

# Software Cost Estimation Certification (SCEC)



## Introduction

The number of Agile development projects in the ISBSG repository is increasing. Therefore, it is possible to perform meaningful, comparative analyses between projects developed using traditional (e.g. waterfall) and agile methodologies.

The ISBSG collects software project data, where output is measured using ISO/IEC standardized, objective, repeatable and auditable methods. The function point counting methods include Nesma, IFPUG and COSMIC. Typical key metrics based on function points are:

- Project Delivery Rate (PDR)<sup>1</sup>: Hours spent per function point
- Cost efficiency: Cost (or Price) per function point
- Quality: Defects per function point (in test and/or 1<sup>st</sup> month of production)
- Speed: Function points delivered per calendar month.

The ISBSG 'New Developments & Enhancements' repository contains thousands of completed projects, releases, and sprints for which these metrics are calculated. This enables organizations to use this industry data for fact-based understanding and decision making.

ISBSG regularly publishes short papers in which relevant subjects are analyzed and/or explained. These short papers can be found [here](#), on the ISBSG website.

An important topic in the IT industry is the cost estimation of software development projects. This is also a relevant topic for Agile software development.

**In this short paper, we dive into the benefits of software cost estimation and the certification program run by the International Cost Estimation and Analysis Association (ICEAA)<sup>2</sup>.**

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<sup>1</sup> The PDR is the inverse of the universal concept of Productivity (output/input) as it is easier to process for human minds, which usually struggles with metrics with many decimals.

<sup>2</sup> [www.iceaaonline.com](http://www.iceaaonline.com)

## Software Estimation – why is it different?

Although there are thousands of certified professional cost estimators worldwide, only a few of them know how to estimate software development projects in a professional way.

Cost estimation can be challenging when requirements are not fully known or when they change during project development. It is also difficult to measure the size of the product to be delivered. Furthermore, there is usually not much data available for completed software projects (other than ISBSG data).

A well-founded, realistic estimate is crucial for:

- the business case.
- planning.
- the quotation in case of outsourcing (certainly in case of fixed price / fixed date).
- the financial result of the project and the organization.
- claiming and releasing resources.
- coordination between IT and the business/customer.
- progress reports and dashboards.
- the satisfaction of the team and stakeholders.

Many organizations do not have a professional estimation process and rely heavily on the experience of their professionals to estimate projects or agile teams. Human experts can be overly optimistic and may miss some requirements. This may result in large budget and schedule overruns.

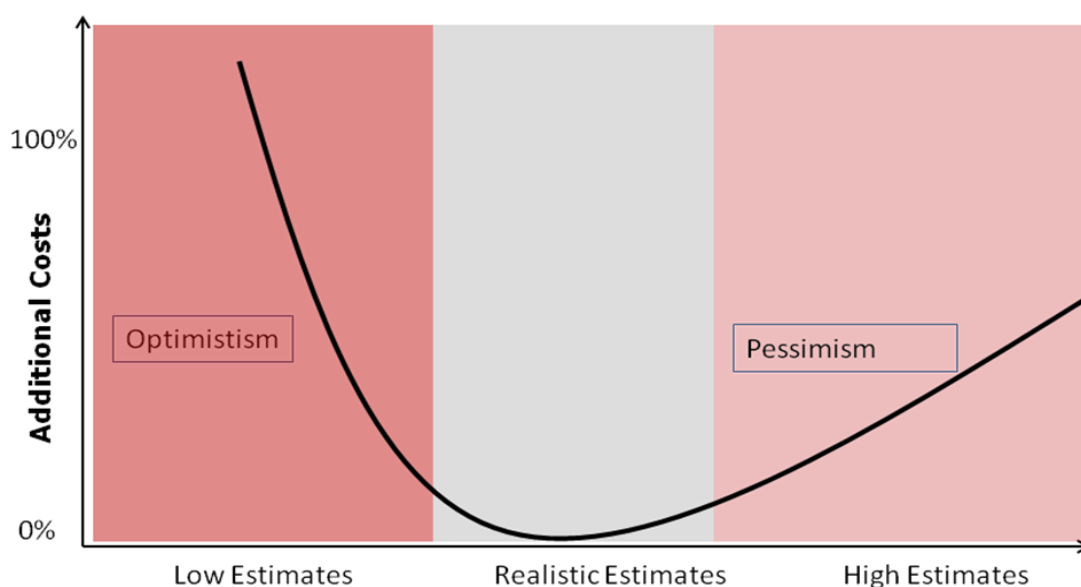


Figure 1: Source: 2021 Metri Software Cost Estimation

Figure 1 shows the effect of optimistic estimates. They result in non-linear, additional costs. This is due to ineffective measures used to gain control of the project when it is evident that an overrun will occur. Millions of euros are wasted in this way every year. This money and effort could have been spent more wisely.

## Estimation Maturity for Software development projects

To increase the maturity of software development estimation, it is useful to have a standard to test that maturity. As a solution, Dan Galorath, from Galorath Incorporated, published the Software Estimation Maturity Model, in 2017. Galorath is one of the world's leaders in parametric cost estimation models, and an ISBSG gold partner. The model is displayed in Figure 2 below.

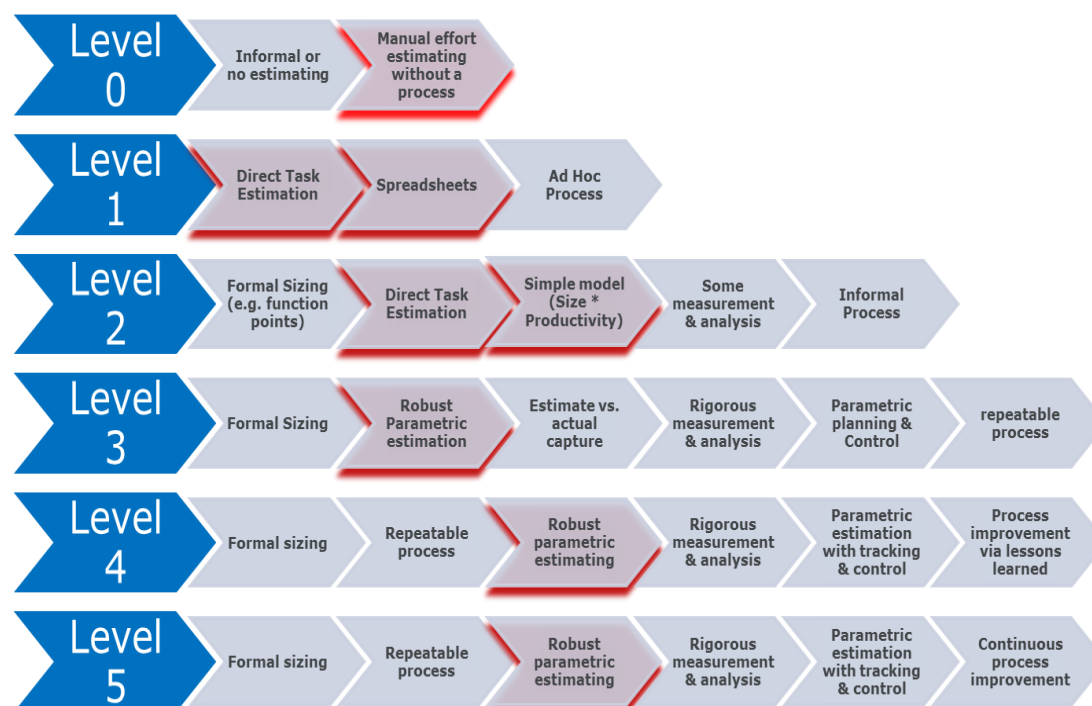


Figure 2: Software Estimation Maturity Model. Source: 2017 Galorath.com

As shown in Figure 2, most organizations are on level 0 or 1, where estimation is carried out by human experts. From level 2 onwards, formal sizing is introduced. This makes perfect sense, as knowing the size enables the use of historical data of similar projects. Examples of formal sizing are IFPUG, Nesma, COSMIC or FiSMA functional-size, measurement methods, which are all ISO standards.

As functional size measurement can be applied when the (high-level) requirements are known, this is a very useful first step for any estimation of a new project. A short paper on how to use ISBSG data in combination with formal sizing can be found on the ISBSG website – How to use ISBSG data for Software Project Estimation. Click [here](#) to see paper.

## The International Cost Estimation and Analysis Association (ICEAA)

The International Cost Estimating and Analysis Association (ICEAA) is a non-profit organization. Its primary goal is to foster the professional growth of its members in cost estimating, cost analysis, and allied fields.

ICEAA is represented by more than 20 chapters (groups) in the United States and has international affiliates in Australia, Canada, Japan and the United Kingdom.

ICEAA holds a yearly conference where hundreds of people engage in a 3-day event to share the latest research and case studies related to cost estimation.

ICEAA governs the Cost Estimation Body of Knowledge, which is free for its members. This is a user-friendly cost estimating and analysis training resource. It has information organized into 16 interactive modules within five general subject areas. It is designed to cover all of the topics that represent the body of knowledge that ICEAA promotes and tests for in the following exams:

- Certified Cost Estimator Analyst (CCEA®)
- Professional Cost Estimator Analyst (PCEA®) exams.

### Cost Estimation Body of Knowledge for Software (CEBoK-S)

In 2013, ICEAA and Nesma discussed the creation of what later became the Cost Estimation Body of Knowledge for Software (CEBoK-S). Nesma and ICEAA signed a Memorandum of Understanding (MoU) to develop the materials. Formal sizing and the use of historical data, such as the data repositories offered by ISBSG, are important topics in the CEBoK-S.

CEBoK-S is now available on the ICEAA website. Successful completion of an online certification program qualifies the applicant as a Software Cost Estimator Certified (SCEC) expert. More information can be found on the ICEAA website – [click here](#).



Figure 3: ICEAA Certification Exam details, from ICEAA website.

All questions on the SCEC exam are derived from ICEAA's Cost Estimating Body of Knowledge-Software, or CEBoK-S. CEBoK-S provides guidance on

the essential considerations in software cost estimating. It factually and objectively demonstrates all software sizing methods, and allowing users to draw their own conclusions about the merits of any given method. The curriculum is a guide on determining software estimates and covers:

- development effort and cost
- sustainment and maintenance
- comparing procured solutions vs. commercial off-the-shelf software
- reviewing another party's software size

CEBoK-S builds upon the cost estimating best practices outlined in CEBoK by tailoring lessons on core cost estimating tenets. These include: maturity models, risk, uncertainty, data analysis, and data normalization to the specific uses and applications when estimating software.

PCEA or CCEA certification is not required to qualify for the SCEC certification, but a thorough understanding of standard cost estimating practices is necessary for success.

All ten CEBoK-S lessons are at the ICEAA store, available for purchase in PDF format as individual lessons or a full-curriculum package. Click [here](#) for more details

The introduction of the CEBoK-S and the SCEC certification makes it possible for experts to grow in their profession. They allow organizations to increase the maturity of their software estimation process, using formal sizing and historical data to increase software project success.

If you wish to do your own analysis, or if you are interested in using the ISBSG data for software cost estimation, benchmarking, performance measurement, procurement, etc., please visit the ISBSG website – click [here](#) to learn more.

## The International Software Benchmarking Standards Group (ISBSG)

The ISBSG is a not-for-profit organization founded in 1997 by a group of national software metrics associations. Their aim was to promote the use of IT industry data to improve software processes and products.

ISBSG is an independent international organization that collects and provides industry data of software development projects and maintenance & support activities. This is done to help all organizations (commercial and government, suppliers and customers) in the software industry to understand and improve their performance and decision making.

ISBSG sets the standards of software data collection, software data analysis and software project benchmarking processes. It is thought of as the international thought leader in these practices.

**The ISBSG mission is to support commercial and public organizations to improve the estimation, planning, control and management of IT software projects and/or maintenance and support contracts.**

To achieve this:

ISBSG maintains and grows 2 repositories of IT software development/maintenance & support data. This data originates from trusted, international IT organizations and can be obtained for a modest fee from the ISBSG website - <https://www.isbsg.org/data-subscription-2/>.

### *Help us to collect data.*

ISBSG is always looking for new data. In return for your data submission, we issue a free benchmark report that shows the performance in your project or contract against relevant industry peers.

Please submit your data through one of the forms listed on <http://isbsg.org/submit-data/>

**A specific Agile/Scrum data collections questionnaire can be downloaded here: <https://cutt.ly/4vnuXVT>**

### *Partners*

The following page, from the ISBSG website, will help you to find an ISBSG partner in your country: <https://www.isbsg.org/board/>