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A PUBLICATION OF THE INTERNATIONAL FUNCTION POINT USERS GROUP

NEW TRENDS

in Measuring Software Size to Answer Questions About Productivity and Software Value

PRESIDENT'S MESSAGE

This issue of *MetricViews* is all about the "New Trends for Using Software Size to Answer Questions about Productivity and Software Value." As stated in the request for articles, "the need to measure the value IT delivers is strategic."

IFPUG has been focusing on the need to have the right processes and tools for strategic decisions, and one of these needed is to be a stable and consistent size measure. During the last 30 years, IFPUG has seen several great presentations about using IFPUG Function Point Analysis (FPA) to show value in contracts, delivery performance and estimates. The presenters are often one of our very knowledgeable IFPUG volunteers. In 2007, I gave the presentation "Estimating As An Art: What it Takes to Make Good Art" at a PMI event in Madrid, which was a well-received presentation at that time. Unfortunately, the reasons for improving the estimation in almost all software projects still stand, but new approaches and methods complemented our thoughts in 2007. 2007 was also the year we started the first talk about a non-functional size measure for software—today known as Software Non-Functional Assessment Method (SNAP). Looking at the past, present and new trends, it is obvious that IFPUG FPA and SNAP are still "current and relevant."

The news about the European Parliament usage of the IFPUG sizing methods for their IT development contract recognized IFPUG FPA and SNAP for a) Price modelling, b) Comparison of solutions, c) Schedule improving, d) Monitoring and control and e) Delivery confirmation.

This usage is excellent evidence of the understanding of the needs to measure the value both from an operational and user perspective—as a way to measure the value of IT deliveries from a strategic perspective.

IFPUG FPA and SNAP both being industry recognized standards (ISO and IEEE), and with the broad base of very knowledgeable resources within this area, I am sure that this is just the beginning of a new trend.

This edition of *MetricViews* includes a team of reviewers to validate and evaluate the articles and thereby acknowledging the quality and validity of the content—a new trend for IFPUG in the publication of *MetricViews.* I want to thank everybody on the team and all the authors for your dedication and time in the creation of this edition. Thanks.

I am looking forward to reading all the great articles and looking forward to seeing events or other volunteering of engagement that can come out of this edition of *MetricViews.*

Yours sincerely,
Christine Green
IFPUG President (2019-2021)

MetricViews

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EDITOR'S MESSAGE

Dear reader,

Perhaps you are reading these words from the United States or from India, from Brazil, France, Malaysia or Italy. Or from Spain, Canada, Israel, New Zealand or Japan. The aforementioned list is just a small number of countries: IFPUG is the worldwide organization where the sun never sets. With decades of trajectory, the IFPUG methods are considered the IT sizing standards and even inspirator of other methods.

The circumstances during which this *MetricViews* edition sees the light, and has been written, is a little bit different: COVID-19 hit the world, has changed a lot of things in the economy and in life; created a sad history of loss of human lives, crisis and negative effects. We hope that this pandemic period will be history as soon as possible.

Under this universality mentioned above, in this issue you will find articles written by authors from Asia, North America, South America and Europe. Some of the articles are related to inspiring **experiences,** such is the case of how the IT department of the SNCF group (Société nationale des chemins de fer, the France's railway company) has developed a new valuation method based on the IFPUG Function Points, or the testimonial of the different uses of the IFPUG method to manage projects in SDM Conseil.

You can find interesting articles linked with **Agile,** such as the art of measuring iterations and measuring the health of squads and tribes; others linked with **COVID-19,** such as to determine with metrics if the software productivity has increased or decreased during COVID-19; how to manage projects with efficiency during this pandemic period or the importance of the value that IFPUG brings in the **requirements** phase. IFPUG answers in numbers the productivity and the value that the software provides; those answers cannot be possible without measuring the software size.

Thanks to the authors, experts in the metrics, to the different IFPUG committee chairs who have shared the committee life and news, and thanks to the *MetricViews* editorial board comprised by worldwide recognized experts in metrics and project management. All, together with a set of great people behind of the scenes, have made this publication possible.

Greetings, thanks and take care!

Antonio Ferre Albero

FEATURE ARTICLE

By Sushmitha Anantha

REQUIREMENTS STANDARDIZATION:

WOULD IT BRING VALUE TO FUNCTION POINT ANALYSIS?

Agile Manifesto talks about "working software over comprehensive documentation." Can this statement be interpreted as requirements documentation is inconsequential and not worthy of the time?

No, such interpretation would be wrong. It is always important to have complete and well-written requirements irrespective of which methodology is followed for the delivery of the project. If a project uses Function Point Analysis (FPA) for estimation, productivity measurement or any other purposes, documentation of requirements becomes highly vital. In this article, we shall try to explore important aspects such as requirements standardization and relationships between quality of requirements and quality of Function Point Sizing.

Gathering and analyzing requirements is one of the initial stages in the software development process irrespective of whether the Agile or Waterfall methodology is being followed. During the requirements phase of the project conceptualization, an agreement must be reached between the client and the project teams as to what exactly the final product should do and how. Without proper documentation, such agreements cannot be arrived at.

Requirements are the most crucial documentation to start the project and influence project planning, estimation and pricing. They guide subsequent phases of the project such as high-level and detailed design, test planning and test case design.

Requirements are generally expressed in language preferred by client and project teams and outline what is expected out of the product. Organizations may have some standard documentation structure for defining how to arrange different types of requirements and which document formats to use. Beyond this, the requirements themselves are usually written by different individuals who follow their own writing style. Due to this, we often encounter requirement documents which are varied in level of detailing, balance of technical/functional content and usage of standard diagrams (or lack of).

Requirements Standardization

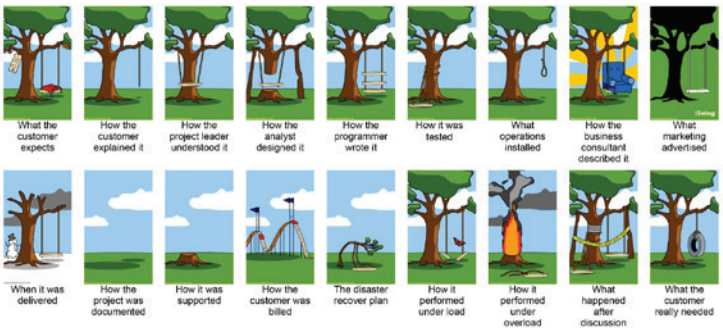
Requirements Standardization is an attempt where a team or a project follows a set of rules while documenting requirements to make them more homogenous and to generate consistency in writing styles. Agreed standard is applied to the documentation produced in the Requirement Analysis phase of a project, including the requirements, use cases or user stories, diagrams and process flows.

This paper shares the experience of requirements standards that are formal but not written in a coding language, for example UML (https://www.uml.org/what-is-uml.htm). Whilst UML can be processed by a "tool" to give the functional size, the investment in the requirements development environment (tools, training, etc.) was not justified.

Generic IT Standpoint:

Expert business analysts observe that consistency gained from standards would improve readability [1]. Consistency allows other team members and stakeholders to quickly understand what is written. As the reader of the documentation is familiar with one style, the time spent reading the documentation will be focused on content rather than figuring out writing style or learning the author's language. Perspectives of multiple stakeholders largely dependent on requirement documentation, consistent approach will ease out the process of review and arriving at consensus.

Software Development Life Cycle



Likewise, standardized documents can be peer reviewed efficiently. Similar writing standards across teams can simplify the review process. Standard documentation will as well optimize project transitions. Writing in similar styles allows someone new to the project context to review the document and focus on the content as opposed to the language choices and styles of expression.

Function Point View:

An adequate level of information conveyed in a requirement or user story documentation enables effectiveness of FPA. From the requirement documentation, an FP analyst can gather details like impacted transactions and get an indication on changes to logical files. Sometimes, even details like DETs and FTRs are available in the detailed requirement documents. On the contrary, when requirements are documented in a very high level, an FP

analyst will not be able to gather the details needed.

When programs have FP-based pricing contracts, productivity measurement or estimation processes it is worthwhile to standardize overall documentation style. This includes not only standardization of requirements, but that of design and testing artefacts as well.

Zooming out a little from here, user requirements usually constitute of Functional Requirements and Non-functional Requirements (NFRs), which focus on product and project requirements as outlined in ABC Schema by Luigi Buglione [2]. Standardization of Functional Requirements achieves better quality of FPA and that of NFRs increases implementation potential of Non-Functional sizing technique such as SNAP by greater extent.

Challenges in Standardization

There are some potential shortcomings that should be considered while developing a standard for requirements documentation. It is important to understand the downsides as well. First, enforcing such standards will take project time and additional efforts, and many a times, documentation standards may get ignored. Core benefit of standardization comes from reduction in communication gaps and reduction in time spent on internal reviews as efforts are focused on reviewing content over language, grammar and format. On the other hand, if the suggested standards are not followed, excess time is spent in the review because the document is being reviewed against the standard as well as the content.

Such standards can create more headaches than they are worth if not implemented holistically and not executed in a rational manner. To be useful in the larger scheme of things, it is important to realize that requirement standards should not be viewed as immutable.

Requirement standardization aims at bringing some amount of uniformity in the way requirements are written. It is important to note, one size doesn't fit all. Hence it is not a wise idea to define a global standard for requirement writing and force them down the throats of project teams big or small. Here are the few aspects to remember when attempting requirement standardization.

1. **Assess if standardization is required in first place:** For very small teams, standardization may not bring desired value and sometimes it may be counterproductive to impose stricter and thorough standards on such teams.
2. **Start small, scale later:** It is better to define a limited set of rules for requirements writing and introduce it to a smaller team. With this, time and efforts that go into standards definition and implementation can be optimized. Once a model works well for the small team, the process can be extended to other teams.
3. **Be flexible with rules:** Adoption of standardization with least frictions is a desirable outcome. If there are larger points against standardization, it may go into never-ending debates than having them implemented.
4. **Anticipate criticism from established teams:** Teams may have been working comfortably without written standards for writing requirements, user stories or use cases. Asking them to accept a new process around documentation would be certainly challenging. Also, the new rules and standards may completely get ignored. Bringing out clear benefits from prior standardization experience from other projects or teams may help acceptance.

Requirements are the most crucial documentation to start the project and influence project planning, estimation and pricing

Some guidelines for requirements writing are discussed by Joy Beatty in her blog [1] and by Guido Moretto and Maria Teresa Doriguzzi in their GUFPI-ISMA 2019 presentation [3], which I feel are simple yet powerful:

- Requirements should take the form of "(subject) shall (action verb) (observable result)." For example, "System shall display a list of all insurance schemes applicable for logged-in user, sorted as per selected preferences."
- Use case names should be of the format (Perform Action on Object). For example, "Add Course to Training Program." If the same functionality is described in multiple use cases because the actor is different in each, then add "for (actor)" to the end of the use case names.
- Use case names should be consistent across requirements, if there are multiple requirements mentioning the same use case.
- Each step in the use case should describe a single, discrete action by the user or the system. Multiple actions should not be combined into a single step.

As we follow these simple rules, potential elementary processes and logical files manifest inherently in the description, which help FPA by great extent. Among the mentioned examples, we can clearly identify "List of Insurance Schemes" and "Add Course to Training Program" elementary processes. "User," "Course" and "Training Program" could be potential logical files. Remember, good requirements are measurable [3].

Function Point Analysis and Requirements conceptually exhibit a fine two-way relation

Synergy Between Function Points and Requirements

Taking the interest of the Function Point community into consideration, this topic seems incomplete without mentioning the fine synergy between Function Points and Requirements. Function Point Analysis and Requirements conceptually exhibit a fine two-way relation, where FP Analysis can guide standardization and quality improvement of requirement documentation and standard requirements improve the quality of FP Analysis.

An interesting paper by Carol Dekkers and Mauricio Aguiar discusses in detail how FPA can help in improving completeness of the requirements [4]. The authors discuss in detail, evaluation of rules and consistencies while performing FPA has the potential to unearth requirements which were either assumed to be implicit or missed altogether. Point Analysis technique serves as a framework and offers the analyst one extra frame of reference to measure the completeness of the known user requirements.

In one of the programs I had worked on, the delivery method had been changed from Waterfall to Agile method. They started documenting all the project details in Jira (issue tracking and collaboration tool by Atlassian) compared to an earlier method of maintaining MS Word documents and placing them in a repository. The program had FPA in place for meeting the year-on-year productivity improvement targets. The project team was facing shortage of time to participate in longer discussions on Function Points. It was decided to focus on improvement of documentation in order to reduce the time taken in FPA.

Based on expert opinion, minimum viable improvements for documentation were suggested. Also, Jira framework for documentation was defined based on the suggestions. This method

was rolled out for a few of the application specific teams. We were able to achieve significant reduction in time taken from FP analysts to perform the FP sizing at the same time the project team's involvement for FPA was reduced to almost nil.

Requirement Documentation Before:
OMS user should be able to view Top 5 offers based on Customer preference which should be editable as per conversation.

Requirement Documentation After:
As a Customer Service Representative, I would like to view Top 5 offers applicable to the customer in the 'Offers' tab. 'Offers' tab needs to be added to Customer Details page. Based on Customer inputs, offers can be opted for or ignored. It should also be possible to Delete offers based Customer interaction.
(Additional Details were traceable from the comments section of Jira)

Simple example shows requirement documentation before and after the roll out of the documentation improvement initiative.

It was observed that, with a standard way of documenting requirements, FP analysts find it easy to understand the requirements and to focus on details than spending time on figuring out "different styles of expression." Quality of Function Point sizing improves when requirements are complete and standardized.

Conclusions and Next Steps

Requirement Standardization brings consistency in the requirement documentation process and reviews. It also enhances understandability between project stakeholders and improves communication. Effort spent on strict standardization rules may not bring more value when dealing with small project teams.

Focusing on Functional Requirements of ABC Schema [2], Quality of FPA depends greatly on availability of detailed documentation and availability of project experts to provide the right context. In absence of subject matter experts, documents become the sole basis of FPA. In such situations, it's essential to have the documentation standardized by defining how requirements should be written. Also, the completeness of the requirement documentation should be ensured to achieve good quality of Function Point sizing. Standardization of Non-functional requirements for enabling measures such as SNAP must be explored in detail.

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About the author:

Sushmitha Anantha is a Function Point Expert and Productivity Champion working for a leading Services Organization. She is the current IFPUG Partnerships & Events Committee Chair. She has worked for more than a decade in the fields of function point, related metrics and function points productivity measurement in different domains, methodologies and technologies. She has authored various whitepapers related to function point measurement and metrics. Sushmitha is an IFPUG Certified Function Point Specialist.

FEATURE ARTICLE

By Emmanuel Berthomé, Jean-Pierre Scappaticci, and Jérémy Torrent-Bassin

Management of Digital Performance and its Business Value

We currently observe a cultural change in the IT world: IT services are no longer seen as a mere cost factor, but equally as a veritable operational driver of business transformation [1,2]. As a consequence, IT departments need to help the users to select the most value-adding projects by sharing measurement methods and growth factors.

The IT departments of the SNCF group [3], a French public railway corporation, and Semantys [4], an IT consulting firm, have developed a new valuation method in this context, which is based on the IFPUG Function Points (FP). This method extends the FP analysis by additional deliverables that are based on the Basic Functional Components (BFC) from a classic Function Point Analysis (FPA). It is the goal to focus the projects on the most value-adding elementary processes and data groups. The projects rely on their value creation for the user and anticipate their future purpose.

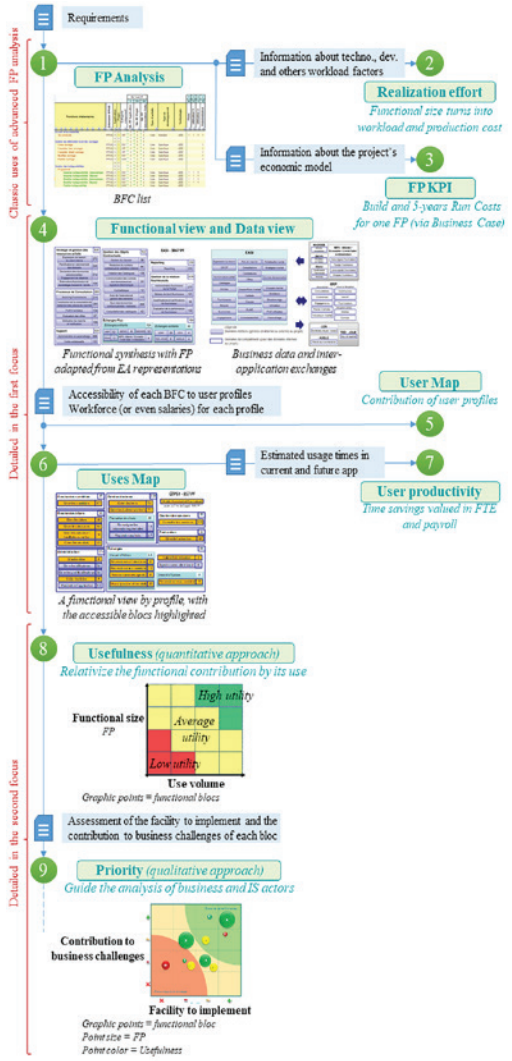
This advanced evaluation of the BFC list breathes new life into the existing FP analysis, which has served the SNCF as a workload estimation method for more than 20 years.

> *IT services are no longer seen as a mere cost factor, but equally as a veritable operational driver of business transformation*

This article will briefly describe the steps of this method. The illustration of the advanced steps will be the later focus of this article. The last part will present the realisation within the SNCF and the results.

Overview of this valuation method

The description of this method has been part of a more detailed white paper, available in French [5]. Its major steps are briefly presented in the following:



(1) A **classic FP analysis** is performed at the beginning of the project (after the requirements have been formalised). Extra care is taken at this step since this is the basis for the use cases.

(2) The project delivers information regarding the technology stack, the type of development, and other factors that have an impact on the workload/costs/delays. After this, the **workload** can be estimated with details per phase and actor, which is important for challenging suppliers.

(3) The project's economic model is analysed to calculate the **indicators** necessary for the governance structure (in €/FP).

(4) A **functional view** and **data view** are built, based on the BFC list. This facilitates the stakeholders' comprehension (sponsors, internal and external partners). The number of FPs is annotated on them. These views reflect the major principles of a functional formalisation found in the enterprise architecture (EA) [6] (see focus).

(5) Every line of the BFC list is associated with the accessing user profiles. There is a subsequent analysis to identify the respective contribution per user profile (**user map**).

(6) The user data are integrated into the functional view to make the **uses map**. The accessible blocs are highlighted per profile.

(7) It is possible to calculate the **users' gain in productivity** by the project. A study of use times per functional bloc and per user profile would be necessary. This requires a chronometric examination of the existing application and an estimate of the use of the target.

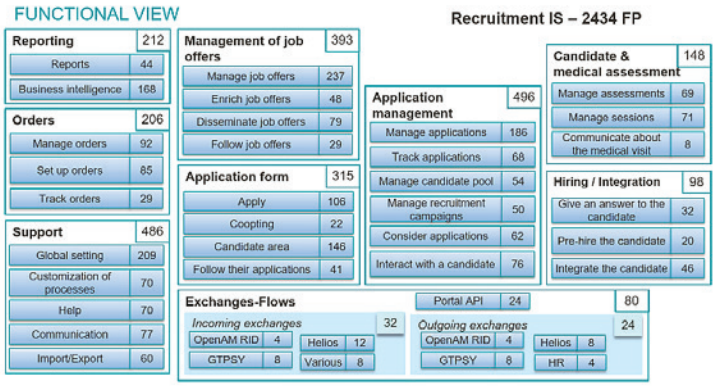
(8) The first graph represents the **usefulness of the functions**; all functional blocs are positioned according to their use volume and their size in FPs. A bloc that is placed at the extremities of both axes could be interpreted as "highly useful" (see focus).

(9) In the second graph that represents the **priority of functions**, each functional bloc is positioned according to their business challenge and their facility of implementation. This qualitative information depends on the context of the project. It is collected in a workshop with the maximum of project team members (business, IT).

Focus on the functional view and the uses map

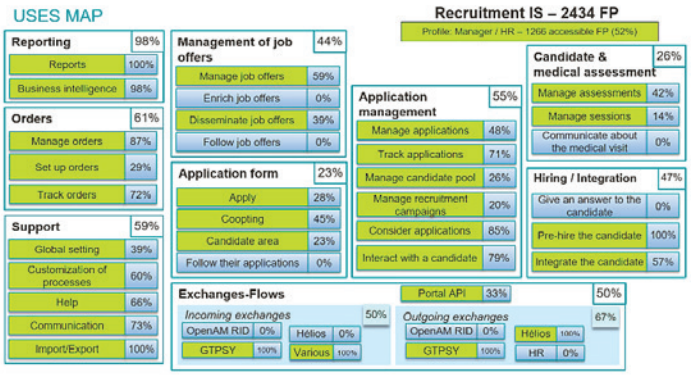
Functional view

This step is based on the proposition of Semantys to synthesise the data and functions and present the result of an FP analysis of a project [7]. There are certain EA rules and formalities to be applied. The BFC list is regrouped in functional blocs (or macro-functions). This allows the representation of the view on one page. It requires the limitation of macro-functions.



Uses map

By adding the information of user profiles, the BFC list contains the correspondences between the user profiles and the elementary functions they use. Therefore, it is possible to decline the functional view for the different user profiles within the uses map. The accessible macro-functions are highlighted per user group. The ratio of functions available to a particular user group per macro-function is calculated.



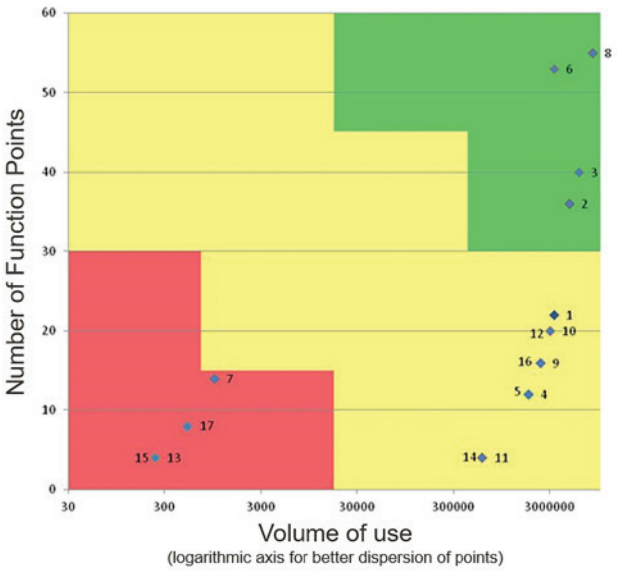
The uses map aides the planning of a project and answers the following questions:

- Who is the key user that has to be addressed in the various workshops from conception to delivery?
- What are the training needs for the various user profiles?
- How many training sessions are necessary?
- How does the user manual need to be structured?
- What types of troubleshooting processes are needed for users?

The following steps of the method allow a quicker understanding of each function's purpose, ranked by their user numbers or their use time. This also shows which function is useful (accessible, usable).

Focus on the prioritization of the functions

A graphical presentation of macro-functions according to their functional size and their use volume (relative to their number of users) enables a visual determination of their "**usefulness**." This is the relationship between the functional input and their usage. The goal is to compare macro-functions within a project. The



extent of employment depends on the context. Depending on the visibility, an identifier is attributed to each macro-function to name the different representations.

In this graph, you can see in green an important functional contribution that is matched with an important usage. You see in red little functional contribution and few usages. At this point, we do not judge the business value of a bloc. The used data is quantified and objective.

Even if the project is not conducted in an agile mode, the results allow the team to better plan and rank their functional requirements

A second, more qualitative, approach consists of analysing the macro-functions according to two new axes: their facility of implementation (according to the complexity level of development and deployment) and their level of response to business challenges.

The different business and IT project referents evaluate the **facility to implement** of each macro-function with the help of a matrix that contains several criteria such as technical feasibility, business feasibility, time of the realisation, time of the deployment, user acceptability, and other actors' acceptability.

The business referent evaluates the **contribution to business challenges** of each macro-function with the help of an advanced evaluation matrix and a survey based on the MAREVA method [8,9] (value analysis method recognised in France). The axes of the matrix are the following risk factors (to be defined by the organisation, in this case, the SNCF):

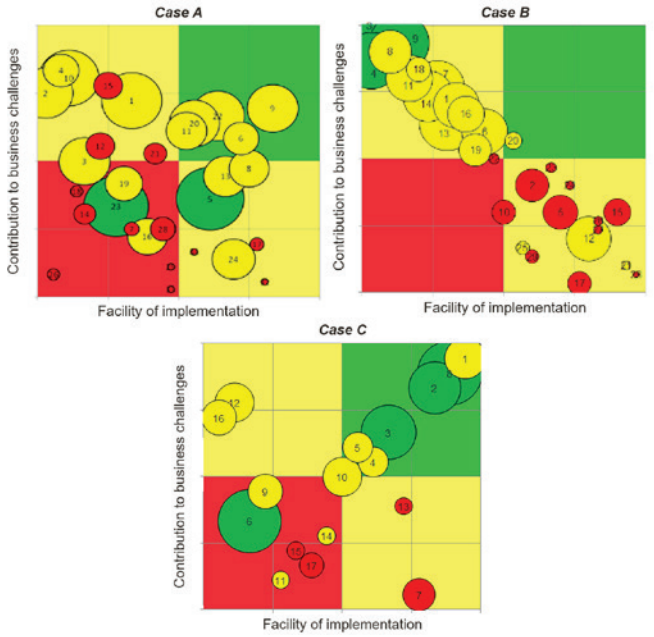
- Client (client experience, the image of the company)
- Security (passenger security and circulation; regulatory and legal conformity)
- Staff (commitment, social climate)
- Economic performance (revenue, margins)
- Industrial performance (regularity of circulation, operational productivity)

If there is not discrimination among the macro-functions (e.g., a highly specialised software), the business referent ranks the importance of the macro-functions (simple ranking numbers).

Matching the notions of the facility with challenges and by adding the notions of size and use, **the graph allows visually prioritising of the macro-functions**.

The colour of the bubbles corresponds to macro-functions usefulness (cf. precedent graph) and represents their functional contribution that is correlated with their level of use. The size of the bubbles is proportional to their FP size. The green zone corresponds to the prioritised macro-functions that contribute to the highest business value and are the easiest to deploy (and the opposite in the red zone).

You see below three real cases as an example:



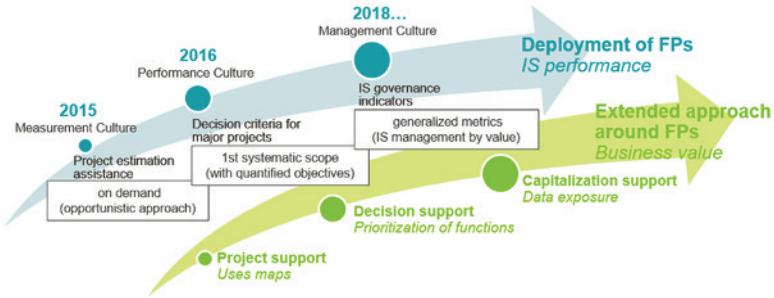
- Case A: Classic project based on a package (large and highly used functions, but with little value/business importance).
- Case B: Project with a package requiring strong expertise (useful, but difficult functions).
- Case C: Project with a package for technical supervision (the most used, easy functions).

These results can be used for the decision-making process. They allow a prioritisation and an arbitrage, in a product backlog for example. Even if the project is not conducted in an agile mode, the results allow the team to better plan and rank their functional requirements. They furthermore improve project management and deliver value.

Please note that this method does not take any functional or technical dependencies among macro-functions into account. This has to be analysed as part of another scope in order to make the final choice.

Advantages and use cases observed at SNCF

The complete method has progressively been integrated into the IT governance at SNCF for three years. SNCF deployed that method systematising the evaluation of all of their projects that have been submitted for validation to the SNCF IT Project Validation Committee (PVC). This committee validates and follows up on projects with a budget higher than €3M (build and 5-years run budget, devices included). The central unit in charge of FP measurements and the conduct of this valuation method, has analysed to date a portfolio of 26 projects (roughly 70,000 FP).



This process often starts by simply sharing the results of measures before including all the actors in the process:

- The IT buying department to complete the tendering process
- The IT sourcing/contract management (in the case of service centres) to respond to the demand of different types (counter-estimation, performance audit, a measure of the project progress)
- The management of an IT portfolio to use the KPIs based on FP as scoring criteria (build and maintenance FP costs)
- The enterprise architecture to complete the EA repository in the event of new projects (business, functional/applicative, technological and data views) and to make the connection with the requirements management or other actors (e.g., chief data officers)

Deploying the method, the use cases have been enriched and have completed the classic workload estimation and the use of the FP KPIs. They can be classified into three families:

- **Project support**
  - o Evaluating the workload of developing a project,
  - o Structuring and sharing the project functionalities thanks to the functional view,
  - o Identifying the key user profiles for conception and acceptance workshops,
  - o Structuring the user training,
  - o Prioritising the product backlog of an agile project,
  - o Determining the necessary competence level for the project team,
  - o Managing an agile project according to the delivered value (in addition to the velocity);
- **Decision support**
  - o Comparing the performance of a project within a portfolio or the market,
  - o Choosing between a specific development and the use of a package software as a service,
  - o Challenging the proposal of a supplier;
- **Capitalisation support**
  - o Measuring the real productivity of a project,
  - o Quantifying the productivity gains for the user,
  - o Identifying the data to share with other projects,
  - o Represent the functional contribution of a project in one view.

Conclusion and perspectives

This method assists the project teams in their response to business needs by offering a maximum value. This method also delivers performance drivers to governance, EA, and sourcing teams. It helps to assist and master the digital transformation of a company. Upstream of the project, the method also supports the teams in their elaboration of their economic model by objectifying the cost and benefits estimation to justify the investment.

The four big contributions to retain:

- Performance evaluation of projects (workload, KPIs)
- Formalisation of the functional value of projects (the synthesis in line with the EA and other business users, based on the FPA)
- Analysis of the business users' productivity gain in their routines (gain per function and global gain FTE)
- Prioritisation of functions to develop and the data to expose, thanks to the link between FP, their volume of use, their business value and their facility to implement

By continuing to deploy the method at SNCF, new use cases are emerging and the method is enriched. Currently, we are deepening decision support on which data to expose to the business ecosystem. An equivalent prioritization process exists for data in response to the challenge of exposure and business value. In addition, during the project review after application deployment, the initial study serves as a reference for restoring upstream knowledge and choices. ■

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FEATURE ARTICLE

By Patrick Viscaino and Noémie Andre

IFPUG:

THE RIGHT METHOD FOR PROJECT MANAGEMENT

This article presents the different uses of the IFPUG method to manage projects with Function Points in SDM Conseil, a French independent company specialized in improving the software development, applying and using mainly IFPUG Function Points Analysis. The method mainly used during SDM Conseil missions is the Function Point metric and more precisely the IFPUG method (ISO/ IEC 20926:2009 standard).

The SDM Conseil methodology recommends that quotations be founded on IFPUG Function Points, helping clarify functional requirements shared between the client and the supplier

Indeed, thanks to this standardised unit, the method was able to bring added value to the good management of IT projects, by proposing a review of the needs expressed by the client and the deliverables expected at different phases of the project.

Very early in the project, when estimating the budget and thanks to the IFPUG method, SDM Conseil consultants were able to defend and justify to decision-makers the interest they had in launching a project in line with the company's economic strategy.

The IFPUG method provides SDM Conseil consultants with the ability to perform early estimates, establishing, justifying and defending realistic commitments that align with the company's economic strategy.

The SDM Conseil methodology recommends that quotations be founded on IFPUG Function Points, helping clarify functional requirements shared between the client and the supplier. Using this method, SDM Conseil consultants can identify what has not been described in the functional documentation and thus remove any ambiguities. When the ambiguity persists in certain cases, the certified specialists must explain and document the assumptions made.

These assumptions are generally verified in the end-of-project balance sheet.

It is indeed important to trace all the assumptions and decisions made during each quotation phase in the functional nomenclature resulting from the Function Point counting.

The IFPUG methodology and its implementation

When decisions are taken to remove certain ambiguities, it is advisable to create a company-specific guide that will be the complementary reference to the IFPUG method and refer to it whenever useful. This guide should contain all the rules and assumptions implemented for each project that is subject to contract with Function Points. It is part of the deliverables shared between all the project stakeholders.

When writing general functional specifications or functional requirements in the broadest sense (user stories for example), it is important to formalize the requirements in a precise manner. This will allow validation of the functional coverage of the project, while also identifying the users impacted by the project. It is also strongly advised to work with the business teams who write the functional requirements.

By proposing a revision of the requirements and referring to each requirement during the production of the quotation using the Function Points, a formal contract between the two parties (customers and suppliers) will be drawn up, which will serve as a guideline and initial contract for further development.

Finally, during the quality review of the delivered product, the quotation in Function Points makes it possible to check if the number of Function Points described in the initial contract corresponds to the total number during the project review.

This method allows to establish precisely in the initial contract the exact definitions of the customer's expectations regarding the delivery of Function Points (definition of the Function Points delivered) and to set up a contract between the customer and his supplier based on a standardized and non-questionable metric. The customer therefore pays a deliverable in proportion to what has been delivered.

Above all, this method is an incredible tool for preparing test cases, because the IFPUG method is based on functional requirements and lists all the functionalities of the business process. Nothing is easier to create the test cases that will be executed when the software is delivered.

Of course, the IFPUG method does not stop at the study of functional need, which is only the beginning and the heart of the IFPUG FP method.

How does the IFPUG method take in consideration non-functional requirements (NFRs)?

This step consists of analysing the NFRs, which are important for certain projects. For this, there are several solutions, one can use the Value Adjustment Factor (VAF) which assesses 14 characteristics of the IFPUG method (well known by CFPS experts).

This factor then allows the value of the Function Points to be adjusted within a range of plus or minus 35% of the adjusted number of Function Points. It is worth noting that the VAF is not part of the ISO/IEC 20926 functional sizing standard as many of the characteristics are considered "non-functional."

The non-functional project considerations are often collected as project attributes or part of an assessment. Most estimation tools and models such as COCOMO collect non-functional attributes and then adjust the effort, quality and schedule accordingly.

The IFPUG Software Non-Functional Assessment Process (SNAP) method is the foundation for IEEE 2430-19 Standard for Software Non-Functional Sizing Measurements. IFPUG therefore provides guidance for functional and non-functional requirements.

The suppliers and customers must understand, that if Adjusted Function Points are being applied, how non-functional requirements and project attributes impact the project commitments. Obviously, if pricing and payment is based on Function Points, knowing if Adjusted Function Points are being applied vs Unadjusted Function Points is a critical aspect to clarify payment calculations.

This is why, when drawing up a possible contract based on the Adjusted Function Points, it is essential for the supplier to analyse the sizing method described, its conditions of implementation, tools and other methods and the role that the supplier must have in the project (division of tasks/ scope between client and supplier on the project).

The supplier must understand, be comfortable with, and demonstrate transparency of the measures and attributes collected and how costs, prices, schedules and other elements that comprise agreements are calculated and negotiated. Global fixed priced contracts at SDM Conseil are typically based on Cost per Adjusted Function Point.

Customer-supplier trust: a major challenge

However, it is not only the implementation of all these steps that makes this method indispensable in project management today.

Most of the time, the main causes of misunderstandings between customers and suppliers are related to:

- Lack of clarity (poor, incomplete, vague documentation)
- Project "churn" due to changing/ evolving business and technical requirements
- Lack of proactive, effective collaboration and partnering with various stakeholders and team members

The IFPUG method helps avoid these misunderstandings that generate endless discussions, often ending in a bad relationship between the parties. It allows suppliers to commit themselves without having to justify themselves to their hierarchy.

Thanks to the IFPUG method, a **win-win contract** will be obtained.

In an international context, experts may meet clients who have not yet sufficiently explored the needs covered by their project or who find it difficult to trust an independent third party using the IFPUG Function Point method.

It is also the role of IFPUG experts to adapt their discourse to reassure these distrustful clients, using the solid arguments available to the method to reassure them and convince them of its usefulness.

The Function Point Analyst must understand and analyse the needs expressed by the customer and, with the support of the supplier, study all the possibilities of the processes and thus complete the expression of the needs in Function Point measures that will then have to be delivered by the suppliers.

The objective is to create a sincere and genuine professional relationship of trust between customers and suppliers in complete impartiality.

The results obtained by scrupulously applying the IFPUG method cannot be called into question, as it would not be the case with a calculator if the "EQUAL" key were pressed.

Framing the needs, an essential step for a precise analysis

Some missions are more complex than others because Function Point Analysts are often called to the rescue at the last minute and act as "firefighters," they intervene when the fire has already started.

The experience of the IFPUG analysts helps to find solutions, but this kind of inconvenience to companies could be avoided if customers and suppliers relied on the know-how of certified experts, for example when drawing up contracts. Determining the cost of a Function Point is not simply a matter of taking Function Points and man-days and trying to correlate them.

On the contrary, it is a question of establishing a reference baseline of values specific to each company by having a common unit,

the Function Point, and thus benefiting from internal and external benchmarks. This approach is not only valid for suppliers but also for customers:

- For the supplier, this allows him to respond to an invitation to tender while being able to justify his prices (in particular by evaluating his risks, his capacities,...), position his offer in relation to the market while knowing his internal productivity (number of Function Points produced per person day) thanks to key performance indicators (KPIs).
- For the customer, this method allows them to study the data and information more easily, by comparing the coverage of their functional need, considering the non-functional characteristics with the proposed price.

The IFPUG method, as well as the defined counting process, makes it possible to value the cost with a mathematical method that is not debatable

The IFPUG method, as well as the defined counting process, makes it possible to value the cost with a mathematical method that is not debatable. The customer can thus study and choose the supplier proposals, in a transparent way, reflecting on functional and non-functional requirements, project attributes, constraints, desired outcomes, performing comparative analysis of suppliers with internal historical experiences/ benchmarks.

The construction of an inventory of project measures that include Function Points is indispensable, especially when working in the public sector where expenditures are always under the microscope and where every expenditure must be justifiable.

When choosing the IFPUG method, it is important to bear in mind that an organization is set up based on professional and impartial trust, which the customer and its suppliers commit to respect from the beginning of the projects to their delivery.

The team/ organization responsible for the metrics program must be trusted and transparent with the focus of being fair and encouraging effective and efficient software delivery and support.

Function Point-based contracts require commitment from the customer and the supplier. The role of the Function Point Analyst is to collect and analyse data, transforming it into actionable information that is balanced for suppliers and customers.

SDM's recommendations for efficient analysis

The ideal organization for the software metrics rating team, according to SDM Conseil experts, is a team of 3 to 5 people (including at least one certified expert) working in the same time zones.

The team must have easy access to business requirements writers, experts, and decision-makers. Ideally, it must have at its disposal a dedicated documentation platform, to trace all the Function Point measurements carried out and a measurement repository with all the KPIs studied (time spent per project phase, major characteristics of the project: quality of the documentation, level of maturity of the teams,...).

SDM Conseil believes that the IFPUG method, beyond being an ISO standardized method allowing to value the functional size of a project, beyond measuring the progress of a project from a functional point of view, beyond measuring productivity and much more, is also the perfect tool to establish trust between partners whether they are customers, suppliers or others (user groups, MOA, MOE, Product Owner, Scrum Master...).

This is what most motivates in our company: creating a reliable bond of trust between the people involved in each project. ■

About the authors:

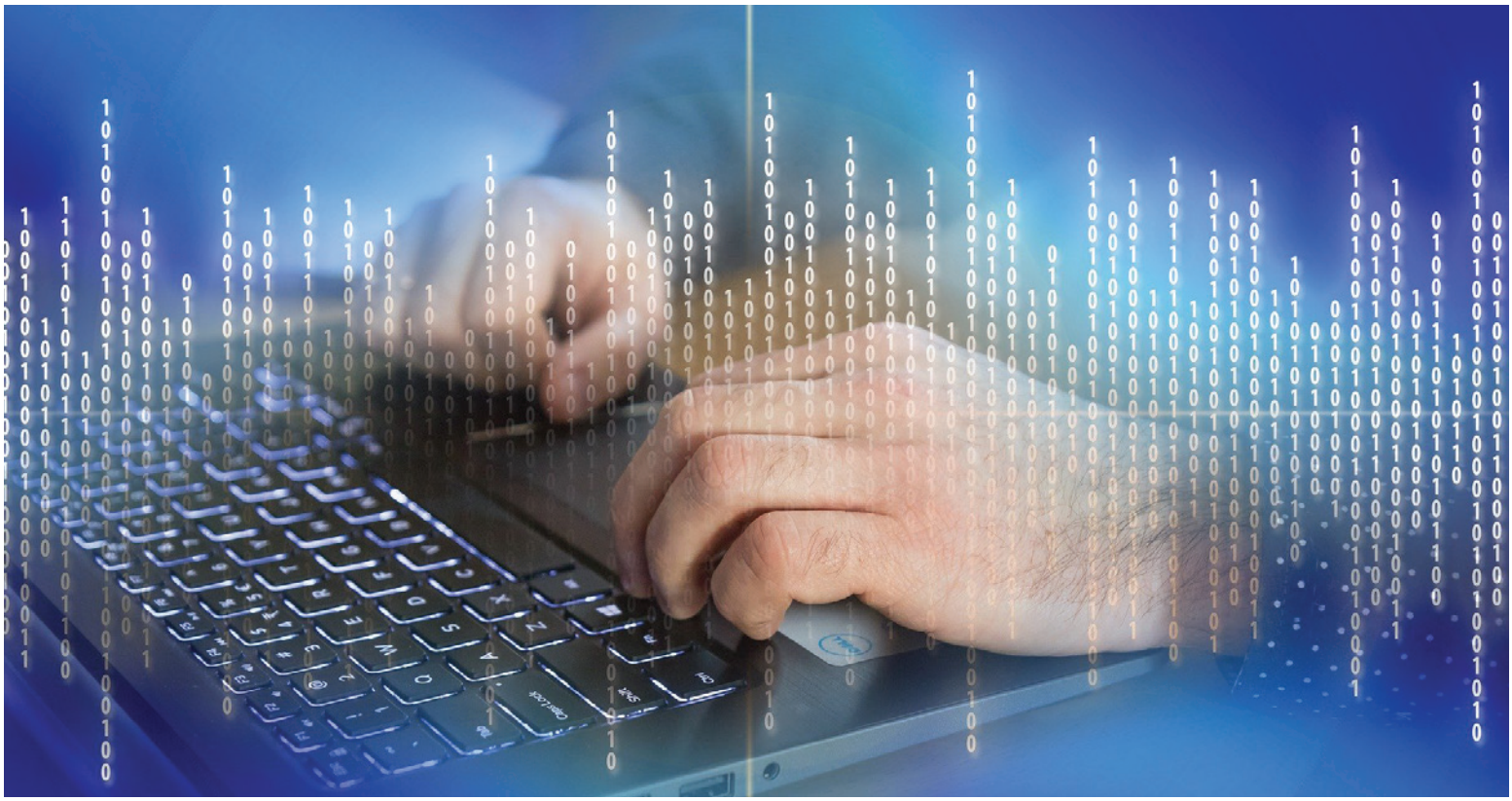
Patrick Viscaino is a CFPS Consultant and president of SDM Conseil, founded in 2014, which has the largest number of IFPUG certified experts in France with many years of experience (15 years or above for a majority). SDM works on many different projects, including with ministries, a national rail transport company, banks, major retailers as well as public administrations in France and in Europe.

Noémie Andre is a CFPS Consultant and has been working at SDM Conseil for several years. She has notably helped companies wishing to set up Function Point contracts. Her missions have been carried out for different companies and structures, with various organizations, both nationally and internationally.

FEATURE ARTICLE

By Carlos Eduardo Vazquez

EFFICIENCY MANAGEMENT AFTER COVID-19



Over the last decade, the United States has experienced a unique growth of its monetary base. The COVID-19 pandemic further increases it. In this same period, digital transformation and agile software development became a trend in business and software management. Priorities gradually have been shifting towards results in achieving the next best thing at all costs. After all, there has never been as much money available. Nobody can predict for sure how much longer it will last.

In this context, time is of the essence. Therefore, lead time, cycle time and reaction time are common metrics in agile software management. They provide insight about results, specifically about **time efficiency**. Although time is an important component to manage efficiency, it is not the only one. **Cost-benefit** is another. Agile software management addresses it mostly during product backlog prioritization at a lower level; or during the roadmap planning at a higher level. The idea is to maximize the overall ROI by determining which parts to deliver, such as a user story or a feature depending on the abstraction level where the prioritization takes place.

Productivity is a third component to manage efficiency. Some references include **price per unit** as a fourth component, although it is nevertheless a special case of productivity. Anyway, both require quantifying the product somehow. **And here is a gap, which must be addressed by C-level management** in this brave new world we are all entering.

What is the purpose of productivity measurement? When it comes to Function Points, the first thing that comes to the mind is to derive estimates. We want to know an average productivity, so we may extrapolate the cost and effort necessary to deliver a certain amount of functionality or to determine how much functionality fits in a budget or timeframe.

Agile software development prioritizes responding to change over following a plan; individuals and interactions over process and tools. Therefore, **estimation plays a far less important role than it does in a different context**.

Friend or foe

In fact, depending on the scope, estimation is closer to a foe than to a friend. Once you have a too conservative estimate for an item, there is little probability you will have it delivered earlier or use less resources. On the other hand, an item with a too aggressive estimate inevitably bends down to the weight of reality.

> *Function Points allow you to measure software in an ISO standardized business perspective*

Scopes in Agile development cycles, sprints in Scrum, tend to be composed of few backlog items. Furthermore, there is not a uniform relationship between effort employed to address functional development/enhancement and effort employed to address non-functional requirements. Therefore, why use parametric estimates based on function points, or even, estimate at all in the context of a Sprint? For project management purposes, daily meetings and Kanban tracking is enough to ensure delivery value at its end. However, **what about accountability**?

It is not about a user story

The whole is greater than the sum of its parts. In fact, when it comes to software solutions, it is even possible the parts are still unknown. **Function Points allow you to approximate software size** regardless of a detailed architecture or already elaborated requirements availability. Therefore, function points estimates are a solution for early estimates. However, **Function Points' primary benefit in Agile development resides in productivity monitoring at a higher level**. Function Points in this context is not about project management, it is all about governance.

Function Points measure software based on **how business determines tasks and services regardless of software building blocks; software non-functional requirements, such as usability and performance; and documentation.** After all, you can always trace screen, reports and interfaces to a business process at the user objective level—the task. While user stories' and other backlog items' identification and refinement along the development depends on project constraints and developers' decisions, **Function Points allow you to measure software in an ISO standardized business perspective**.

In fact, you don't even need to apply the method in its full extent; **although a full measurement may be possible, it may be not necessary** for simplicity sake and an approximation is the adequate solution.

A new face to face-to-face conversation

Before the COVID-19 outbreak, agile development equated to dedicated teams working as a locally based squad, even though its members were from different providers. Management is based basically on supervising and daily meetings and production sizing were measured in story points or any other form of technical complexity point; sometimes advertised as a functional or business measure, however both depend on development decisions and not on business workflows and operations.

If measuring overall production from a perspective understood and meaningful to the business was already important before, it becomes paramount when a new face of face-to-face conversation challenges the micromanagement paradigm. If I do not measure software production from such a functional perspective, how can I manage productivity on a higher level when comparing different squads against each other and against external benchmarking references? **How can I evaluate productivity from a development operation when actual low performance leads to user stories splitting and the sum of the derived user stories' sizes exceeds that of the original nondelivered functionality**? After all, the developers have control over the measurement components. ■

About the authors:

Carlos Eduardo Vazquez has more than 25 years of experience in software development, maintenance and management. He has been a function point analysis user (1991), instructor (1993), CFPS (1996) and CSP (2018) by IFPUG and COSMIC (2012); among the first Brazilians to hold them. He coauthored the book APF: Medição, Estimativas e Gerenciamento de Projetos de Software, currently in its 13th edition. He coauthored the book Engenharia de Requisitos: Software Orientado ao Negócio and became certified by the IREB (2016). Primarily a business-oriented professional, he founded FATTO Consulting, where coordinates research and development for consulting services.

FEATURE ARTICLE

By Fabrizio Di Cola, Nicolantonio Auciello, Domenico Geluardi and Daniele Zottarel

MEASURING ITERATIONS

IN AN AGILE CONTEXT: REALITY OR FANTASY?

The measurement with standard methods of iterative processes, especially when using agile approaches, is mostly underestimated in its usefulness by many of the agile teams. In the agile context, what we are trying to achieve is a way of estimating the effort that enhances the collaboration of the team, allows certain governance of the project but without any pretension of universality even between projects of the same company in order not to lose "agility" and speed. This is where Story Points are born.

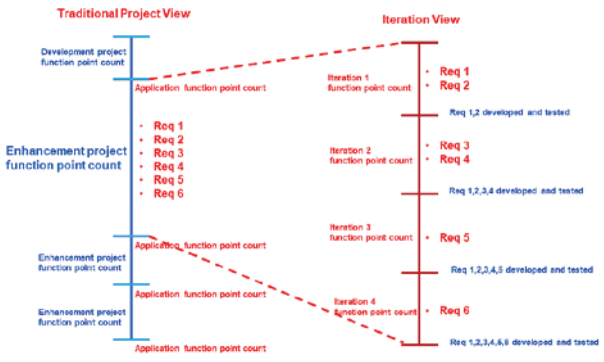
Let's see the other side of the coin. In contexts such as those of the Public Company, there are some unavoidable dynamics that require transparency of costs, comparability with certain sectors of the market and "ethics" in the management of the public good lead to a single solution: the use of software measurement metrics even in those sectors of the company that use agile approaches.

The need to capitalize the software and at the same time the governance of development cannot ignore the comparability of estimates, in the same company, but also between companies when this governance passes through a comparison of costs with the market. Does all this make it impossible to apply measurement methods together with an Agile approach? If the common goal is to make the company more efficient and not only to use an artificially chosen methodology, absolutely not.

Function Points and iterative processes: our approach presented at ISMA15

At ISMA 15, we had already illustrated a way to apply function points in an iterative process and in an agile context. Basically, the proposed approach was based on two tracks: the functional dimensioning of an enhancement and a structured way of estimating the velocity of an iteration.

In the example we presented, we consider an enhancement project with a traditional project view (for example an agile backlog) and an iteration view:



We have 6 requirements and divide this project in 4 iterations. We start with the first iteration pushing "Req 1" and "Req 2" in it. We suppose that we are a 1:1 relation Requirement to elementary processes ("Req 1" to EP 1, Req 2 to EP 2…) and we have 4 modified logical files (Logical File 1 to Logical File 4).

> *The proposed approach was based on two tracks: the functional dimensioning of an enhancement and a structured way of estimating the velocity of an iteration*

In the iteration 1 we count 20 FP:

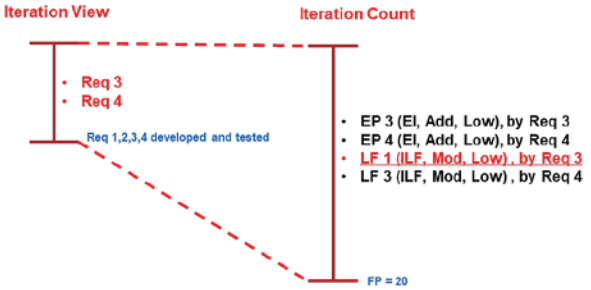
- EP 1, an EI, modified, low complexity, 3FP
- EP 2, an EI, modified, low complexity, 3FP
- Logical file 1, an ILF, is modified for the Req 1, 7 FP
- Logical file 2, an ILF, is modified for the Req 2, 7 FP

We have the same value of the enhancement project at this time.

In the iteration 2 we have two requirements ("Req 3" and "Req 4"). We count also 20 FP:

- EP 3, an EI, added for Req 3, low complexity, 3FP
- EP 4, an EI, added for Req 4, low complexity, 3FP
- Logical file 1, an ILF, is modified for the Req 4, so we count 7 FP. The second time this file is modified.
- Logical file 3 added for Req 4, an ILF, 7 FP

This is not the same number of function points added in the enhancement project. The enhancement project would be counted only the first time that logical file 1 is modified:



Then the enhancement project count is 20 FP for the first iteration and 13 FP for the second iteration.

However, after we count the first modification, if the following changes result in a complexity modification, we consider this case counting for the enhancement project the difference from CHGA and CHGB as usual. In the case of an agile context, the change in complexity would lead to an update of the backlog estimation.

In the iteration, to count "velocity" in function point, we count all time a BFC is modified. Iteration 1 is 20 FP and Iteration 2 is 20 FP.

In enhancement project, we count only the first time a BFC is modified. We have to justify the difference.

In case of multiple logical files modification, we have 2 situations:

- "Natural rework"
- "Change request"

It is certainly necessary that there is experience in Function Point measurement within the agile team

In case of an elementary process, this issue is not present. In fact, at the end of iteration all Requirements pushed in it are closed with the necessary level of quality. So, in the iterative process we have not "natural rework" in elementary processes, but we have this situation:

- "Change request," settled like logical file
- "Bad elicitation" of Requirements
  - o It is the case of an Epic we have not decomposed in user stories with the necessary level of granularity. We settled it like the case of a "change request" and used it like an index of poor level of requirements analysis.

We have to analyze the "Natural rework," the number of function points counted for iterations and the number counted for an Enhancement project:

- The modification of the logical file in the enhancement project is a "one-shot" modify. It includes all the small modifications to have the final result.
- The modification of the logical file in the iteration is a "micro modification." It includes only the subset of modification to achieve the iteration goal.

The difference of function points is justified by the higher productivity of a "micro modification" set than the "one-shot" modification in the enhancement project.

Function Points and iterative processes: applied!

After reviewing the example presented to ISMA, it must now be put into context and applied in reality. When to measure the backlog? When to measure iteration and therefore velocity with a functional measurement?

At least two alternative approaches to solve these questions can be identified. The first approach includes:

- FP backlog measurement
- Measurement of FP iterations
- FP Asset Measurement

This is a scenario in which the example described can be applied at all. The backlog estimation may not be done after each iteration but only, after the initial estimation, when the Product Owner needs to deeply review it. The FP measurement at each iteration allows the continuous alignment of the backlog to the result of the iteration. Finally, just this continuous update of the backlog leads us to minimize the final recount activities and therefore we only have to apply the application count update formula after evolutionary maintenance to update the company assets.

FP counting of each iteration may have a cost to the project and it is certainly necessary that there is experience in Function Point measurement within the agile team. The more widespread this experience is, the less iteration time will be spent on the measurement itself.

A second approach is to reduce the number of counts to just the size of the backlog:

- FP backlog measurement
- Management of the iterative process with agile estimates
- FP Asset Measurement

This approach allows for timely project governance at the beginning and end of the development cycle, as well as the analysis of the impact of changes to the backlog by recounting them when necessary. As an activity that does not follow the normal iterative flow, knowledge of FP measurement is not necessarily part of the team. The measurement expert may be involved in certain phases or in cases of critical changes to make an impact analysis.

However, this makes it impossible to manage velocity in a structured way. The user stories may not initially have the level of detail needed for the measurement (which only those ready to be included in the next iteration will have) and often the level of granularity is not adequate, so that some user stories of the backlog may be broken down into finer-grained user stories in the succession of "Product backlog refining". So, the initial estimates of the backlog could be very rough estimates.

This requires a mixed measurement approach to manage the iterations and the team could use the classical methods of agile process estimation such as story point estimation for iterations. Obviously the backlog will be estimated "twice" (once by the measurement expert with the function points and once by the team with the story points) and somehow this double estimation, although it may lead to an improvement of the agile team's relative estimates for comparison with the "methodological" estimation, could prove to be an extra cost.

Function Points and iterative processes: velocity with SNAP

The "agile" development is something empirical and pragmatic itself and only with an equally substantial approach can SNAP be dropped effectively in this area.

The measurement effort of SNAP is massive, especially when it is compared to the speed required in these highly iterative contexts. Two approaches could be useful for an effective use of SNAP in this context:

- Approach 1 ("Declaratory" (Estimation)): estimation of the impact of SNAP subcategories on the functional measure in terms of impact—High, Medium, Low
- Approach 2 ("SNAP measurement"): methodological measurement and use of conversion tables to determine the impact of SNAP subcategories on the functional measurement.

Approach 1 is suitable for velocity estimation. By using approach 2, at the end of the development (after the last iteration), we can make the "SNAP Measure" of the application to capitalize the software.

Conclusions

A company that wants to take a similar approach to the one described will obviously have to meet a number of prerequisites including a mature metrics culture and enough FP and SNAP meters to cover the needs. The choice of which approach to use of those described with Function Points can be the result of many considerations. Surely, if you want to do this, you need to invest in a measurement culture otherwise measurement in Agile contexts will remain just a fantasy.

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About the authors:

Fabrizio Di Cola got master graduated in Informatics Engineering. He had university research and private consulting experiences in the IT sector between 2000 and 2007. In 2007 he was hired by Sogei Spa as IT and Software Architect. He has been working in software measurement metrics as company reference in this sector since 2011. Currently he works as a teacher in CFPP/CFPS exam preparation and he has coordination responsibility in software measurement metrics experimentation too. He got CFPS in 2012, PMP in 2016, PMI-ACP in 2020. He is a member of the IFPUG's "Committee for Non-Functional Sizing Standards" since 2020.

Domenico Geluardi got a scientific high school graduation and gained experience in publishing sales. From 1999 to 2012 he worked as a consultant in the field of IT solutions in telecommunications and banking fields and in web solutions in the gaming and institutional fields. In 2013 he was hired by Sogei Spa, in the role of expert analyst and software developer. Currently he deals with analysis, software development and testing in the gaming and institutional sector. He was certified in CFPS since 2014. He has collaborated in the preparation of numerous presentations valid for IFPUG conferences and certification extension program.

Nicolantonio Auciello has more than 15 years of experience in software development. He is involved in the analysis and design of software systems and analysis of function points. Since 2017, he has been working on the company's metric expertise team, particularly in the study and testing of software measurement projects. Since January 2020, he has been working with the IFPUG committee to disclose the SNAP metric. He is also CFPP and PMP certified.

Daniele Zottarel was born in Rome in 1961 and got master graduated in Civil Engineering in 1987. He has been working as an IT technician since 1989 in Sogei. Currently he is the reference for the Data Warehouse solutions for the client Demanio Agency. He is certified "fellow" for IFPUG / FP (CFPS certificate for more than 20 years) and carries out methodological experimentation and consultancy as a company reference on the IFPUG metric.

FEATURE ARTICLE

By Sanoop Manjoor and Paramita Dutta Mandal

LEANING WITH SPOTIFY AGILE:
HOW TO MEASURE THE HEALTH OF SQUADS AND TRIBES

By now most organizations are already well versed and well equipped with Agile delivery methods and have already started to reap the benefits that Agile is designed to produce. With more and more companies transitioning to Agile and benefitting from it, organizations are now rooting for innovations in Agile to face the twin storms of incumbent competitions and insurgent ones.

This article talks about Spotify's immensely successful matrix design experiment to scale and transform Agile based on the concept of the Dunbar number. The Spotify model uses Tribes, Squads, Chapters and Guilds for self-organization to promote Agile way of work. Many organizations are now attempting to emulate the Spotify engineering model, carefully curating it to adapt to their company's culture and adjusting it as they make new discoveries along the way.

This article discusses the arrangements of a Spotify-like working model and the basis for measurements in this working environment. It further broaches the subject of productivity measurement of squads and tribes for optimization and value creation.

As most IT companies expand their verticals, increase their global presence and grow in strength (both its internal staff and external user base), their software products are becoming more and more complex. They are being forced to experiment with technology and product delivery methods. Agile and DevOps have been successful in many ways to cater to the end users by continuously delivering working pieces of software and to the organizations themselves by creating an autonomous workforce through "self-organizing" and "cross-functional" teams. However, as organizations grow larger, with teams spread across the globe, there is a need for employees to adapt their way of working continuously [1].

Spotify, one of the fastest growing music streaming companies, has been experimenting with Agile scaling as they keep growing from a few hundred to thousands of employees and with a few thousand subscribers to millions of subscribers globally. Staying true to Agile, Spotify has been encouraging its employees to run their own tests, learn what works and optimize accordingly [2]. This constant experimentation gave birth to a unique Agile scaling

method which has been a success in the way Spotify creates deployment-ready build artifacts and delivers its software products continuously.

Many enterprises are now restructuring their agile design principles by adopting the Spotify engineering model in order to scale and increase their organizational agility. The popularity of this scaling model is in its simplicity and ease of customization [3] with a clear segregation of responsibility. The squads form the backbone of this framework which are then organized into tribes, guilds and chapters to keep people aligned and help cross pollinate [4] ideas.

The spirit of Spotify agile are the highly engaged and autonomous development teams (squads) that contribute to productivity and success of product delivery. A three-step process has been devised to assist a squad in maintaining a band of healthy and highly productive players by taking their Squad Health Check [4] to the next level:

1. Measure the current state (baseline) of value delivery
2. Define appropriate KPIs and set KPI targets
3. Improve KPIs

About Spotify Agile [5]

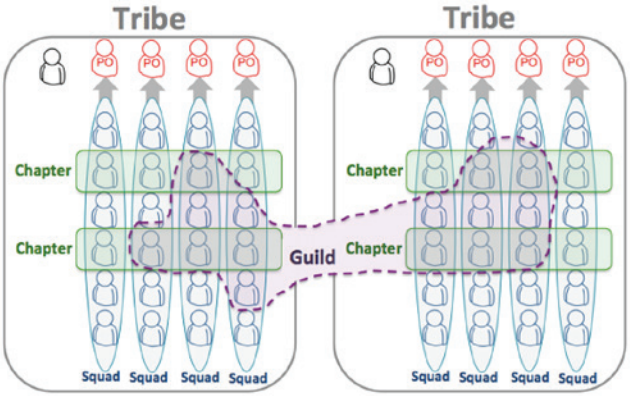

Fig 1: Agile unit as applied by Spotify [5]

This section briefly introduces the Spotify Agile model.

Squads

It is the smallest development unit designed like a "mini startup" having the overall product responsibility. The squads are self-organizing teams having all the skills and tools necessary to design, develop, test and deploy features. They decide their own way of working—whether to use Scrum, Kanban or a mix of several other approaches. Each squad has one long-term mission and sticks to one part of the product for a long time; they become experts in that area.

Squads have all required resources to make product-related decisions and are responsible for updating their metric scorecard based on experience in delivering the product features. This so-called product-aligned delivery speeds up decisions and implementation significantly because all decisions can be made within the squad [4].

The spirit of Spotify agile are the highly engaged and autonomous development teams (squads) that contribute to productivity and success of product delivery

Tribes

A tribe is a collection of squads that work in related areas. The tribes are designed to be less than 100 people based on the concept of Dunbar number. They enable and ensure that the squads can work as efficiently as possible with continuous deliveries.

Squads, though autonomous, may have inter-squad dependencies in a tribe. In case of undesired inter-tribe dependencies, reorganization, reprioritization or changes are made.

Chapters and Guilds

The flip side of autonomous bodies are the loss of economies of scale. The Chapters and Guilds enable inter-squad and inter-tribe communications for cross pollination of ideas and solutions. Chapters usually form around functional skills whereas Guilds are communities of members with shared interest for informal exchange and knowledge [6].

In this matrix like setup, the vertical dimension comprises people grouped into squads/tribes based on skillset to deliver a product. The horizontal dimension is for knowledge and solution sharing. It is the vertical dimension that is key for setting up a metric measurement program to enable these autonomous groups to operate at their highest level to deliver great product features.

Health Check

The Squad Health Check [4] is an experimentation with estimation, metric etc. to enable agility with less exactness of numbers. Usually conducted during Sprint retrospective, it is a chart that collects information from the source.

Fig 2: Squad Health Check [4] Chart

The information presented in the chart becomes the basis of further discussion on ways to create more value and boost productivity. All the components in the card are filled in by each team member based on perspective and experience during sprint delivery. This type of entry eases number intensive calculations, spares time and enables collection of information from the doers. The collected metrics are then aggregated and rolled up to the different teams in Scrum of Scrums to create a health report overview across teams (see Fig 3) for quick analysis and performance assessment.

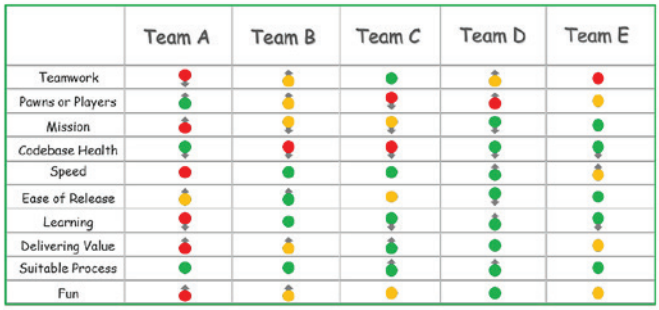

Fig 3: Aggregated Health Report [4]

Such metric reports bring in a sense of team engagement wherein members feel involved in putting forth their views and create a sense of collective ownership when they are in red. The intent of the health card is to focus on improvement of each metric parameter till all the switches turn green as well as leave room for more innovations.

However, much of the metrics is based on gut feel of the squad members, which can be easily substantiated and replaced by hard data. Some of metric components in the health card like speed, delivering value, suitable process can be derived from established standards without necessarily compromising the autonomy of the squads. There are two aspects to creating a robust health check card:

- Qualitative: This comprises the team self-assessment parameters like mission, learning, fun, etc.
- Quantitative: This comprises the measurement parameters like speed, value, codebase health using team inputs of efforts, estimates (whether story points, function points etc.), cost and so on.

A combination of both enables an effective performance measurement for optimal operation of the squad and will ensure a near accurate representation of a squad's health.

Metrics and Measurements

Squads are likened to scrum teams comprising enough resources to deliver project/product continuously. As with typical agile projects, story points are the most prevalent estimation method used in most organizations following Spotify agile to estimate relative work effort and represent Agile velocity of the Squads. Function Points is another size measurement unit that can be used in place of story points to serve the various measurement needs. In fact, there are several benefits of using Function Points:

- It can be used not for size estimation of sprint requirements
- It can determine the sprint velocity,
- Form the basis for productivity measurement and comparison (which cannot happen with story points due to its nonstandard nature) of the squads.
- Can institute several other KPIs like, cost per FP, defect density, risk assessment, product valuation and many more to further enrich the health check chart.

A three-step approach can be setup to bind together the several measurement aspects of each quantitative metric to create a holistic metric measurement program for the vertical dimension of this matrix setup. Let us take an example of productivity measurement for squads.

1. ***Measure the current state (baseline) of value delivery:*** For an agreed timebox/release of feature(s) of a squad, perform the sizing in Function Points and extract the actual effort spent from reliable sources like Jira tool. Sanitize the effort data to remove non-functional components and compute the productivity in FP/Mandays. The process is repeated for many more releases till enough datapoints are available for a suitable baseline setup after outlier removal.

The baseline setup process can be similarly performed for other health metrices like cost efficiency, speed or value delivery.

> ***Continuous improvement is by now a buzzword in the Agile world and is thoroughly ingrained in a team's DNA***

2. ***Define appropriate KPIs and set KPI targets:*** The metric for the example taken is productivity, defined in FP/Mandays. A target of say 10% productivity improvement (over and above the baseline) can be committed at an agreed interval. Based on improvement levers adopted and innovated, the recomputed productivity provides a view of the target achievement status. New improvement parameters are then introduced by the team through brainstorming in case any KPI (in this case, Productivity) falls short of the set target.

3. ***Improve KPIs:*** Continuous improvement is by now a buzzword in the Agile world and is thoroughly ingrained in a team's DNA. A squad's retrospective is leveraged to come up with improvement levers and innovative ideas for the team to improve their scorecard and create tremendous value for their customer.

Metric	☺	😐	☹
Qualitative			
Teamwork	✓✓✓	✓	✓
Pawns or Players	✓	✓✓	✓
Fun	✓✓✓✓	✓	
Quantitative			
Productivity	✓		
Velocity	✓		
Value created		✓	

Fig 4: Sample Squad Health Check Card

The above approach can be replicated for as many required KPIs as needed to create a robust metric chart (see Fig 5.) which when aggregated at the Tribe will represent a near accurate heath report for the entire Tribe. The metric measurement approach creates transparency in the data (eliminating gut feel), enables inspection (through constant self-assessment and measurement) and adaptation (by course correction on not meeting targets) without disturbing the core constituents of a Spotify like setup. ■

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Paramita Dutta Mandal has around 11 years of experience in the IT industry in roles such as Scrum Master and Project Management and Estimation Consultant. She has professional experience in the areas of IT performance measurement, cost estimation, Agile implementation in Scrum and Kanban and various process improvement model creation. Paramita has co-authored various whitepapers in performance improvement and various estimation techniques. As a CFPS since 2014, besides, contributing to FP measurement and audit for various projects, proposals and large deals in her organization, she has played a key role in productivity measurement and improvement, process leaning, external estimation consultancy and training in FP and its variants.

Sanoop Manjoor has close to 14 years of experience in the IT Industry primarily in the areas of Program management, Functional sizing, Business analysis, Competitive analysis and Estimation. Sanoop has been IFPUG CFPS certified for over 7 years. He has experience implementing multiple programs with large global clients relating to Estimation, Productivity measurement and Pricing covering various sizing/estimation techniques and delivery methodologies. He has been leading FP based Sales enablement and Parametric estimation initiatives, and Productivity measurement/Functional sizing related capabilities. He has co-authored whitepapers relating to the Functional sizing and Productivity/Estimation areas.

FEATURE ARTICLE

By Antonio Ferre Albero

HAS SOFTWARE PRODUCTIVITY INCREASED

OR DECREASED DURING COVID-19?

The first hope when this article is written is that health, people and economy have returned to the normal situation in every corner of the world, or at least that positive trends exist to reach it.

Coronavirus disease (COVID-19) has brought suddenly a lot of changes. The teleworking, telecommuting or working from home has been accelerated and implemented by necessity: to work remotely now in a lot of sectors, such as Information Technology (IT), is a must and not an option.

Focusing on IT, it can be read in a lot of places headlines announcing, or claiming, that the productivity of IT companies or IT departments has been increased (due to this remote working) or that at least this productivity has not decreased. Regarding this productivity concept, from the metrics point of view, it is interesting to recall that for managing the **productivity** we need to know the **size** of the work done, and the **effort** needed to do that.

How essential or good is a company? What add value does the company or its products provide? Metrics, trends, analysis and projections are essential, and companies might take advantage of those analysis.

We can say that the tasks have been accomplished on time, or that the effort spent in a concrete activity has been according to the planned effort, but standard productivity is something different. An interesting detail is that it is essential to have a high-precision recording of the effort because when working from home the effort can be more volatile and difficult to measure with precision.

IT strategic standard metrics in this virtual time (physically speaking) are essential for creating strong trust, transparence and sincerity between clients and IT providers, sharing clear and understandable metrics by all the parties, without any kind of cooking the books. For avoiding creating ad-hoc indicators and KPIs to project level, application level or even to company level, the eyes might be put in the highest-level perspective, applying worldwide standard metrics and indicators that bypass applications, companies and countries.

Recalling the IT software productivity, nothing can be measured without the size (so in enhancements as in creating IT products), and at this point IFPUG, like a lighthouse, brings light with its three worldwide methods: 1) IFPUG Functional Size, the ISO/IEC 20926 standard and even father and inspirator of other methods, 2) SiFP (Simple Function Points), and 3) SNAP (Software Non-Functional Assessment Process) method, the standard IEEE 2430-2019 that measures the Non Functional requirements.

COVID-19 is synonymous to a big-bang economic crisis, in spite that the most important are the health consequences. In just a few weeks a lot of things have changed: unemployment, sales drop, loss of benefits and crisis are words too common. A lot of things have collapsed like a house of cards.

We can say that the less affected are the essential ones or the best ones. But how essential or good is a company? What add value does the company or its products provide? Metrics, trends, analysis and projections are essential and companies might take advantage of those analysis.

It can be said that a **first group** of companies consider IT metrics as something essential and taken into consideration to base decisions on for years. For this group, metrics are “a must” and are essential to take strategic decisions to C’s levels, in addition to other levels. They provide a long past historical perspective that help to anticipate future trends, a kind of “what if…?,” or even “what happened when we did a set of actions in the past?”

Those companies have a set of golden information to multiple levels, starting from the drivers that can affect positively or negatively the productivity, the quality and the time-to-market, amongst others. To know, for example, how competitive is a company versus the competitors, or even what can happen if enter into scene a set of scenarios. Those metrics will bypass projects, technologies and companies.

A company can focus mainly in financial metrics, without putting too much focus in having deeper indicators such as “why the company has good results?” or “which ones are the drivers that have contributed in the previous years, and now, in the economic success?” or “in what position is the company versus competitors or versus standards?” Even, in the case of having excellent economic results, if the productivity is low, if the product quality is just normal and if the product cost (for example due to

dinosauric company costs or to a high non-productive pyramid, all of this combined with a low productivity) is high, then actions might be taken.

The objective is not only to have strategic info but that this info is sincere, without any kind of cooking the books or fabrication. Multi-axis info and with multiple objectives might be managed, such as if the company or IT provider has an excellent ratio productivity vs quality vs time-to-market vs costs vs value vs service spirit. If all of this is accomplished, if the company has a good vision, mission and common sense, and if the product is innovative then it can be offered the best valued product.

A second group of companies or IT departments implement metrics programs, but perhaps more focused in just having metrics or fulfilling requirements (such as to be able to affirm that Productivity metrics, for example, are managed) or certifications (such as we fulfill the Measurements and Analysis CMMI process area) than in providing strategic information and taking advantage of them. Metrics will exist but sometimes can be more focused on having good numbers than on ensuring the numbers are the real ones. Something like if you publish a picture from yourself in Instagram but to publish it, you have taken previously 100 pictures, you have selected the best one from those 100 pictures and even you have applied some magic touch of Photoshop to the selected one. This picture is yours? Yes. This picture refers to your real you? Perhaps not.

Facts such as to penalize projects or teams with bad indicators but with honest numbers that give credibility to the metrics, and in the opposite way to reward projects with perfect metrics results but adding non-nice practices such the mentioned above (select the best picture and to apply Photoshop-to-the numbers techniques) are indicators to non-mature companies because you will not have the real numbers, the real reasons and the real conclusions.

Obviously a **third group** exists. It considers that to manage metrics, to know them and to take advantage of them are just fiction because they have the perception (feelings more than numbers) that they are the best ones. During crisis times, they can recall the idea of not having strategic, and recorded, info was not a good idea. Implementing metrics plans is something that takes time: not only to implement the plan but to have historical info and metrics objectives, historical changes, revisions and corrections. Even, not having those dozens of "What if…?" and "Why…?" questions answered in numbers for years is not a good idea, too. These companies can be a little bit like a great ship on the high seas, in the middle of the storm, without an engine, and carried by the high waves.

To be in the first group might be something essential. To know the competitivity using standard metrics might not be considered as an option, but as a must. In these changing times, and always, it is needed to bring the best high value to customer and to companies.

Metrics and metrics areas or departments might not be considered as a cost but as an investment: strategic activity that provides golden-key information and provides guidance to companies and to its C's levels. If providing this guidance is important in sunny days, it is even more important in the night or in dark times, perhaps synonymous to the actual time. The IFPUG standard worldwide methods that permit to manage strategic metrics—and to compare indicators and trends with internal and external worldwide indicators—are essential and might be a lighthouse to help IT projects, IT products and companies to arrive correctly and safely to the port. In just a few months a lot of things have changed. ■

About the author:

Antonio Ferre Albero (Spain) has more than 30 years of experience in information technology, project management and metrics, working for private companies, government and IT companies. He is CFPS accredited, has been member of different IFPUG committees for years and is currently the IFPUG CMC chair. Antonio is CIO of Plastic Forte, and innovative Spanish private company. He is specialized in applying the innovation, the technology, the excellence and the common sense to ensure that the Information Technology helps companies to be more competitive. Hundreds of Antonio's technical articles have been published in newspapers and other publications.

Certification Committee

By Mahesh Ananthakrishnan, Committee Chair

The main updates of the Certification Committee are:

- SNAP Brazilian Portuguese exam published.
- Apart from support to certification extension, the Certification Committee has done a set of ongoing updates to exams, based on the user feedback.
- In addition, the Certification Committee is working on CSP Exam Extension approaches.

Communications and Marketing Committee

By Antonio Ferre Albero, Committee Chair

MetricViews, the magazine that you are reading now, is one of the deliverable products of this IFPUG committee. Starting from this edition, it has been created an editorial *MetricViews* board composed by worldwide high seniority people; first IT metrics worldwide players from different countries and at the same time with great links with IFPUG: thanks Thomas Cagley, Joe Schofield, Steven Woodward, Roberto Meli, Peter Thomas, Carol Dekkers, and Diana Baklizky to be part of this editorial board, together with myself. We have implemented Slack as a collaborative tool to work together, and involve the authors to have a more collaborative and agile approach.

How much time the volunteers invest in IFPUG activities! For sure that the key motivation driver is the conviction of the metrics' importance and the passion to bring value measuring the past, the present and to anticipate future trends. Without this conviction it would be more difficult, or just impossible, to have time. I would like to say a great thanks to David Herron, who served as editor in the last years and is now involved in other activities: thanks David for all your great contribution! Thanks too to those (it will be difficult to write all the names) who have preceded in the mission.

Following the same metrics passion, it is important to welcome Marcia Arimitsu and Patrick Viscaino, as new CMC volunteers. Thanks Marcia and Patrick.

Functional Sizing Standards Committee

By Daniel B. French, Committee Chair

Despite the challenges we have all faced in 2020, the Functional Sizing Standards Committee (FSSC) has been working hard on a variety of projects. The case study update is complete and will be published shortly. In addition, work continues on the Elementary Process and Mobile Applications white papers. The UML white paper will also soon be published. Work will also shortly begin on a joint project with the Non-Functional Sizing Standards Committee (NFSSC) on boundaries and partitions.

Some members of the committee have also been working diligently on the Simple Function Point task force (SiFP), led by VP Chuck Wesolowski. The task force's focus this year is on updating the SiFP manual to align with the Counting Practices Manual (CPM). IFPUG President Christine Green is also working with the task force to get the updated SiFP manual published later this year. Once the SiFP manual is published, the task force will be working with the Certification Committee to develop a certification exam.

After 20 years serving on both the FSSC and its predecessor, the Counting Practices Committee (CPC), FSSC Vice Chairman Bonnie Brown has decided to step down. We are grateful for Bonnie's tireless dedication and support of both the FSSC and IFPUG. We are also pleased to announce that former FSSC Chairman Tammy Preuss has kindly agreed to serve as the new Vice Chairman. We are appreciative of Tammy's years of work on both the FSSC and the New Environments Committee (NEC) and look forward to and appreciate her assumption of the Vice Chairman position. The FSSC would also like to thank Adri Timp for his many years of service to IFPUG both as a member of the CPC (including serving as Chairman) and the FSSC.

We are also pleased to announce the addition three new members: Diego Rocha from Indra Company in Brazil, Kiran Yeole from AMDOCS India, and Daniele Zottarel from SOGIE S.p.A in Italy. The FSSC is excited have these new members on board and all three have been assigned mentors and projects. We look forward to their contributions to the FSSC and IFPUG.

The committee appreciates the support of the IFPUG membership and is always looking for new projects to work on. Some topics under consideration for our next projects include MicroServices, Agile and Cloud. We welcome suggestions from members on topics of interest; please submit your suggestions to fssc@ifpug.org.

Industry Standards Committee

By Carol Dekkers, Committee Chair

IFPUG remains active in industry standards in SC7 and other areas. The recent publication of IEEE 2430 SNAP was a landmark achievement in the advancement of non-functional sizing of software requirements, under the leadership of industry standards member Talmon BenCnaan. IEEE representatives to SC7 presented the standard and proposed its standardization with ISO/IEC JTC1 SC7 WG6 and the fast-path project will be balloted for inclusion in September-December 2020 timeframe. We are hoping for a successful outcome and resultant standardization to follow.

IFPUG 4.3.1 and related ISO functional size measurement standards remains unchanged with standards arising for confirmation and re-affirmed positions on an ongoing basis. We remain active as a member organization in the U.S. Technical Advisory Group within INCITS. Many thanks to the U.S. TAG for supporting IFPUG's efforts with both our functional and non-functional sizing standards.

Industry standards member, Steve Woodward, working as the Canadian delegate to WG6, announced that IFPUG 20926 was incorporated into ISO/ IEC 25025—Systems and software Quality Requirements and Evaluation (SQuaRE) —Measurement of IT service quality. In other ISO/IEC work, he mentioned that SC7 has requested that Steve be their liaison to SC38 for cloud standards and that the Cloud Quality SaaS 25052 standard is moving forward.

International Membership Committee

By Saurabh Saxena, Committee Chair

Due to COVID-19, the last few months have really been tough on all including IFPUG and its members. The International Membership Committee (IMC) has always acted as a bridge between IFPUG and its members. In our sincere efforts to engage IFPUG members more, we are working on several initiatives.

We have a new Brazil Country Representative, Loami Barros, joining IMC. He is a professional with more than 30 years in the IT area acting in governance, structuring and improvement of global projects and processes, sizing and metrics, as well as experience as a technical consultant of software tools and support on multinational companies. We welcome Loami into the new role. Sergio Brigido has taken up the volunteer process so that more IFPUG members get the advantage of being engaged with IFPUG committees and task forces.

At this time of the year, IMC as a committee is assisting its members so that they can renew their membership in a smooth and effective manner. We have collaborated with IFPUG PEC committee to organize the very first IFPUG virtual café webinar, which was highly successful. IMC also continue its collaboration with Brightest for smooth online CFPS/CFPP exams experience.

As always, IMC is committed to enhancing membership experience and providing first line of contact for all IFPUG related queries.

Non-Functional Sizing Standards Committee

By Talmon Ben-Cnaan

SNAP is a candidate to be an ISO Standard. Following the approval of SNAP as an international sizing standard—IEEE 2430-2019, IEEE has introduced SNAP to ISO group, proposing to adopt SNAP as a joint IEEE/ISO standard.

SNAP is officially used by the European Commission. The European Commission, Taxation and Customs Union Directorate-General, mandated the use of IFPUG FP and SNAP as project control methods for new Development, Maintenance and Support of Customs and Taxation Information Systems.

New SNAP artifacts. The NFSSC will soon publish a guideline on how to use the three sizing methods (Unadjusted Function Points, SNAP and modified GSCs). This paper will guide users on how to separate the non-functional part so that FPA, SNAP and revised GSCs will provide better information needed for estimation.

Another guideline we are working on will show how to count Security. Other news of the committee is that SNAP 2.4 translation to Brazilian is available.

Partnerships and Events Committee

By Sushmitha Anantha, Committee Chair

Partnerships and Events Committee (PEC) is focusing on improving strategical partnerships between IFPUG and other organizations. We are working with ISTB, NESMA, ISBSG and others.

PEC is continually working towards engaging with IFPUG members through virtual events and conferences. In the beginning of June, we launched a webinar series "IFPUG Knowledge café," which is intended to share important insights with members. The first talk in the series was delivered by Tom Cagley, former IFPUG president and a highly respectable speaker, coach and consultant. Tom talked about "Software Development: Preparing For Life After COVID-19" and emphasized on potential focus areas for the software industry post COVID-19 pandemic.

On 29 July, PEC conducted the first virtual conference with the support of other committees and the IFPUG board. The event had included a talk on "What is a Sequence Diagram? How to Determine FURs for Sizing Function Points?" by Dr. Luigi Buglione, IFPUG director for sizing & international standard and president of GUFPI-ISMA. This course was CEP eligible and all members who attended the talk were eligible for a year of extension on their CFPS certification. Another topic that generated lot of interest was "IFPUG FP for Software Pricing— Recommendation and Beyond," delivered by Christine Green, president of IFPUG. The event was attended by 339 participants from across the globe.

Please write to pec@ifpug.org with your suggestions for topics and speakers. We shall try to host them during our Coffee Talks. If you are interested to work with the PEC, please send filled volunteer forms to pec@ifpug.org.

STAY CONNECTED

As an IFPUG member, you are part of an international association dedicated to improving the quality and future of the information technology industry. Are you taking full advantage of all that your membership offers?

Benefits include:

- Access to education and professional growth through semi-annual IFPUG Workshops and the annual IFPUG Conference at special member rates.
- Opportunity to join a local IFPUG Chapter, where you can exchange ideas, share experiences, and learn about new techniques on an ongoing basis, in your area.
- Participation in IFPUG communities to advance state-of-the-art software measurement and professional networking with colleagues from around the world.
- Professional certifications, which establish your credentials as a specialist in the growing field of software metrics.
- Access to state-of-the-art products and services at vendor showcases during the annual conference.
- Special member rates on IFPUG materials, such as the Function Point Counting Practices Manual and the International Software Benchmarking Standards Group publications.

IFPUG's social media channels allow you to stay connected to your fellow IFPUG colleagues and the HQ staff.

Be Informed! Stay Connected!