

# “Enhance accuracy in Software development’s planning & estimation process by adopt “Uncertainty Analysis and Assessment” in the system modeling process” A Review

Kardile Vilas Vasantao

Department of Computer Science, Tulajaram Chaturchand College, Baramati.  
Affiliated by Pune University, Pune, Maharashtra ( India)

**Abstract:** In the process of software project development prediction of effort and estimate it is very challenging task. So it is referred as intricate “brain tester”. Though we have several cost and effort estimating method. We are not got success to find a method which will give accurately estimation of effort for project development. At the early stage of software development effort estimation is done. Where project is not complete, inconsistent, unclear, or uncertain stage. In this stage development team has lot of option of confusion. To avoid such confusion Instead of Unexplained treaties if development team highlight to a understand confidence, Analysis and Assessment it, which will assist to estimation process or help to design and choose development approach. By this method development team can provide beater estimate and provide efficient schedule for complete the project within time and cost with acceptable quality. This paper conveys need of uncertainty analysis and assessment module at the modeling process for assist to recognize modular uncertainty system development process and the role of uncertainty at different stages in the modeling processes.

**Key Words:** software development approach, modeling process Uncertainty, Uncertainty analysis and assessment.

**Introduction:** In the IT services organization used formal and grown-up procedures and tools for the development and deployment of software. Existing methods for software development have lot of options which can be classified into two categories, plan-driven (traditional) and practice-driven (Boehm and Turner 2003; Iansiti and MacCormack 1997).

With the era of rapid advances in communication and information technology, organizations and its development teams have continues pressure to deliver high-quality software and solutions at low cost. Challenges arise due to fast evolving technology and increased competition as companies are under constant pressure to develop new functionalities to satisfy changing client needs and to deliver them in short cycles at low costs. (Iansiti and MacCormack 1997).

Every software devolvement organizations dream goal to develop a software project, within time and cost with acceptable quality. A major difficulty to managing software development project is predict technological changes, clients needs and thus the solutions to clients problems and this wills become strong cause of project failure. in a today’s dynamic environment such as the World Wide Web.

Very often, the client lacks the knowledge and experience to describe their needs, not to mention requirements and specifications. There is evidence showing that effective learning by the client during the initial design phases of a project impacts positively on its success (Wastell 1999; Majchrzak et al 2005). Requirement changes at later stages, which often happen as a result of client learning occurring late in a project, could lead to not meeting client expectations, and budget or schedule overruns (Boehm 1989). Therefore, a rigid project plan becomes less effective in guiding the project team and could result in an obsolete system. Instead, the project team needs to collaborate with the client to help each other learn fast and the development process should be flexible enough to allow frequent changes.

The practice-driven (Agile) methodology is a hub of software development methods that attention on customer needs, shorter development cycle time and accept to changeable requirements. The family includes Extreme Programming (Beck et al 2002), Scrum, DSDM and Crystal Family (Fowler 2005).

Agile method is characterized by a chaotic perspective, collaborative values and principles, and barely sufficient technology (Highsmith 2002). Its foundation incorporate: the individuals and interactions over processes and tools, working software over comprehensive documentation; customer collaboration over contract negotiation; responding to change over following a plan (Manifesto for Agile Software Development). As comparison of the Plan-driven (Traditional) method, the Practice driven (agile) methodology addresses effectively due to its’ closer collaboration in deem knowledge of both the client and the developer by encouraging.

Usually, client representatives are located and work alongside the project team. Instead of working against the plan, frequent changes are embraced to address the client’s changing business needs. As a result the success of project using practice-driven approach hinges on the effective communication skill and correct abstraction formalization of development Team.

In such situation development practitioner and Organization and company has confuse for which approach is abandoning or which adopting because of the strength and weaknesses which will force to learner for accept **“Technology never fail it will fail to produce best result due to opponent opportune.”**

*So if developer get to know at early stage of estimation that which methodology is suited for which module of system then we are able to reduce failure cause of software process.*

The aim of this paper to understand modeling process and uncertainty appearance in particular module for better to estimation process and convey conveys how software development organization can benefit from introducing uncertainty analysis and assessment model into their modeling process.

## Section –II:

**Problem: Design a Process:** In software development process one methodology is not complete solution for all projects. Practice driven (Modern “lightweight” agile) methodologies are gaining ground on more Plan Driven (Traditional “heavyweight”) methodologies. Both have their advantages and disadvantages, and appropriateness where we get best result.

Many project fail because of inaccurate handling design approach or decision made early some time prove to be wrong later on. The most critical and crucial part of software development approach is when planning of design development is required in the early stage of the software life cycle where problem to be solved. Estimated, requirement by user is not completely understand and problem to be solved had not yet been completely revealed. The Major issue that separates the various processes that we looked at is the amount of up-front Planning they require. We can think of this as a spectrum, which at one end has a purely Plan oriented and other end practice oriented question is then for any given situation how do find the right approach.

Alternatively You can find a situation where the approach will give best result for this causes to handle this uncertainty we must be understand Risk handle strategies of each approach. Software Risk although there has been considerable debate about proper definition for software risk, there is general agreement that risk always involves two characterizes: Uncertainty and Complexity (Project Risk, Technical Risk, Business risk, .etc). That will directly affect the Software deployment Process and approach.

There are four broad control factors. This factor s is interconnected when one changes at least one other factor must also change.

- Cost- or Effort. Available money impact the amount of effort put into the system
- Schedule – A Software project is impacted as the timeline is changed.
- Requirements-The scope of the work that needs to be done can be increased or decreased to affect the project.
- Quality – Cut control by reducing quality.

To avoid such problem if we know level and sources of uncertainty in model design, initial phase of development , It will directive the developer to design accurate software cost and schedule estimation. Which are essential for software project success? However once the required efforts have estimated, little is done to recalibrate and reduce the uncertainty of the initial estimates

### Section –III: Modeling process:

**Modeling as a part of Project planning in system development** is one of the most critical activities within the project lifecycle. **Project plan development** is the main part of Project Planning Stage. The project manager takes the responsibility for creating a project plan that is a formal document showing the basis upon which to assess the performance of the project and measure its results. Let's review the steps of **project plan development** in detail.

#### Create the Work Breakdown Structure.

To design project plan, developer will need to settle on the Work Breakdown Structure for project. Which is give detailed list of all the phases, activities and jobs required for successful project completion .In other word we can the Work Break Structure becomes the base for project plan can use it to decide the resources required to deliver each activity or task listed. The WBS allows designer to design simple to-do lists and task lists and then assign them to members of the project team.

#### The benefit of Work Break Structure (WBS):

When designer try to developing a project plan WBS represents the dependencies between tasks. Which is focus on, how each

task is associated with other tasks and what (implicit or explicit) dependencies can be set.

#### 1. Define the Required Resources.

Once the plan and its activities required for deliver to project are situate, next step in creating a project plan is to identify the resources required for each task and activity. WBS showing the possibility of the project which describes resources are required and in which quantities and measures. In this step the project resource base and types of resources will be describe.

Generally project may require Manpower and resources. Designer of plan is calculating how many people S/he should employ to do project and Human and equipment resource.

#### 2. Design a Project Schedule.

After the Work Breakdown Structure is completely design. Designer are able create a project plan in which schedule tasks and deadline for activities listed in the work break structure.

To build a project schedule the following information is necessary:

- Identified tasks and activities and their dependencies (both internal and external)
- Assignments to members of the project team (who will do which task)
- Risk mitigation strategies and a contingency plan Critical milestones
- Allocated resources required for the project

Designer can design a project schedule on the basis on that information which is described at last two step of project plan development.

But if designer have knowledge of modular uncertainty in work break structure he is able to choose appropriate team for suitable module. But unfortunately there is no such phase who will assist to designer to take proper decision while make project plan

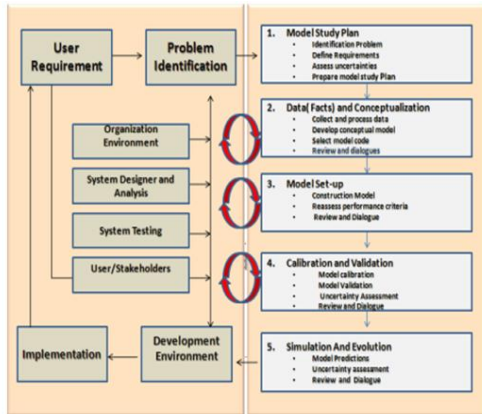
At two previous **project plan development** steps this information has been identified so you can design a project schedule.

A typical modeling study will involve the following four different types of factors:

- ❖ **Organization culture**
- ❖ **System Designer and Analyst**
- ❖ **System test case designer**
- ❖ **End User or stakeholder**

The modeling process may be different according to the organization.

Fig 1: The modeling process (modified, original fig is in Jen Christan Refesgrad and his coauthor's study on uncertainty in the environmental modeling process –A framework and guidelines.) .



**Step 1 Model study plan:** The aim of this step to abstract Model Study Plan including data as Need of modeling for this particular model study, Overall modeling approach and which work should be carried out, model designer's abstraction capacity, technical expert and themes opinion, contributory human factors and themes involvement, resource availability for project release.

The system designer and analyst must understand the problem with its framework on the basis its available feedback for providing solution with anticipation and specification of various requirements which expected accuracy of modeling results. The acceptable level of accuracy will vary from case to case, so will sketch from convention of modeler, project manager and stakeholders/client.

*Suppose in this step if development team analyze the source of uncertainty to classify abstraction on the elements that produce most information of relevance to the problem at hand then development team is aware with source of uncertainty and able to collect conceptualization of model as per relevance type.*

**Step 2 Data and conceptualization:**

The aim of this step to collect all the related knowledge about the project task and sketch an overview of the processes and their interactions logically, how the project should be modeled in sufficient detail to meet the requirements specified in the model study plan with consideration of models stable and temporal detail, projects dynamics, boundary conditions and the model parameters determination from available data.

*Suppose in this step if development team assessed the model structure uncertainty and availability of existing source codes that can concentrate on the model requirements evaluate then development team is aware with type of uncertainty aspect(uncertainty or complexity) and able to set up of model as per relevance aspect.*

**Step 3 Model set-up:** The aim of this step is convert the conceptual models into physical models that can be execute in the selected model code. A main task in model set-up is the processing of data to sketch out the input files required for executing the model.

*Suppose in this step if development team collaborate the model basis of uncertainty and complexity then development team is aware and able celebrating and then validate of model as per independent data.*

**Step 4 Calibrations and Validation:**

The aim of this step is finalize the development process of analyzing model and the set of models as per its aspect that was constructed during the previous step, first by calibrating the model and set of models, and then by validating its performance against independent field data.

Finally, the reliability of model and set of models simulations for the intended type of application is assessed through uncertainty analyses. The results are described so that the scope of model use and its associated limitations are documented and made unambiguous.

**Step 5 Simulation and evaluation:** In this step the modeler uses the calibrated and validated model to make

**Section IV.**

**4.1 Uncertainty expressions and classification**

**4.1. A Definitions**

Uncertainty and associated terms such as error, risk and ignorance are defined and interpreted differently by different authors; see Walker et al. (2003) for a review. There are different definitions available in various literatures. We adopt a subjective understanding of uncertainty in which the degree of confidence Thus according to our definition a person is uncertain if s/he lacks confidence about the specific outcomes of an event. Reasons for this lack of confidence might include decision of the information as incomplete, unclear, inaccurate, unreliable, inconclusive, or potentially false. Similarly, a person is certain if s/he is confident about the outcome of an event. It is possible that a person feels certain but has take wrong decision of the information

There are many different decision situations, with different possibilities for characterizing uncertainty. Uncertainty is also known degree of unreliability of knowledge, which translates into a state of confidence.

**4.1.B Classification:**

Classification of unsatisfactory knowledge is represented by Brown (2004). This is useful to differentiate between bounded uncertainty and unbounded uncertainty

**Bounded uncertainty:** In which all possible outcomes are deemed 'known' and we can define only quantitative probabilities require all possible outcomes of an uncertain event and each of their individual probabilities to be known.

**Unbounded uncertainty:** In which some or all possible outcomes are "deemed unknown".

**4.2. Sources of uncertainty**

Uncertainty is noticeable itself at different locations in the model-based software project management process.

In model base project management process uncertainty is noticeable at different location. This can characterize as follows:

**Context:** At the initial stage of problem phase where problem is understand the model context is defined. Which include external circumstance like the technological external economic, environmental, political, social circumstances that form the context of the problem. Input uncertainty in terms of external driving forces (within or outside the control of the software project manager) and system data that drive the model.

**Framing:** Model structure uncertainty is conceptual uncertainty is because of partial understanding and easy descriptions of modeled processes as compared to reality.

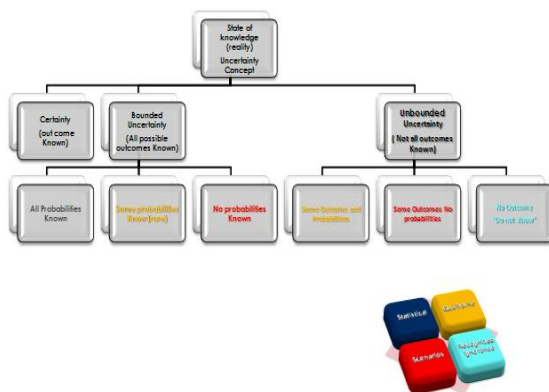
Parameter uncertainty is the uncertainties related to parameter values.

Model technical uncertainty is the uncertainty arising from computer implementation of the model, because of numerical approximations, resolution in space and time, and bugs in the software.

From the all above sources the total uncertainty on the model simulations and model output uncertainty, can be assessed by uncertainty propagation

Fig. 2: Different uncertainty situation and categorization of imperfect knowledge resulting (Brown, 2004).

### Ignorance : Unaware of Imperfect know



### 4.3. Nature of uncertainty

Walker et al. (2003) explain that the nature of uncertainty can be categorized into:

**Epistemic uncertainty:** the uncertainty because of imperfect knowledge and which will reduce by more study or expert advice.

**Stochastic uncertainty or ontological uncertainty:** uncertainty because of inherent variability and which is not reducible by expert advice or more study.

### Section –V.

#### 5. Methodologies for uncertainty assessment

Many methodologies and tools suitable for supporting uncertainty assessment have been developed and reported in the scientific literature. Few of themes are selected to represent in alphabetical order:

- Data uncertainty engine (DUE)
- Error propagation equations
- Expert elicitation
- Extended peer review (review by stakeholders)
- Inverse modeling (parameter estimation)
- Inverse modeling (predictive uncertainty)
- Monte Carlo analysis
- Multiple model simulation
- NUSAP
- Quality assurance
- Scenario analysis
- Sensitivity analysis
- Stakeholder involvement
- Uncertainty Matrix

### Section –V.

#### 6. Indication to select proper methodology for uncertainty assessment (Refsgaard et al., 2007)

There are lot of methodologies and tool which are applied to Uncertainty assessment. A set of option create confusion to select appropriate method fir appropriate purpose. For that we have consider following prospective which will help to select a method for its applicability. (On the basis of Jen Christan Refesgrad and his coauthor's study on uncertainty in the environmental modeling process –A framework and guidelines.)

- 1) A method which use to assessment for level of ambition and model processing.
  - a) Identify and characterize sources of uncertainty.
  - b) Reviews dialogue and decisions.
  - c) Uncertainty assessment and propagation.
- 2) A method which use to assessment for source and type of uncertainty.
- 3) A method which use to assessment for purpose of use.

### Section –VII:

#### 7. Discussion and conclusions

**A. Discussion:** Design and chose approach is repeated incident in our daily life when we plan to go to our work. We estimate the time and risk need for design approach. The estimated time and risk fluctuates according external uncertain factor and theme's condition. In our everyday life, we enhance our estimation based on past experience in which problem solve by which method and in which condition and which opportune provide that method to produce better result .

So, Instead of unexplained discourse and inflexible modeling techniques, if we highlights a proven set of procedures, understandable formulas, and heuristics that individuals and complete team can apply to their projects to help achieve estimation ability with choose appropriate development approaches. That will produce better result.

#### B. Conclusions

#### Conclusion and Feature work.

There is not much to conclude, this is early in our study, our hope is that a systematic look towards the impact of uncertainty at module level and software development methodology, which will useful to explain, state configuration and enact software engineering process for software development process. If, by that way we try to specific allocated process that will be reduce causes of software failure and assist to the estimated time and risk according external uncertain factor and theme's condition.

It is therefore crucial that the uncertainty is introduced in the introductory phase and tracked throughout the model study and identification, characterization of all uncertainty sources are performed jointly by the modeler, The software project manager and stakeholders in connection with the problem framing and identification of the objectives of the modeling study, which will assist to developer to choose the development approaches as per level of uncertainty.

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