Software and IT measurement are pivotal for successfully managing and controlling IT organizations, services and software development projects. Insufficient measurement makes projects fail because business objectives will not be reached and effort will be wasted. Legal obligation such as product liability and many contractual requirements worldwide demand quantitative risk management and traceable measurements.

This workshop will provide an overview on three topics that need to be mastered:

- Benchmarking
- Measurement
- Data Analytics

Measurement, benchmarking and data analytics and are essential for both business and engineering. The current digital transformation increases the amount of data that becomes available. The value of a company is increasingly defined by its data. Value creation can only be exploited fully if these are used efficiently along the entire value chain. All three topics are quantitative in nature and thus demand some understanding of underlying methods and techniques. Different perspectives demand appropriate depth.

Managers need to know what is going on – such as where a project, product or organization stands and which decisions need to be taken. They do not need to understand underlying methods, but certainly must use a trusted radar to avoid managing in the fog. Practitioners, such as developers, architects, quality engineers, project managers and team leads must know how to move forward in the right direction.

This tutorial and workshop will address the following questions:

- What five measurements should be used in any project?
- How to maximize the value for an organization with data analytics?
- Which benchmarks and hands-on guidance will help in specific situations?
- What simple yet powerful techniques should be mastered by each single developer and project manager for estimation and project control, productivity assessment, and code quality

The tutorial will be interactive to allow that participants can address their specific needs.

Organizer:
Christof Ebert
Big Data Technologies

Fraunhofer IESE

To the same extent to which digitalization increasingly permeates all areas of our lives, more and more data are generated as well. The term “Big Data” is very popular today – but when are data actually “big”? This is not only a matter of size. The German Informatics Society (Gesellschaft für Informatik, GI) defines Big Data via three principal dimensions: Volume – Velocity – Variety. In addition to the amount of data (Volume), the speed with which they have to be processed (Velocity) as well as the heterogeneity of the data that must be considered in conjunction (Variety) play an important role. This means that even if the total amount of data to be analyzed might not be so large, a Big Data problem may still arise.

Typically, the goal of making use of Big Data is to increase the company’s own efficiency and effectiveness, to master risks, and to realize new products and services. Companies can prevent bottlenecks in business and workflow processes or critical states in the value chain, such as the failure of production machinery, can be detected early on. Currently the central question posed by many companies is: Do we need Big Data and does it pay off for us to invest in the relevant technology? The strategic benefits of Big Data are often accompanied by substantial costs for hardware, software, training, etc. The seminar supports companies in getting an overview of Big Data technologies and new opportunities that arise from using them. But, also support practitioners in systematically analyzing the specific needs and benefits from using Big Data before investing into building up competences and acquiring tools and infrastructures.

The following questions will be discussed specifically:

- What are typical usage scenarios and challenges when dealing with Big Data?
- From Hadoop to Hana: When to use which Big Data technology?
- How to determine the specific benefits of Big Data for an organization?

Organizer:
Henning Barthel
Jens Heidrich
Productivity Impact Factors for Projects

Metrics Associations International Network

This Workshop Proposal is a continuation of the successful workshop in Assisi (Oct 2012), Rotterdam (Oct 2014) and Kraków (Oct 2015).

ICT Projects have a bad reputation: they often exceed budget or change scope. It holds especially when writing new software is involved; however, writing mobile apps, joint & distributed software development across organizations, integration of new services, sizing maintenance or ICT portfolio projects is also affected. Project management is needed but without proper estimation methods and tools it is limited to managing the budget overrun. For the economy, this is a serious blocker, since ICT is the major engine for economic growth. Work breakdown structure fails because it is part of the project to find out what work is needed; expert estimation fails because experts cannot remember previous decisions and their estimates suffer from important variations. Without proper budgeting, ICT projects carry enormous risks for the financial stability for the sponsors of an ICT project.

Furthermore, with the advent of the Internet of Things (IoT) and Industry 4.0 manufacturing processes, investing in ICT becomes a mission-critical aspect of business. Security and Safety issues can destroy companies and seriously harm all kind of organizations. Measuring Security and Safety is a precondition not only for self-controlled cars and medical equipment, and these are among the primary performance impact factors in today’s world.

There have been other approaches to estimation, especially based on benchmarking within or across organizations and industries. The question arises which parameters to select for comparing different projects. Functional size is a very popular and success approach when developing new software, and definitely a major cost driver. However, quality, complexity, security requirements and other non-functional, but highly influential, parameters drive cost probably much more than functionality.

Recently, the agile way proposed different ways to manage such variations, reflected also in new attributes provided in the ISBSG R13 data repository for Development & Enhancement (D&E) projects. Does it distribute differently functional vs non-functional effort in a Sprint (iteration) or not? If yes, how? Again, the DevOps paradigm seems to be more and more appealing to the ICT community: can it have an impact on estimates? How and why?

In 2010, the GUFPI-ISMA working group on Software Benchmarking Standards identified 27 parameters affecting performance of ICT projects from various sources, including ISBSG, IFPUG and COCOMO. They have the potential to improve comparability of ICT projects for benchmarks across organizations and industries; however, so far they were not adopted on an international level. Last year in Rotterdam, several experiences were discussed crossing different approaches, with a plenty of interesting discussions.

This workshop aims to establish and consolidate more and more across the years a community of researchers and practitioners who are willing to share their experiences and insights for

- Using Performance Impact Factors (PIFs) for project estimation in ICT
- Refining definition for PIFs
- Understanding how to measure these factors can eventually be measured
- Setting up a framework for benchmarking based on PIFs

Organizers:
Mauricio Aguiar (IFPUG)
Luigi Buglione (GUFPI-ISMA)
Ton Dekkers (Nesma)
Thomas Fehlmann (SwissICT)
Harold van Heeringen (ISBSG)
Eberhard Kranich (DASMA)
Luca Santillo (COSMIC / GUFPI-ISMA)
Software Measurement in the Context of Industry 4.0

Ostwestfalen-Lippe University of Applied Sciences

Expertise in the field of software development is a key success criterion for the future economic success of manufacturing companies. The partly pure hardware-based products they produce today need to be supplemented intelligently and with software functions in order to implement Industry 4.0 application scenarios. Although manufacturing companies have strong measurement competencies when controlling the production process, the importance of software measurement is just coming into recognition. This workshop aims to create ideas how to utilize the existing measurement competencies in manufacturing companies for software measurement.

The Reversed GQM (R-GQM) approach may support manufacturing companies to achieve this goal. The idea of R-GQM was first published at the Metrikon 2015 conference. The idea is to transfer metrics successfully applied in one domain (e.g. production) to another domain (e.g. software), Figure 1. The transfer of metrics from the production domain to the software domain simplifies the introduction into software measurement in manufacturing companies as the senior management may use known production metrics also for software measurement.

The workshop introduces the R-GQM approach. It shows examples of metrics which can be transferred from the production domain to the software domain. Workshop participants will create more examples.

Furthermore, workshop participants are encouraged to share their experience about software measurement in manufacturing companies.

Organizer:
Andreas Deuter
Data Manipulation Management

Università dell'Insubria / DPO

All of the existing Functional Size Measurement Methods (FSMM) include rules to capture the “data movement” or “data persistence” components of the Functional User Requirements (FURs). The Feature Point method by Capers Jones and the Fast Function Point method by Gartner seem to have tried to assign weight to the algorithms although they are not strictly classifiable as FSMM according to the ISO 14143 family of standards.

Measuring algorithms separately from the transactional BFCs does not contribute to assign to a set of FURs a unique functional measure capable of capturing all the functional aspects of the requests. While FSMMs like IFPUG FPA and COSMIC prescribe that every process is evaluated individually, so that a representative measure is built up, methods like Feature Point tend to provide an evaluation of an application's property at a global level, rather than a proper BFC measure.

After a long time, during which a huge amount of work has been dedicated to the application of the actual FSMM to different situations and contexts (traditional development, agile, DW, real time, OO, etc.) it is time now to start a joint activity oriented to capturing the algorithmic (alias data manipulation, alias data processing) component of the FURs.

The proposed workshop aims at collecting information concerning the existing practices and proposals (if any) concerning data manipulation measurement, as well as favoring the exchange and creation of new ideas (in a sort of brainstorming session) on this subject.

Organizers:
Luigi Lavazza (Università dell'Insubria)
Roberto Meli (DPO)
Estimating Packaged Software

Nesma

Although there is a lot of focus on the estimating of software, estimating of packaged software is still a challenge. Packages not only consist of different elements like standard functionality, configuration, customization and interfaces, but also go through different development stages like Blueprint, Realization, Deployment, Run and Maintenance. The estimating of packaged software is different depending on the type of element and depending on the stage. This workshop will explain the model developed by Nesma for the estimating of packaged software and request feedback from the audience on this model to be able to make further improvements.

Because there were many questions and discussions about the estimating of packaged software and the ability to use for example functional sizing, Nesma decided in 2011 to start a working group to investigate this topic and to work on a guideline for the estimating of packaged software.

A main challenge was getting the required input. The estimation specialist in the working group didn’t have the required knowledge of package implementations and specialist on software packages didn’t have a clearly defined estimation approach. The amount of publications with respect to the estimating of packages was and is still limited. To solve this issue and because the working group consist of members of large (international) IT organizations we invited experts on package implementations from different organizations in our working group meetings to discuss the topic.

The first conceptual model is presented on the IWSM-Mensura 2012 in Assisi. The challenge was to find the right Cost- and Productivity-drivers for packages but also Size-drivers. These terms will be further explained during the workshop.

In the current version of the guide, drivers are identified for almost each phase of a Package Implementation. Our intention with this guide is to be as complete as possible with respect to the list of drivers. It’s not the intention of Nesma to translate this guide to a working estimation model or define specific drivers for specific technologies. That is the responsibility of organizations that want to apply the guide. The guide provides a good starting point but requires customization based on the type of package implementation and the metrics available.

Organizers:
Eric van der Vliet
Frank Vogelezang
René Nijland
Metrics in Contracts

Nesma

Contracting of software development projects and maintenance in a standard way continues to be a difficult task for many organizations. Recently the urgency to improve the management of contracts and the execution of software projects again became evident in the conclusions of the Dutch Parliamentary Investigation ICT (the Elias committee): the Dutch government has insufficient control over the majority of their own IT projects. Many projects fail, while keeping a ‘green light dashboard status’ until the end, even when the project gets cancelled.

Outsourcing software development projects continues to be a very difficult task for many organizations. For example, they struggle with the questions they should ask in the 'Request for Proposal (RFP)’ phase. These organizations wish to find the questions that enable them to compare the bidding suppliers in an objective, yet meaningful way and they wish to select the right supplier based on this comparison. In practice, the industry sees many RFP’s that seem to comply to this goal, but when looked into a little detailed, it becomes obvious that in many cases the comparison is not objective and meaningful at all and even that in many cases the wrong supplier is selected, often resulting in failing projects. Repeatedly, suppliers argue with client organizations about the objective reasoning for missed offers and sometimes they even start legal actions. The mini guide for ‘RFP Questions’ explains these issues and provides useful guidance during the RFP phase.

IT suppliers usually do intend to develop software of good quality but from time to time this is conflicting with their global scale, size and business model. In practice, the technical quality of software is sometimes disappointing. Changes will be more complex and thus more expensive, cost for software maintenance increases. For the supplier, this results in more revenue. For the customer this is negative, as it is resulting in a higher total lifecycle cost and a slower time-to-market. To gain more control over the technical quality, performance indicators on technical quality should be part of an outsourcing contract. It is not simple to assess code quality and what level of quality to agree for. The mini guide for 'Technical Quality' explains the importance of technical quality and provides best practices on how to have technical quality included during the complete software life-cycle.

The documents describe the way Nesma feels that function point based metrics and quality metrics should be applied in contracting and in contracts regarding software realization projects and maintenance contracts. The scope therefore includes the following contract types:

- Software development projects, including new development, enhancements and (major) adaptive maintenance.
- Maintenance and Support contracts, including for example user support, problem investigation and corrective, perfective and preventative maintenance.

The scope is not limited to certain technologies or methods of implementation. Java, .Net, Oracle, and agile, waterfall, package implementation, websites, mobile apps, data warehouses, etcetera are all in scope.

The scope of this document is limited to metrics based on function point (Nesma, IFPUG, COSMIC) and to software product quality metrics. These methods comply to the ISO standard for Functional Size Measurement Methods and for software quality (i.e. ISO/IEC 14143 and ISO/IEC 25010) and therefore these methods are objective, repeatable, verifiable and defensible. These are essential criteria in contracting, because it reduces/prevents discussions regarding the size of the project or the application delivered and the product quality.

Organizers:
Hans Kuijpers
Harold van Heeringen
Rini Scholten
Frans Schoot Uiterkamp
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Hans Bernink
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