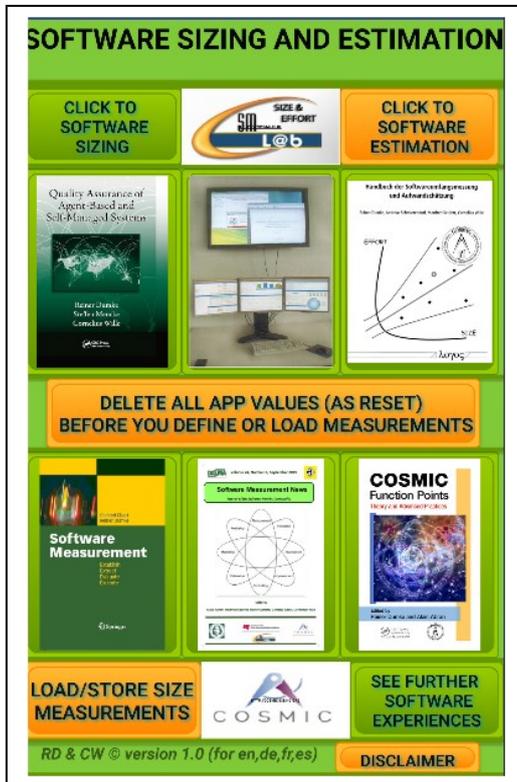


The SoftwareExpert App

by Reiner R. Dumke



The **SoftwareExpert** app is not a comprehensive and large project management system. It helps to get a **quick and concrete overview of the IT project situation** and/or the essential software system features and allow to save them for further comparisons. **SoftwareExpert** helps to accurately measure the software scope. This app serves mainly for the application of the **COSMIC Function Point method** (as **International Standard ISO/IEC 19761**) in a simplified form (as **LeanCOSMIC**¹) and can be used via the button "Software Sizing". Up to 20 so-called functional processes and up to 15 associated data groups (as identification of the COSMIC metrics (data movement)) can be defined/acquired. The determination of the **COSMIC Function Points (CFP)** with the four sub metrics as **Entries, Exits, Reads and Writes** then takes place via the COSMIC Sizing Button whereby each functional process receives its CFP and the total CFP (**Total CFP**) is then displayed. This app also enables the application of a shortened COSMIC method as **Early & Quick Method** and the local extension approach of the process CFPs (e. g. by considering the "inner" functional scope) as **Extend Method**.

As a special benefit, this app includes the ability (in the **Estimate button**) of using the estimation formulas and relations known from the international experience for the effort, the productivity, the project duration and much more due to a size/volume measurement (mainly as CFP). Some of these estimates are displayed under the **Project Dashboard** button as a general overview and a **Project Metrics** overview. If other size measurements are given (e. g. as **LOC, IFPUG Function Points, Story Points** etc.), a conversion can be done under **Convert** before and the estimation formulas can be used on this basis.

The informative part of this app is supplemented by an overview of some of the very classic experiences of software engineering (as **Software experiences**). The measurement data can be provided with an identification and stored within the app (and reloaded later).

On the other hand, these app pages contain links to the COSMIC community, to SML@b, to our metrics bibliography on our GI website as well as to the risks of Peter Neumann and a SWEBOK classification for software engineering in general.

This app is useful for short and fast IT project controlling in the agile development and as educational support for computer science students and professionals based on the current knowledge in empirical software engineering.

(sorry, **SoftwareExpert app has a symbolic price**)

¹ **LeanCOSMIC** means that special aspects of functionality like triggering entry, layers and data attributes are not considered explicitly. But, this do not restrict the COSMIC method application.

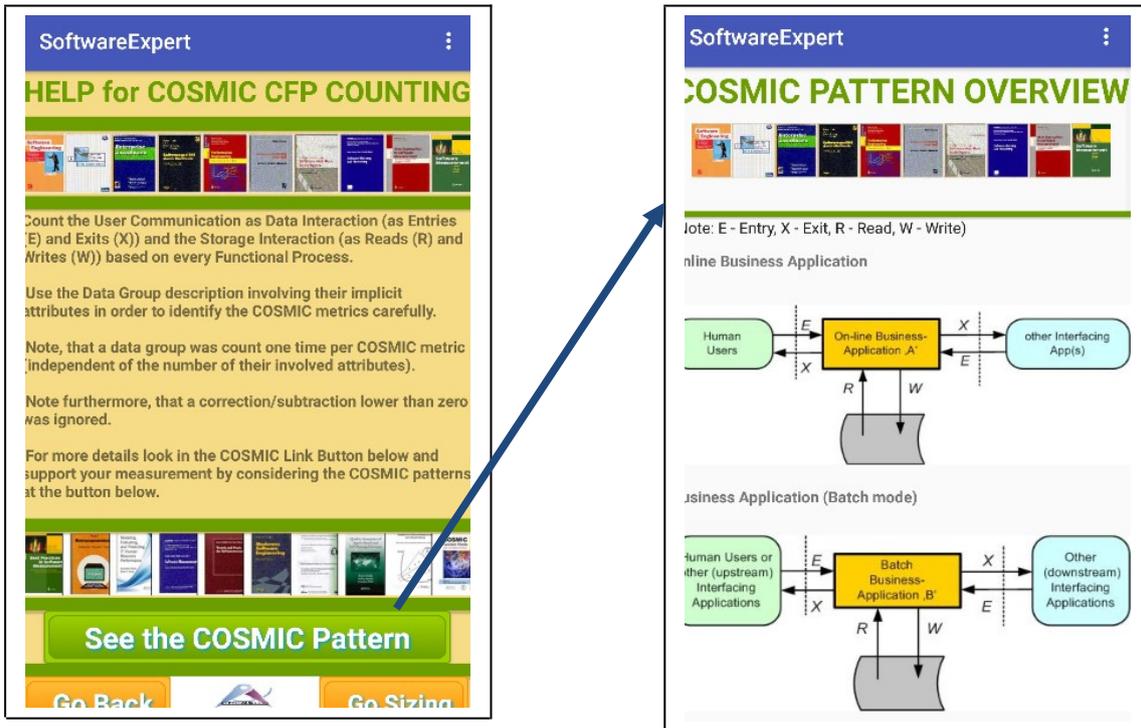
Software Sizing:

Software sizing starts with the definition of the Size measurement characteristics in the **Size Measure Description (1)**. These inputs are optional but meaningful in the IT context.

After these inputs, the **Functional Processes** (limited by 20) are defined as basis of size measurement (2). Each functional process can contain several (limited by 15) data groups in order to identify the data movements.

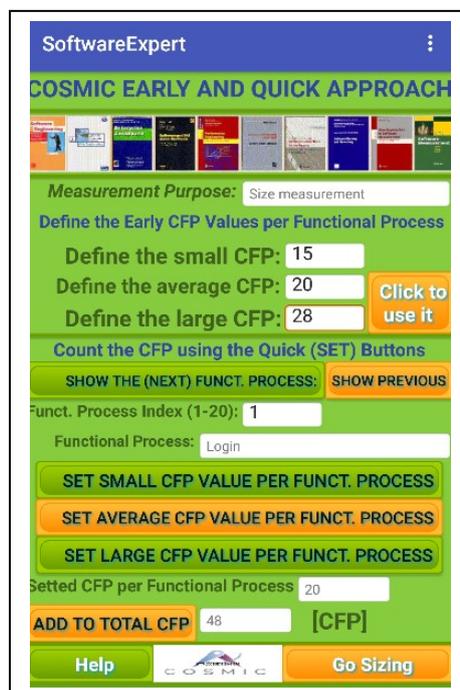
The **COSMIC CFP Counting** supports the size measurement based on the **Entry, Exit, Read and Write metrics (3)**. The **Set buttons** help in the case of large metrics values.

Every size measurement page have a **Help** button. Especially, the **Help** for **Counting** includes an overview about the **COSMIC patterns** in order to support the COSMIC software model identification.

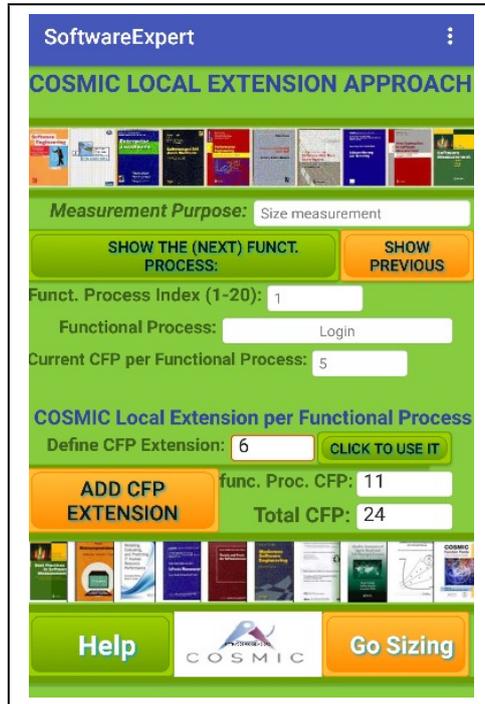


The results of the size measurement can be summarized in the **Measurement Report (4)**.

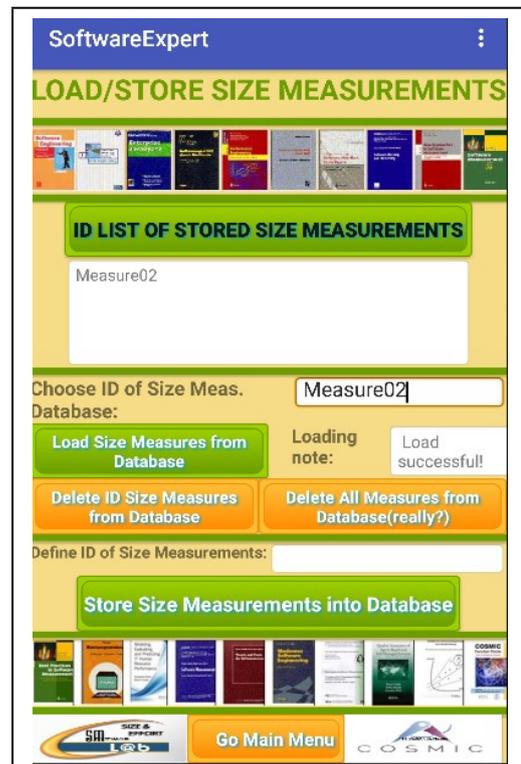
For faster CFP measurement, the **COSMIC Early & Quick method** can be used. Applying this method, you define **three classes of CFP values** and use it for counting/measurement specification for every functional process.



Furthermore, the **COSMIC local extension method** can be used in order to involve CFP values caused by a high functionality in the software system or application. This allows the adjustment of the CFP value of each functional process.



A COSMIC size measurement can be **stored** or **loaded** using the **Load/Store button**.



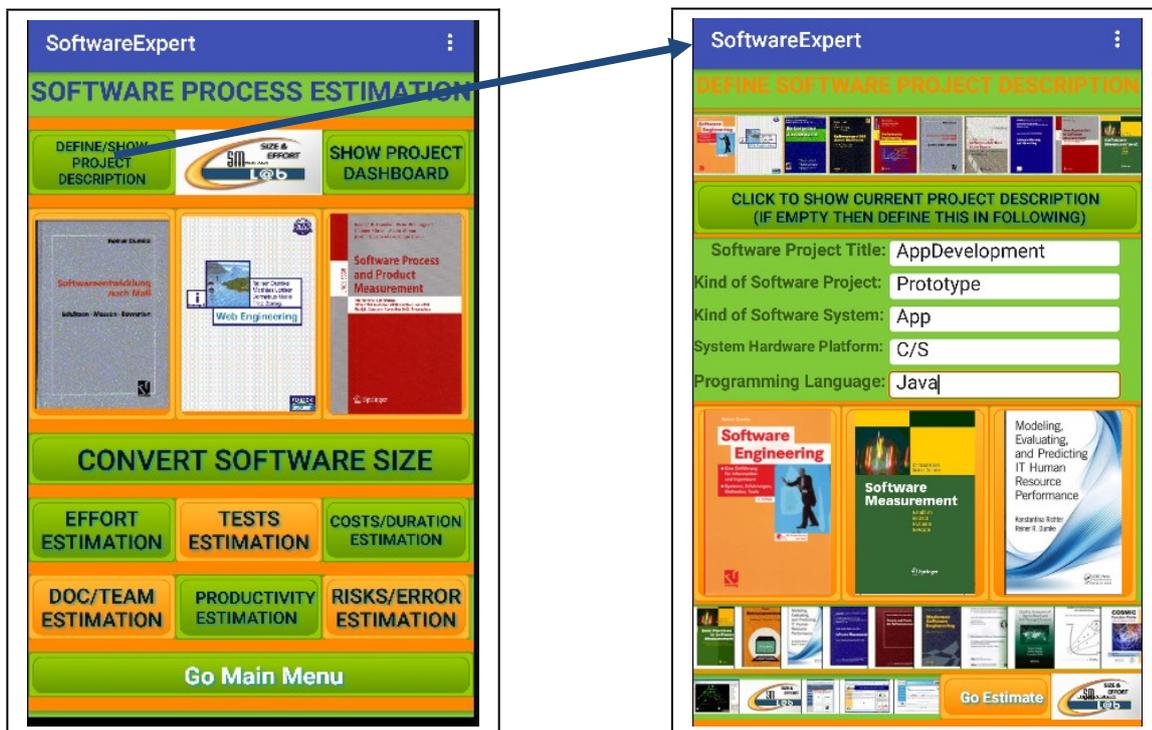
The **SoftwareExpert** app is usable in four languages: **English, German, French and Spain**



depending on the language setting of your Smartphone/Tablet.

Software Estimation:

The different aspects of software process estimation are essential features in the **SoftwareExpert** app. The Software estimation area can be used independently of COSMIC software sizing. It starts with a **Project description** as basic for the identification of the software process estimations. These inputs are also optional but meaningful for later measurement comparisons.



Then you can continue with the estimations using the **total CFP value** from the software sizing before.

But, you can start with **your own size value**. You can choose between *Lines of Code (LOC)*, *IFPUG Function Points*, *NESMA Function Points*, *Feature Points*, *Use Case Points* and *Story Points* and can transform this value to the *general app unit* as **COSMIC Function Points (CFP)** using the **Convert** features.

Then you can perform the different estimates like effort, test, cost, duration, documentation, team size, productivity, risk and errors.

Note, all estimations are based on the given/transformed/defined/assumed software size. You can choose the existing value (by measurement or converting before) or you define your own size value (in CFP!).

In every part of project aspect estimation, you can select (one or more) between several estimates by **Experts** that you can find in the literature of the empirical software engineering. Press the **Average** button for storing the value in the **Project Dashboard**. The correction of any chosen values can be done by pressing the chosen button again.

In principle you can define your own estimation using your *own scaling factors*. The following estimation can be used with the **SoftwareExpert** app.

Development and test estimations

Costs, duration, documentation and team estimations

SoftwareExpert
⋮

SOFTWARE COSTS/DURATION ESTIMATION

SOFTWARE PROJECT TITLE

Software Project Title:

See/Use current Size:
 [CFP]

Define the new Size:
 [CFP] Click to use it

Costs Estimation is based on CFP Size

Define the Costs per PM in EURO: Click to use it

PROJECT COSTS ESTIMATION BY JONES
 [Euros]

Project Duration is based on CFP Size

PROJECT DURATION BY BOURQUE
 [Months]

PROJECT DURATION BY COCOMO(AVG)
 [Months]

PROJECT DURATION BY SNEED
 [Months]

Project Duration on Average
 [Months]

PROJECT DURATION BY ISBSG (JAVA)
 [Months]

PROJECT DURATION (ISBSG REALTIME)
 [Months]

Define your own Factor:
 (size*factor = dur.[Months])

Execute your own Duration (as avg.):
 [Months]

Go Estimate

SoftwareExpert
⋮

SOFTWARE DOCUMENTATION/TEAM ESTIMATION

SOFTWARE PROJECT TITLE

Software Project Title:

See/Use current Size:
 [CFP]

Define the new Size:
 [CFP] Click to use it

Doc/Team Estimation is based on CFP Size

PROJECT MANAGEMENT DOC. SIZE
 [Pages]

PROGRAM DOCUMENTATION SIZE
 [Pages]

USER MANUAL SIZE
 [Pages]

Chosen Documentation Size by Jones
 [Pages]

DOCUMENTATION EFFORT BY LEHNER
 [PM]

Estimation of Development Team Size (in Team Members)

TEAM SIZE ESTIMATION BY JONES

TEAM SIZE ESTIMATION BY BUNDSCHUH

Team Size Estimation on Average

Go Estimate

Productivity, risks and error estimations

SoftwareExpert
⋮

SOFTWARE PRODUCTIVITY ESTIMATION

SOFTWARE PROJECT TITLE

Software Project Title:

Project Productivity is based on CFP Size

See/Use current Size:
 [CFP]

Define the new Size:
 [CFP] Click to use it

Productivity Unit is CFP per Personal Month

PRODUCTIVITY BY ISBSG
 [CFP/PM]

PRODUCTIVITY BY PUTNAM
 [CFP/PM]

Productivity on Average
 [CFP/PM]

PRODUCTIVITY BY ISBSG-CBSE
 [CFP/PM]

Define your own Factor:
 (size*factor=prod.[CFP/PM])

Execute your Productivity (as average):
 [CFP/PM]

Productivity Comparison by Jones (in [CFP/PM]):

Worst Case(Waterfall) = 2.71, Average(Agile Dev.) = 7.26
 Best Case(Team Software Process) = 10.89

Productivity Comparison by Putnam/Myers (Unit: [CFP/PM]):

Avionics=4.9, Business=73.5, Embedded=7.35, Control=24.5,
 RealTime=4.9, Scientific=24.5, Telecom=14.7

Go Estimate

SoftwareExpert
⋮

SOFTWARE RISKS/ERROR ESTIMATION

SOFTWARE PROJECT TITLE

Software Project Title:

See/Use current Size:
 [CFP]

Define the new Size:
 [CFP] Click to use it

Risk/Error Estimation is based on CFP Size

RISK FACTOR ESTIMATION BY JONES
 [%]

(Risk Factor: Percentage of Project Failure)

Error Estimation is based on CFP Size

ERROR ESTIMATION BY HALSTEAD
 [Errors]

ERROR ESTIMATION BY SNEED
 [Errors]

ERROR ESTIMATION BY JONES
 [Errors]

Error Estimation on Average
 [Errors]

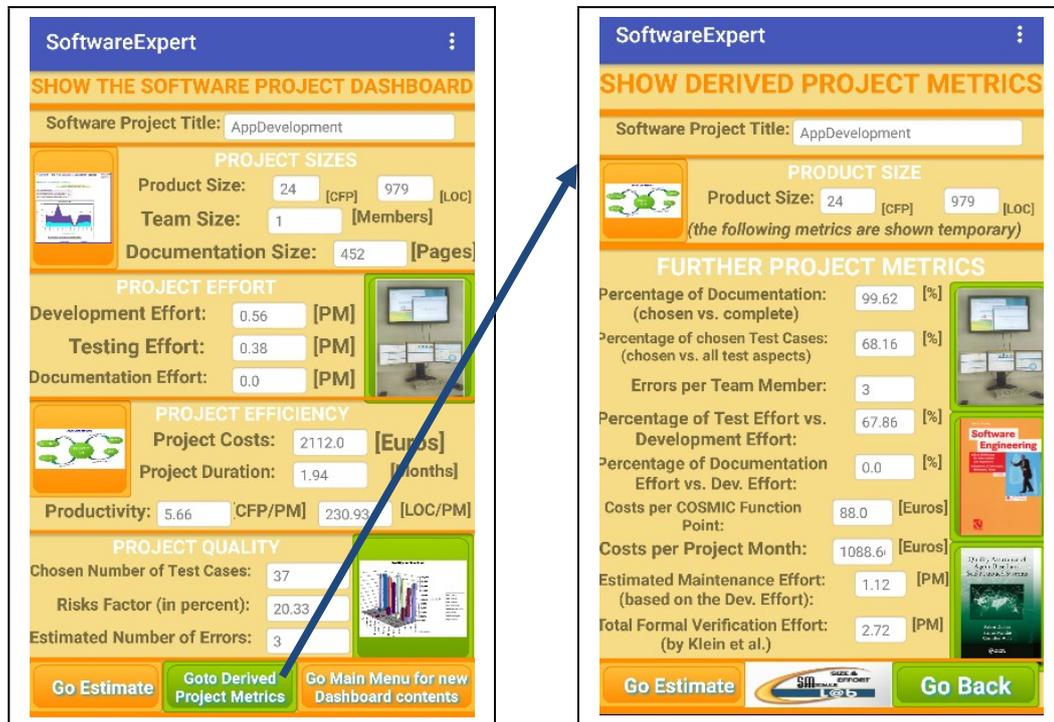
Prog. Language related Error Estimation by Jones
(use C, C++, Cobol, Java or Assembler)

PROGRAMMING LANGUAGE:
(PRESS BUTTON AFTER INPUT)

Estimated Errors:

Go Estimate

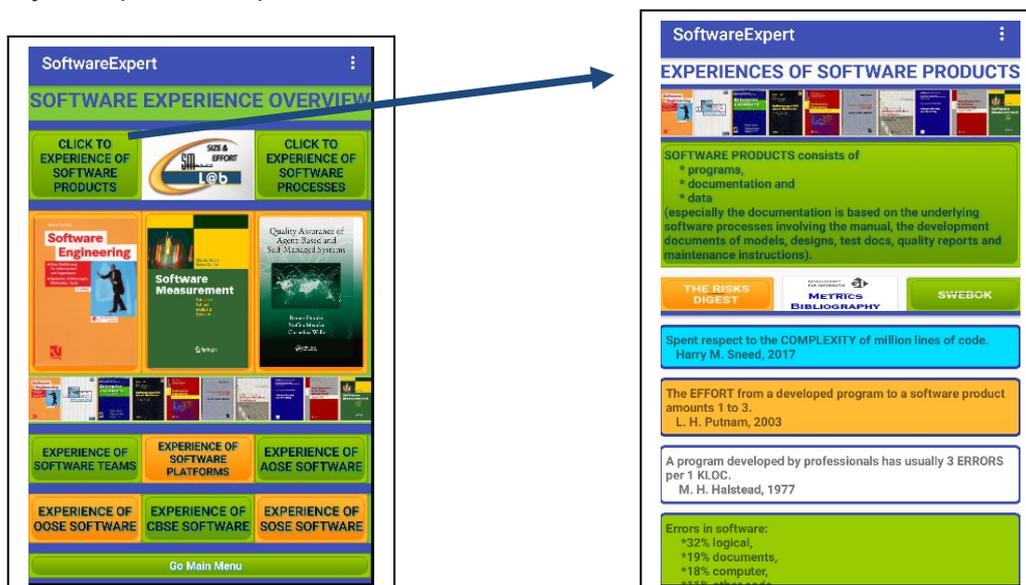
Finally, these estimation values are stored in the so-called **Project Dashboard**. You can consider and accept this dashboard or you can make any corrections in the different estimation parts and define the Project dashboard again. Furthermore, some **Project Metrics** are delivered in a temporary manner and can help to characterize your IT project controlling with further interesting aspects. Both, the size measurement and/or estimation can be stored using the **Load/Store Button**.



Software Experiences:

The part of software experiences summarizes the well known empirical knowledge in software engineering for typical software engineering areas.

The Web links to our Metrics bibliography, the Neumann risks overview and the software engineering description in the SWEBOK could be helpful for understanding and motivating of IT project aspects and problems.



This **SoftwareExpert** app is based on our COSMIC books:

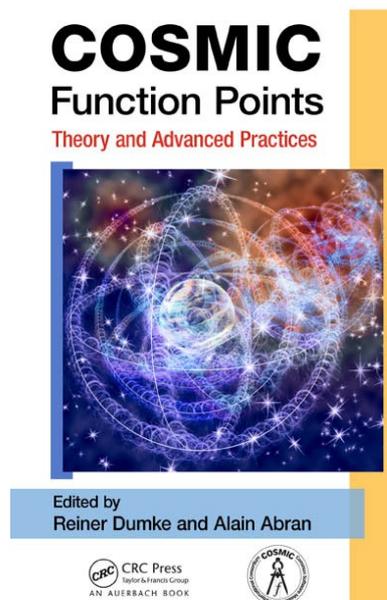
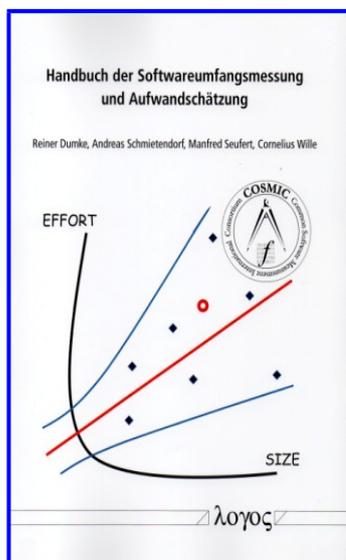
Dumke, R., Abran, A.:

COSMIC Function Points – Theory and Advanced Practices
CRC Publ., Boca Raton, 2011 (334 p.) ISBN 978-1-4398-4486-1

and

Dumke, R., Schmietendorf, A., Seufert, M., Wille, C.:

Handbuch der Softwareumfangsmessung und Aufwandschätzung
Logos Verlag, Berlin, 2014 (570 p.), ISBN 978-3-8325-3784-5



Further/our resources you can find in our measurement bibliography at

<https://fg-metriken.gi.de/publikationen/bibliographie>

The **SoftwareExpert** app can be helpful in computer science education in order to better understand the complexities and relationships in software project management in practices.