ISBSG
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The global and independent source of data and analysis for the IT industry

Short paper

Analysis of Maintenance & Support Productivity

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Introduction

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

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

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

In this short paper we provide a high-level analysis of the other ISBSG repository: Maintenance & Support (M&S). This repository contains data for the maintenance & support activities of more than 1650 applications.

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

Maintenance & Support (M&S) Activities

Maintenance & Support activities in the ISBSG repository are divided into sub-activities:

Maintenance

- **Perfective maintenance** – Software modifications that improve performance or maintainability. They may also enhance user experience.
- **Preventive maintenance** - Software modifications that detect and correct potential faults before they occur.
- **Corrective maintenance** - Software modifications that correct discovered problems.
- **Adaptive maintenance** - Software modifications that maintain its usabilty in a changing environment. For example, changes required to accommodate a new operating system.
- **Maintenance management –** The administration and organization of maintenance activities

Support

- **Problem investigation** – The examination performed to determine whether a reported incident is a defect, an error in user documentation/training or merely a user error.
- **Queries and quick services** - One-time questions that are not part of the application and can be delivered by the support team on request of the user.
- **User help and advice** - General support that is not related to an incident and does not involve any data extraction or manipulation.
- **Support management** - The administration and organization of support activities

The effort is usually captured per calendar year. If data for another period of time is submitted, the data is normalized to a calendar year.

Analysis

In Figure 1, high-level analysis of the Hours/1000 function points (FP) in the period 2018 – 2021 shows the following:

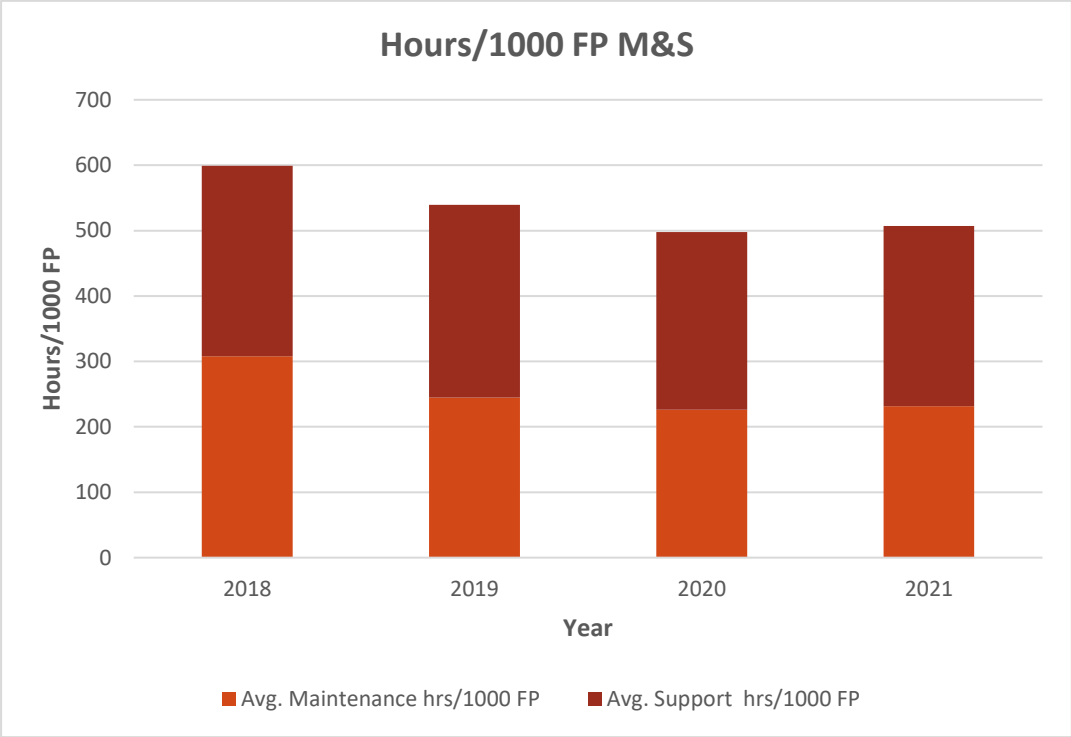

Figure 1: M&S hours per 1000 FP in the ISBSG M&S repository

The total M&S hours per 1000 function points of functionality have gradually decreased in the last few years to approximately 500 hours per 1000 FP. This also means that the number of function points 1 full-time equivalent (FTE) can support is approximately 3000, assuming 1 FTE spends about 1500 hours of effort per year.

If we look a bit further into the maintenance effort hours, as shown in Figure 2, we see that in general more maintenance effort is spent on corrective and adaptive maintenance than perfective and preventative maintenance.

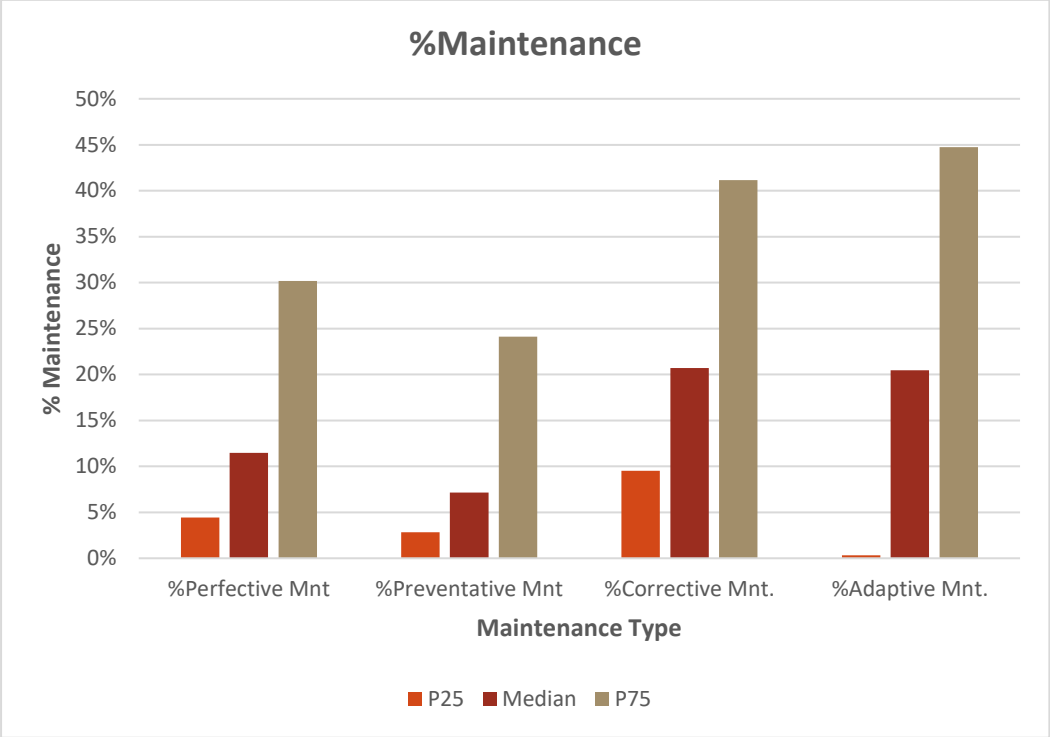

Figure 2: Distribution of maintenance sub-activities

In the Figure 3, the same analysis is made for the support sub-activities.

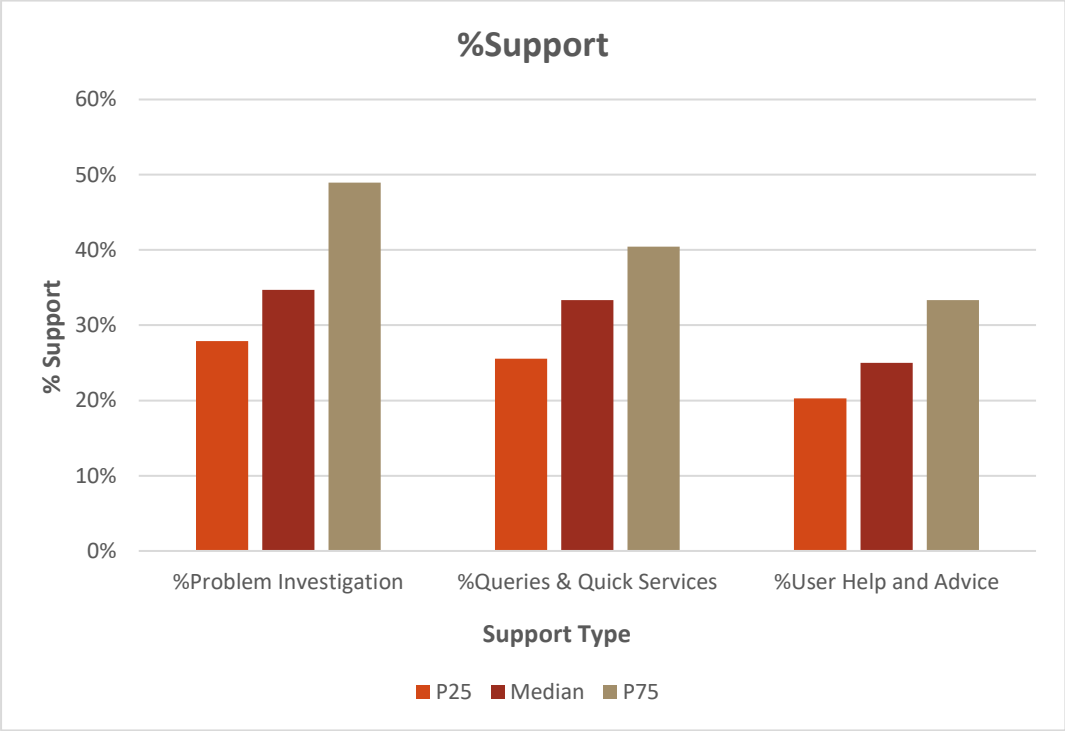

Figure 3: Distribution of support sub activities

For the support sub-activities, the distribution is more even, although it seems that user help and advice is a somewhat smaller portion of the effort in support.

Conclusions

This high-level analysis shows that the average number of effort hours per 1000 function points of application size is about 500, which means that on average 1 Maintenance & Support FTE should be able to maintain 3000 FP of application functional size per year.

The breakdown of the maintenance effort shows that most of the maintenance effort is spent on corrective and adaptive maintenance.

For support it seems that the effort spent on problem investigation and queries & quick services is about equal, and slightly less effort is spent on user help and advice.

This analysis just shows a high-level analysis of the data in the M&S repository without considering other important factors, like programming language, size, etc.

If you wish to do your own analysis, or if you are interested to use the ISBSG data for cost estimation, benchmarking, performance measurement, procurement, etc., please subscribe to the data here: https://www.isbsg.org/project-data/

The International Software Benchmarking Standards Group (ISBSG)

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

ISBSG is an independent international organization that collects and provides industry data of software development projects and maintenance & support activities in order to help all organizations (commercial and government, suppliers and customers) in the software industry to understand and to improve their performance and decision making. ISBSG sets the standards of software data collection, software data analysis and software project benchmarking processes and is considered to be the international thought leader in these practices.

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

To achieve this:

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

Help us to collect data

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

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

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

Partners

This page will help you to find an ISBSG partner in your country: https://www.isbsg.org/board/