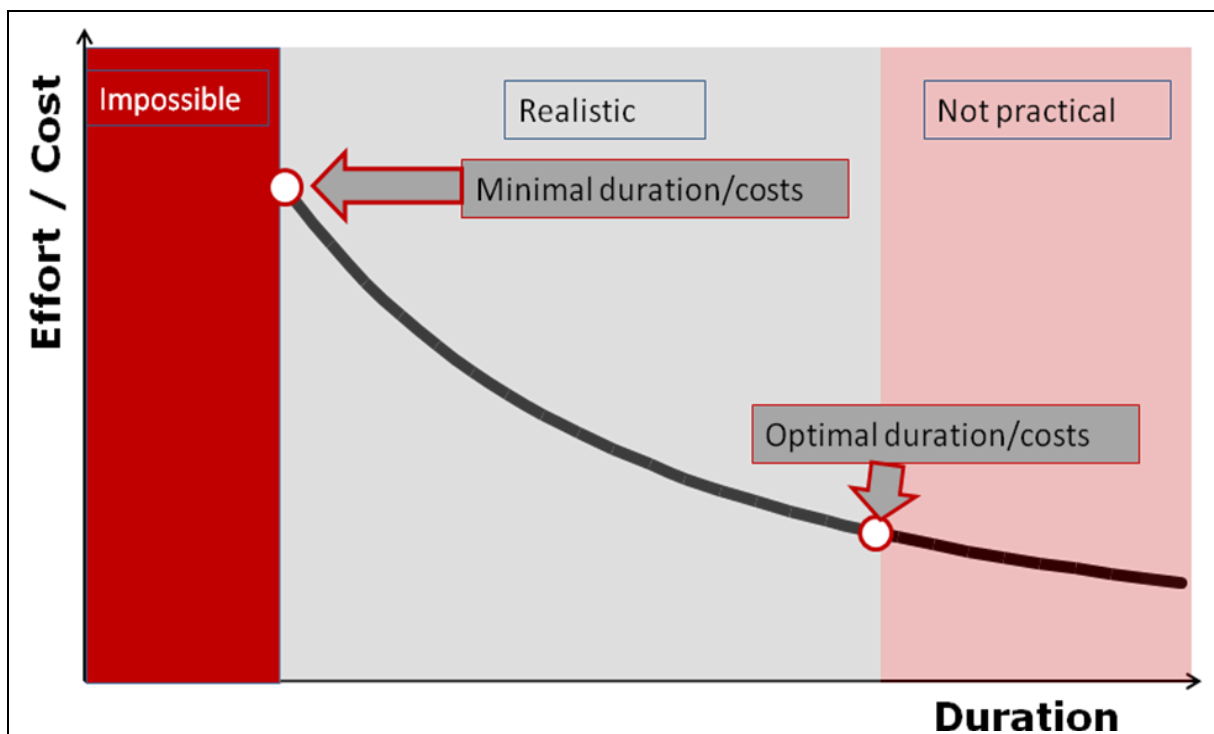


Figure 5.1: Duration vs. Effort/costs tradeoff

When we look at this figure, we see that for every software development project of a given size, it is possible to make a different estimate with regards to cost and effort, depending on the duration chosen. There is an impossible area in which the project simply cannot be done. Also, there is a duration area in which the estimation is not very practical (as the project takes relatively too long, the benefits of the project will be less). The black line that indicates the duration vs. effort/cost tradeoff represents the productivity of a specific organization. This law is based on the fact that to be able to deliver a project in a shorter duration than with an optimal team size, one has to increase the team size to be able to develop faster. However, as for instance ISBSG [8] indicates, the optimal team size of a given project is about 4. Any extra person on the team will reduce the productivity, as more communication paths arise, project management and planning will become more difficult, dependencies will increase, and the number of defects will also increase.

When we look at this figure, we can make the following observations:

- There is an impossible zone in which the project cannot be completed
- The first possible duration indicates the minimal duration/maximum cost scenario
- There are numerous estimations possible on the duration vs. effort/cost tradeoff, each resulting in a different effort/cost estimation and therefore also in different productivity (hours per function point) and cost per function point metrics.
- There is an optimal effort/cost estimation, although it's hard to calculate where
- There is a duration zone in which it's impractical to realize the software, but it's still possible.

So let's consider one of the typical RFP questions that client organizations ask: *What is the price per function point that you offer for the realization (technical design, functional design, coding, unit testing, system testing) of this system in Java?*

First we size the application and it turns out the size is exactly 1.000 FP. After sizing, we use our estimation tools [6][7] and our historical database to derive figure 5.2. Please note that we didn't use our real data here, it's only for instructional purposes.

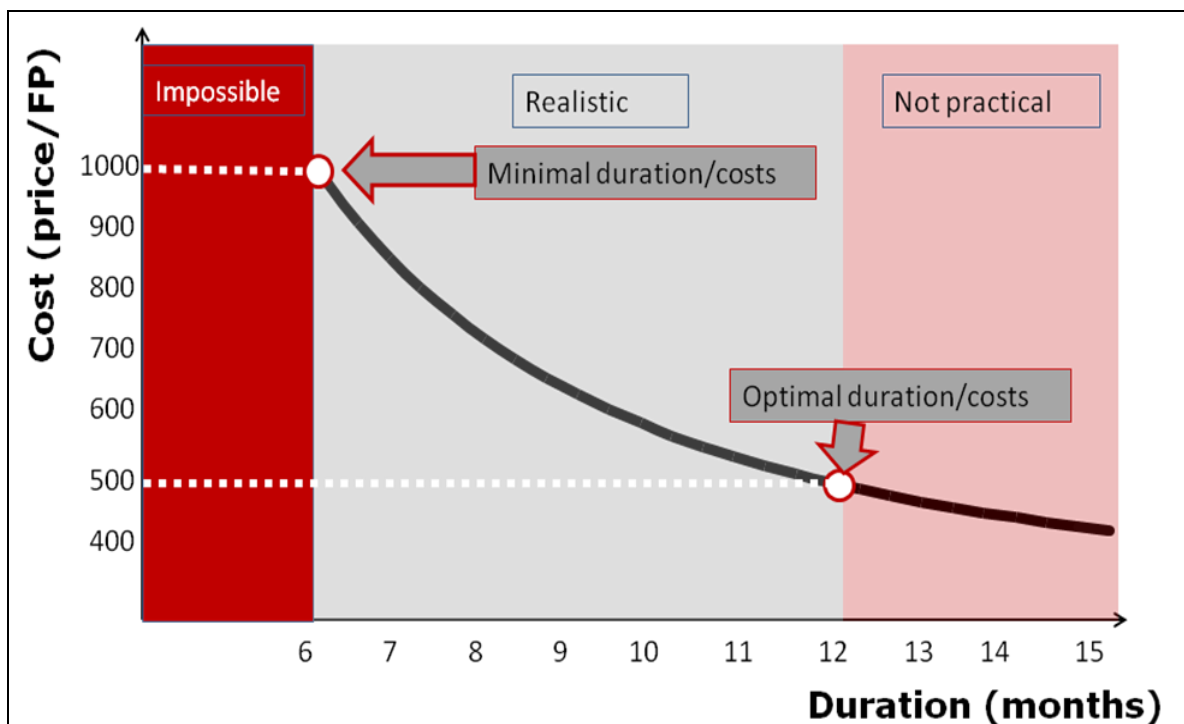


Figure 5.2: Duration vs. Effort/costs tradeoff in a specific bid

So, what would we answer to this question? In fact, the question is unanswerable if we don't know the duration that the client has in mind. If the time-to-market is only 6 months, the answer is 1.000 €/FP. If they have a duration in mind of 12 months, the optimal duration/costs tradeoff can be offered, which is 500 €/FP in this case. The people that are involved in estimating the project, like in our company Sogeti SEC, will report this to the commercial people. The estimate involves a range of 1000 €/FP in 6 months to 500 €/FP in 12 months. The commercial people will probably decide to quote the 500 €/FP in their answer, in order to score points against the decision criteria scheme of the client RFP. They even may go for the 400 €/FP all the way in the impractical zone. However, one should be

aware of the fact that after the project is won, the project has to be carried out against this price. Only then, the negotiations over the duration for the project may start. Of course, this is not a very good way to start the project and probably there will already be problems in the relationship during this investigations. The reason for this: The RFP question was just not specific enough!

Let's consider another software metrics law. This law is described in McConnell [4] and indicates that the project results are very much dependent on the estimation and planning of the project. The relationship is displayed in figure 5.3.

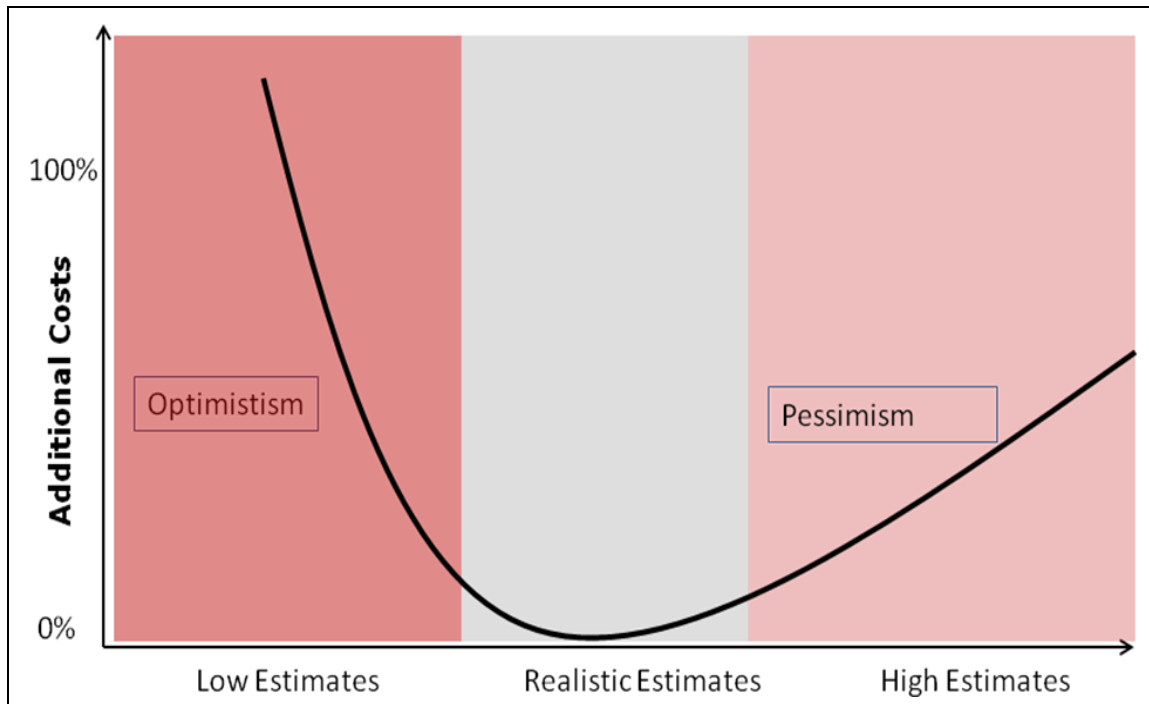


Figure 5.3: Project Estimates and Realization

The figure points out that in case of an optimistic estimation of the project, i.e. regarding the duration of the project too few hours have been estimated, the realized extra costs of the project will be higher in a non-linear way. Causes McConnell gives for this relationship are:

- Planning errors (team size, critical path, etc.)
- Too little time spent on requirements and design and so injecting more defects
- More status meetings, extra management attention, project stress

When the project is estimated in a pessimistic way however, the extra costs of the realized project will rise in a linear way. This is due to 'Parkinson's law [4]' that states that work expands to fill the available time. A second reason is 'student's syndrome' which states that when a project team gets too much time to do a task, they will wait until it's the last possible moment to start with the task and then work really hard to complete it in time.

The implications of these laws are evident. When a client organizations submits an RFP and receives the different quotations of the different suppliers, it's crucial to be able to judge whether the proposals are realistic! Let's look at an example of how things go in day-to-day practice.

### Example 5.1

An organization submits an RFP for a specific project and receives three quotations, A, B and C. The Estimations are shown in the next table figure.

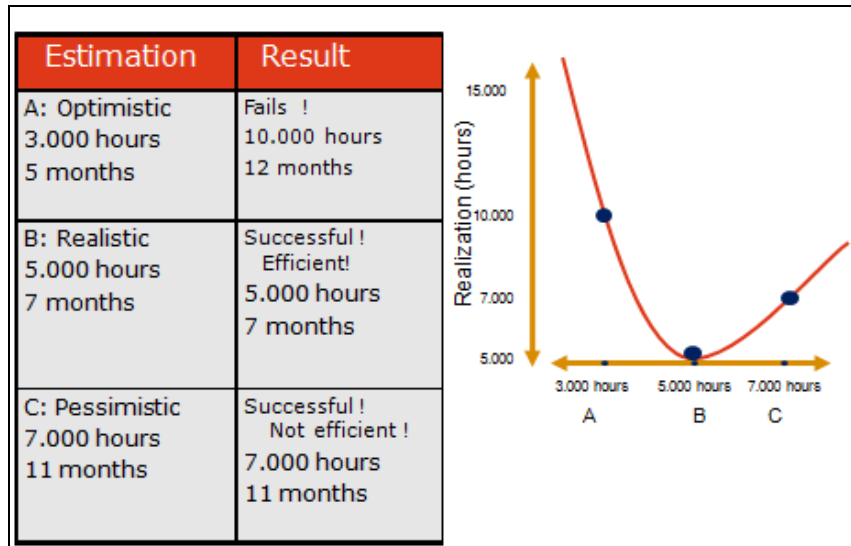


Figure 5.4: Project Estimates and Realization Example

An organization that is not able to recognize that the quotation submitted by Supplier A is unrealistic, may (and probably will) go for this one because it's cheaper and it's faster. The result will be disaster! It's highly questionable if these three quotations are based on the same size. The question now is of course: How can organizations assess whether a quotation is realistic or not?

## 6. Assessing Proposals

There are multiple ways to assess the reality of a proposal. In this chapter we focus on two possible ways: using the QSM SLIM toolsuite [7] and using the ISBSG repository [8].

When an organization possesses the QSM SLIM toolsuite (or a similar tool), it's possible to simulate the estimations in SLIM Estimate. This results in a Productivity Index (PI) that is implied in the quotation. The productivity index in QSM shows the productivity which is corrected with the duration. The black line in figure 5.2 could for instance indicate the  $PI=18,0$  line. Although the number of hours per function point is different on every point on this line, the PI could easily be the same. When the PI that is implied in the Estimate is known, it's possible to assess the reality of the quotation. In QSM it's possible to compare the PI of an Estimate with the average PI for similar projects that are present in the QSM database (over 8.000 projects) or with the PI of the projects that are stored in the organization history project history base. When an implied PI is much higher than the average PI for similar projects in the QSM database, the estimate is probably not very realistic and too optimistic. In that case, the organization should ask the supplier to present proof that they are able to produce software with a productivity that is that high.

A second way to assess the proposal is to use the ISBSG 'New projects & Enhancements repository' [8]. This assessment works basically the same, but the main metric that can be compared here is hours per function point. When this metric is used standalone, we have



already seen in paragraph 5 that the usefulness is very low. However, when also the actual duration and size (and quality) of the project are taken into account when selecting the projects against which the supplier quotations are compared, the usefulness will be much higher. ISBSG also offers a specific tool called the ISBSG Reality Checker [9]. Although input options are at the moment quite restricted (size, platform, language type), ISBSG is in the process of updating the tool to accept more input criteria. The reality check will find the ranges of effort spent and project duration elapsed in which the project estimations much fall to be assessed realistic.

However, as the simulation options in QSM SLIM Estimate are much more sophisticated, it would be recommendable to use this option when the toolsuite is available in the organization.

## 7. Proposals for more effective RFP Management

Now that we have seen some problems that supplier organizations face when trying to answer an RFP, and the implications this has on the ability of client organizations to choose the right partner, let's see which recommendations we can draw up. First let's repeat the type of questions that are often asked:

*"What is your productivity rate for Java projects"*

The main recommendation is very evident. **Make the question as specific as possible.** A better question would already be:

*'What is your productivity rate (hours/FP) for a moderately complex Java project of 500 function points and a duration of 20 weeks?*

However, this question still lacks a lot of context. It's not clear which activities should be included for instance. Will the supplier be in charge of the full lifecycle, or perhaps only technical design, coding and testing? It's crucial to supply this information!

A much better question would therefore be:

*'What is your productivity rate (hours/FP) for a moderately complex Java project of 500 function points and a duration of 20 weeks? Phases to include are technical design, coding, unit testing, systems testing and support of the user organization during the user acceptance test.'*

This last question is easily answerable for suppliers that have a history base with experience project data. For the supplier it's then quite easy to compare the different supplier quotations and also to assess their reality to market averages or history data.

To conclude, good RFP questions contain the following information:

- Metric to compare between competitors, for instance
  - o Productivity (hours/FP, Function points/hour, PI)
  - o Costs (Cost/FP)
  - o Quality (defects per function point, Mean-time-to-defect (MTTD))
- Technology (for instance Java, Oracle or MS.NET)
- Size (in Function Points or COSMIC function points)
- Technical/ Functional Complexity (for instance high/mediate/low)
- Phases/Activities to include (for instance Technical Design, Coding, Unit testing, systems testing).

- Duration requested (days, weeks, months, years)

It may therefore be recommendable to ask the questions in the format of (small) case studies.

## 8. Assesment Example

Let's consider an RFP that is send out by Organization X, containing the following RFP question:

*'What is your productivity rate (hours/FP) for a moderately complex Java project of 500 function points and a duration of 30 weeks? Phases to include are Technical Design, Coding, Unit testing, systems testing and support of the user organization during the user acceptance test.'*

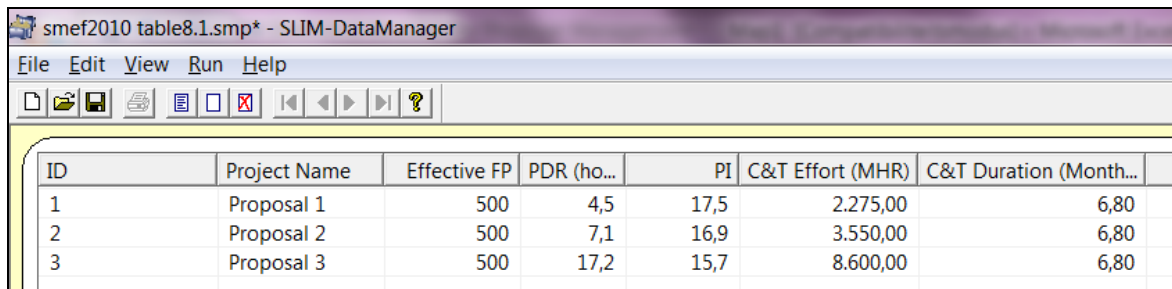
Organization X receives three different proposals, displayed in table 8.1.

*Table 8.1: RFP Proposals*

Proposal	Productivity (hour/FP)
1	4,5
2	7,1
3	17,2

## Assessment using QSM tooling

Now, let's see what happens if we simulate the three proposals in QSM SLIM (figure 8.1).



ID	Project Name	Effective FP	PDR (ho...	PI	C&T Effort (MHR)	C&T Duration (Month...
1	Proposal 1	500	4,5	17,5	2.275,00	6,80
2	Proposal 2	500	7,1	16,9	3.550,00	6,80
3	Proposal 3	500	17,2	15,7	8.600,00	6,80

*Figure 8.1: Simulation in QSM SLIM – PI calculation*

QSM calculates the Productivity Index (PI) enclosed in the estimations. Now we can compare the PI with for instance the PI that is reported by QSM based on their 2008 Dataset of Business Projects measured in function points. This analysis can be made in QSM SLIM Metrics. This shows the following:

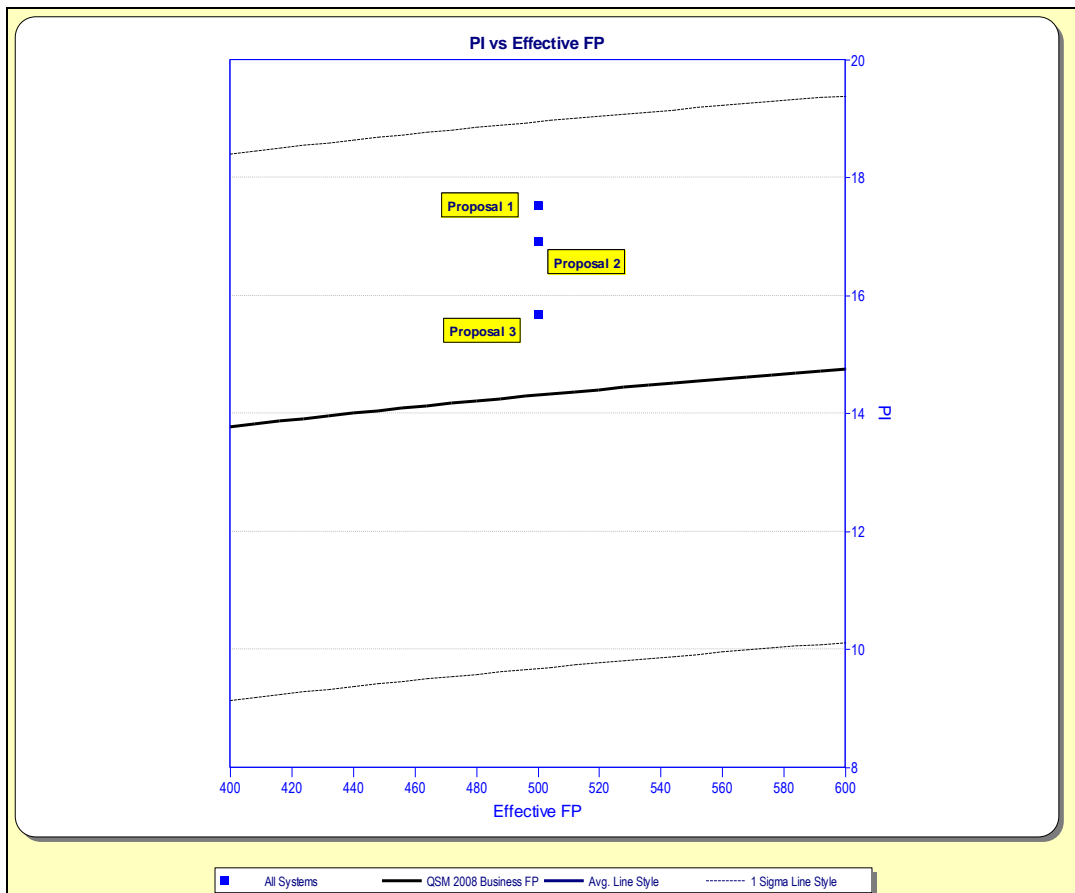


Figure 8.2: Compare proposals to market average

It seems that according to this tool, proposal 3 is the most realistic as it is closer to the PI that may be considered ‘market-average’ (de black line). When the suppliers of proposal 1 and 2 don’t have a good explanation and no proof of the fact that they can deliver software with a productivity that much higher than market average, it would be advisable to choose proposal 3.

## 9. References

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