

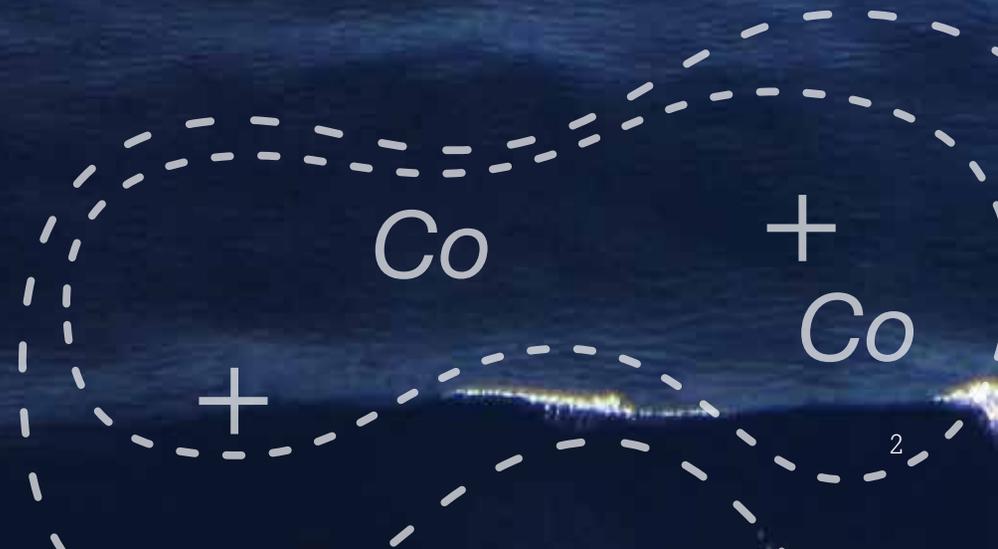
Mendix Benchmark Report

September 2014



“You’ve got to be very careful
if you don’t know where you’re going,
because you might not get there.”

[Lawrence Peter “Yogi” Berra]



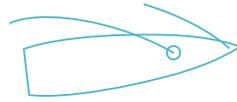
DESIGNING THE RIGHT COURSE

Once a ship sets sail on the ocean, the helmsman consults a nautical chart. Even though he cannot see the bottom of the sea, he will be aware of the obstacles below the surface.

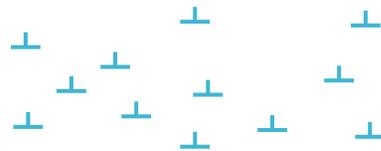
QSM has a broad industry database at its disposal with more than 12,000 completed software projects developed in Europe, Japan and the United States. Altogether, these thousands of projects are of great value in determining the feasibility of new software development projects and complex package implementations.

This broad database can be compared with a nautical chart's legend. Using the database, QSM can map out the obstacles in a project in much the same way sailors are able to determine a navigable course. This allows us to determine whether the project is feasible within the appointed budget and the desired time.

In other words, it warns you when your project is in danger of wrecking and enables you to change course in time. We would be glad to pilot your ship.



“To reach a port, we must sail - sail, not tie at anchor - sail, not drift.”
[Franklin D. Roosevelt]



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ABOUT QSM

QSM is an independent authority in the field of quantitative software management. We offer insight into the feasibility, predictability and transparency of software projects and complex package implementations. At this, Function Points play the central part.

Function Point Analysis

Making projects and implementations predictable and transparent is only possible when we are able to determine the scope of the project explicitly. For this, QSM uses an internationally recognized standard method: the Function Point Analysis (FPA), a method to determine the functional size of an information system.

The use of the Function Point (FP) offers us an objective unit of measurement that can convey the size of a software system. Meanwhile, it can also be used to compare software systems.

Extensive and broad database

QSM starts from absolute facts. Over the past 30 years we have set up a validated database consisting of more than 12,000 completed software projects from Europe, Japan and the United States. The database is continuously updated.

However much they differ, all software projects possess certain characteristic similarities.

From that, QSM has developed a methodology that enables the comparison of large-scale software projects with similar projects from the industry. This is the basis from which we can decide whether the entire project is realistically achievable within the available budget and development time. We can determine whether you are on course or if you will have to make adjustments in advance.



Active all over the world

Quantitative Software Management (QSM) was founded in 1978 by Lawrence H. Putnam, a distinguished expert in the software measurement industry. Since its inception, QSM's mission has been to develop effective solutions for software estimating, project control, productivity improvement analysis and risk mitigation.

Over the years QSM has established itself as the leading total solution provider of choice for software developers in high-performance mission-critical environments.

QSM serves the American market from its headquarters in McLean, Virginia while QSM Europe serves the EMEA market from its office in Breukelen, Netherlands.

“Modest doubt is called the beacon of the wise.”

[William Shakespeare]

ABOUT MENDIX

Mendix is a software company that provides an integrated app platform as a service offering to design, develop, deploy, run and manage enterprise applications. The Mendix App Platform is used by organizations across the globe to build web- and mobile applications to engage with customers, empower employees and improve business operations.

One platform to bring IT and business together

Mendix strives to accelerate the delivery of new applications by bringing IT and the business together on one platform, enabling rapid, iterative and collaborative development.

Development in Mendix takes place through a visual, model-driven development approach that allows both developers and non-technical domain experts to build apps without low-level coding. Social collaboration capabilities in the platform keep stakeholders aligned throughout the project.

Typical Mendix use cases

The Mendix App Platform is used for building a variety of applications, including transactional, data-driven apps with complex business logic and integration with multiple systems.

Examples include customer and partner portals, legacy migrations, vertical apps, workflow apps, HR on-boarding, ecommerce, contract management, CRM and supply chain apps.

Approach

Accountability

Mendix invited QSM to perform an independent benchmark study on the Mendix App Platform. Mendix customers and partners cite the ability to deliver specific custom business applications in a significantly shorter timeframe, at lower costs and with smaller teams compared to traditional application development approaches. This study was executed to validate those claims.

Approach

In order to quantify the productivity of the Mendix App Platform, we compared the results of the build and test phase (which is finished when the application is ready for use) for Mendix projects with those from industry benchmarks. In other words we are comparing Mendix projects against software projects from the broad QSM industry database. We first validated the data we received from the Mendix projects for consistency before including the projects in the research.

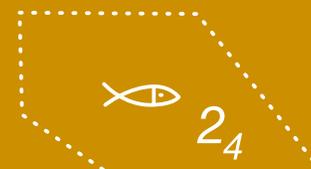
For each project, we determined the scope using a Function Point Analysis (FPA). Subsequently, we used the FPs to calculate a Productivity Index. With that, we applied a set of four parameters: project duration, number of hours (investment), team composition and quality. This approach resulted in a more general conclusion for the productivity of the Mendix App Platform. In order to obtain an industry perspective, we compared the Mendix results with the business industry average (namely that of application development).

Project characteristics

We analyzed seven projects built using the Mendix App Platform and the Mendix visual, model-driven development approach. The size of these projects ranged between 242 and 533 Function Points, while peak staffing ranged between 0.6 and 3.6 FTE. All projects were delivered within a four-month period (with a duration between 1.6 and 3.8 months).

To conclude

The outcome and conclusions that we are presenting in this report are based on the data from seven completed and representative Mendix projects from North America and Europe. These projects were all executed using the Mendix App Platform. We directly performed the research and verified the results.



Summary

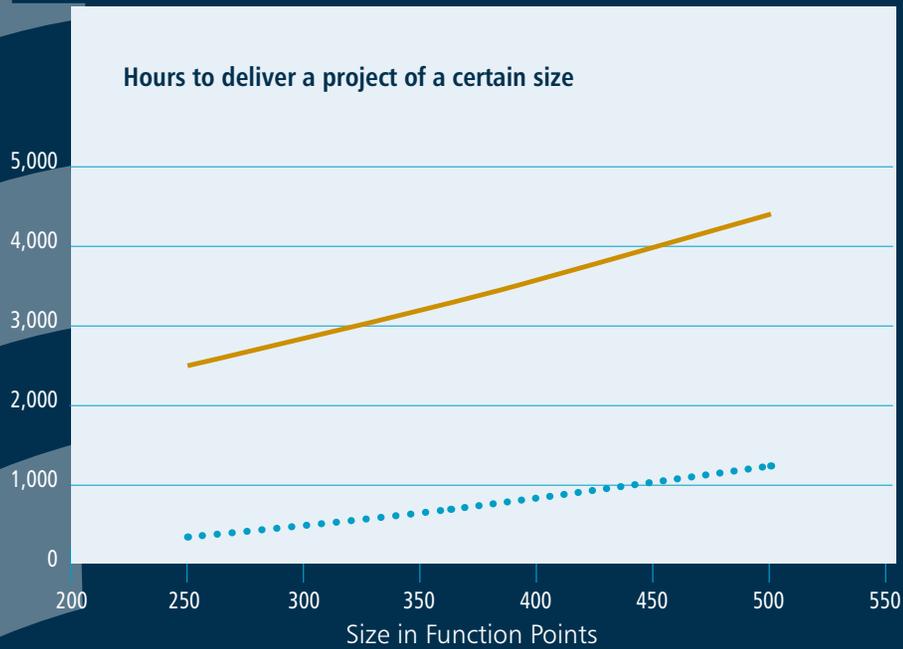
We analyzed the data of the application development projects that were selected by Mendix as a representative set of applications built on the Mendix App Platform. We determined the size of the project in Function Points. We compared this data with the benchmark derived from the QSM industry benchmark database for business application projects.

Key Findings

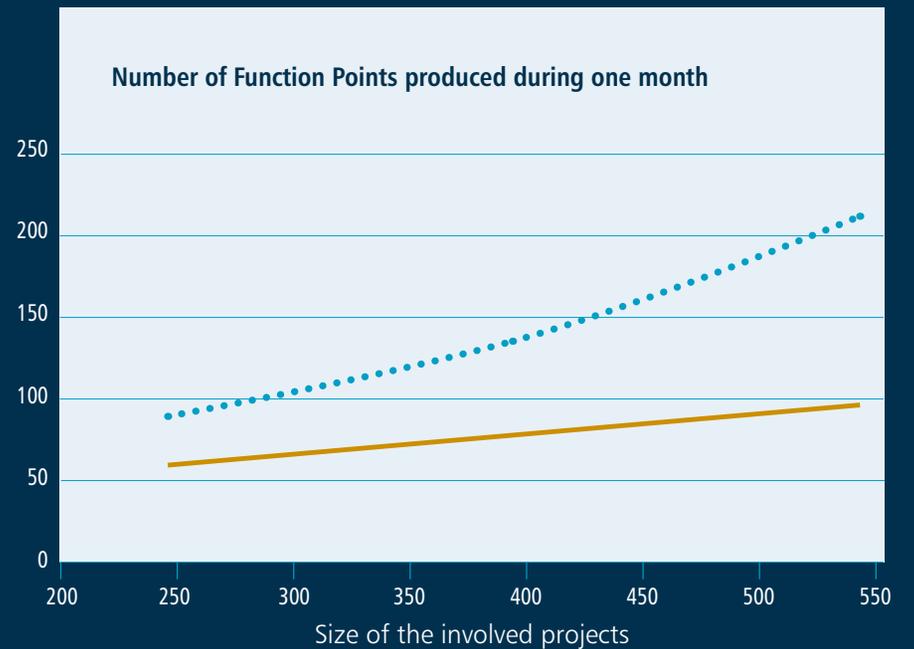
1. The productivity of the projects that we analyzed for applications built on the Mendix App Platform was above market average. In most of the projects, the Mendix platform outperformed projects built in a traditional environment significantly. The average productivity of Mendix projects, expressed in Function Points per development hour, is 6 times higher than the industry benchmark.
2. Mendix projects realize a productivity advantage through a combination of the following factors compared with the average from our benchmark database:
 - a. Project teams are 60% smaller
 - b. Project duration is 50% shorter
 - c. Development effort is reduced by 70%

Key Takeaways

These results from the analyzed projects validate the Mendix proposition to deliver higher productivity than traditional programming methods. They show that Mendix projects require only 1/6 of the development hours compared to the industry average for business application projects.



This graph shows that Mendix delivers on average 6x lower cost per unit for the projects assessed in this benchmark.



This graph shows that Mendix delivers on average 50% faster for the projects assessed in this benchmark.



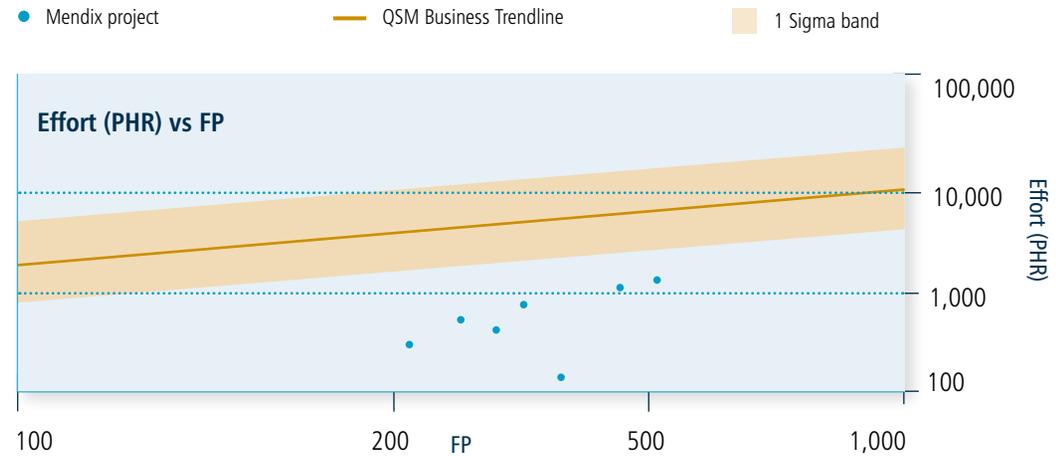
Explanation of the infographics

- Size:** Functional scope of the project measured in Function Points.
- Duration:** Difference between start and end date of the project. Expressed in Months.
- Effort:** Number of hours spent on the project. Expressed in Person Hours (PHR).
- Peak staff:** The highest number of people who worked on the project, measured during one month. Expressed in FTE.
- MTTD:** Mean Time to Defect is the average time between the discovery of new software defects. Expressed in Days.
- PI:** Productivity Index. "Productivity" embraces many important factors in software development, including:
- Management influence
 - Software development methods
 - Software development tools
 - Skills and experience of development team members
 - Availability of development computer(s)
 - Application complexity
 - System size

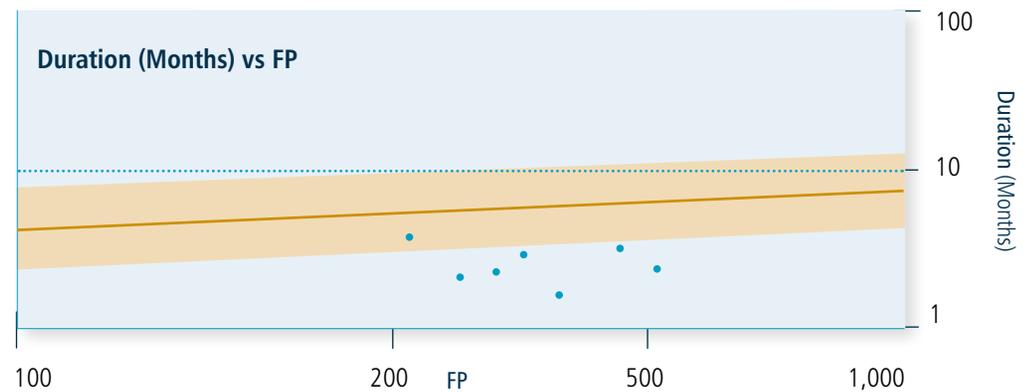
The PI is a macro measure of the total development environment. Values from 1 to 40 are adequate to describe the full range of projects. Low values generally are associated with poor working environments, poor tools and high product complexity. High values are associated with good environments, tools and management and well-understood, straightforward projects.

Project Summary		
Size	X	Function Points (FP)
Duration	X.X	Months
Effort	X	PHR
Peak Staff	X.X	People (FTE)
MTTD	X.X	Days
PI	X.X	
PI=X.X Size=X FP		

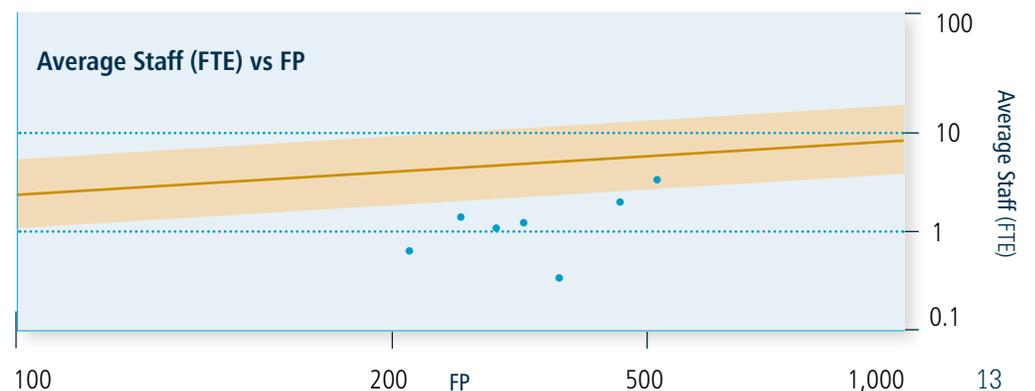
This graph displays the scope in Function Points (FP) on the x-axis and the invested effort in person-hours on the y-axis. A logarithmic scale is used. The blue dots show the Mendix projects. The orange line is the business trend line that is based on the 12,000 projects in the QSM database. The orange shaded area indicates the 1-sigma line. Within this bandwidth 68.26% of the projects from the QSM database have been realized.



This graph displays the scope in Function Points (FP) on the x-axis and the project duration in months on the y-axis. A logarithmic scale is used.



This graph displays the scope in Function Points (FP) the x-axis and the team size in Fulltime Equivalent (FTE). A logarithmic scale is used.



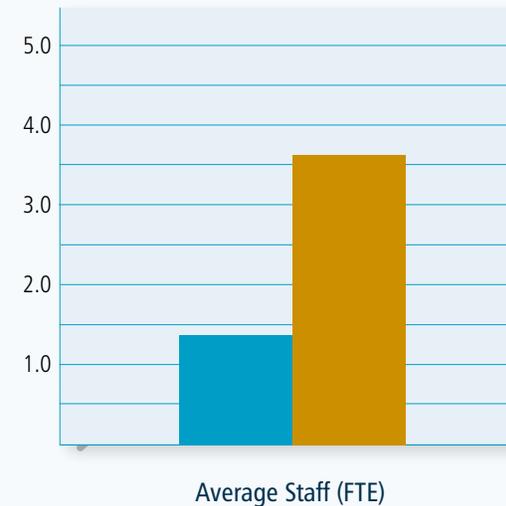
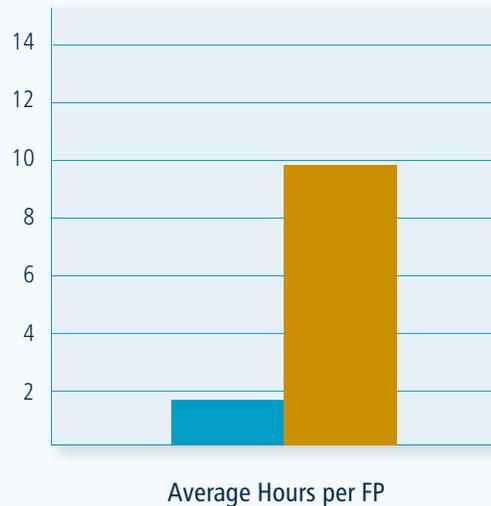
Global Securities Service Provider

Project Description

The customer's core business is providing clearing services in the financial market. This project was to build an application for calculating penalties and bonuses for market parties following a complex set of trading rules. The application automated manual and error-prone processes and integrates with existing core systems and middleware solutions.

Explanation of the graph

The first graph shows the productivity in terms of the average number of hours spent on the project. The second graph shows the average team size.



Comparison with the market average

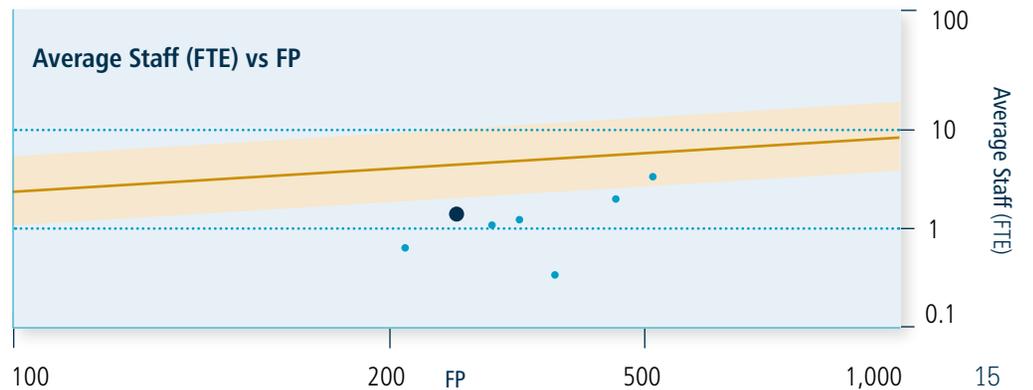
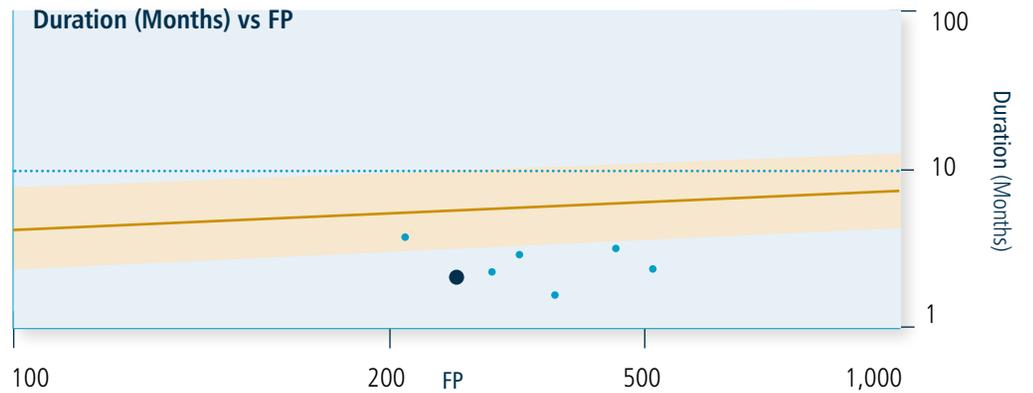
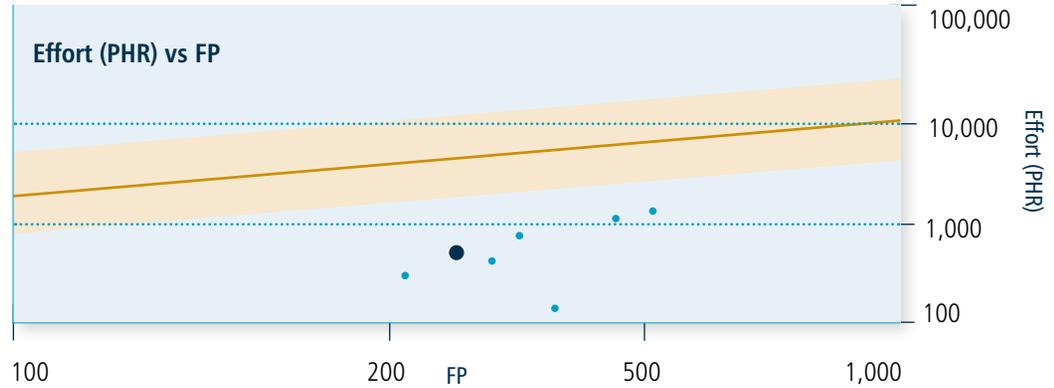
- Build cost with Mendix is five times lower.
- Overall QSM benchmark team size is two and a half times larger.

Global Securities Service Provider | Details

Overview core metrics

- Global Securities Service Provider ●
- Mendix project ●
- 1 Sigma band ■
- QSM Business —

Project Summary		
Size	303	Function Points
Duration	2.3	Months
Effort	527	Person Hours
Peak Staff	1.5	People (FTE)
MTTD	2.8	Days
PI	21.0	
PI=21.0 Size=303 FP		



Leading National Pension Provider

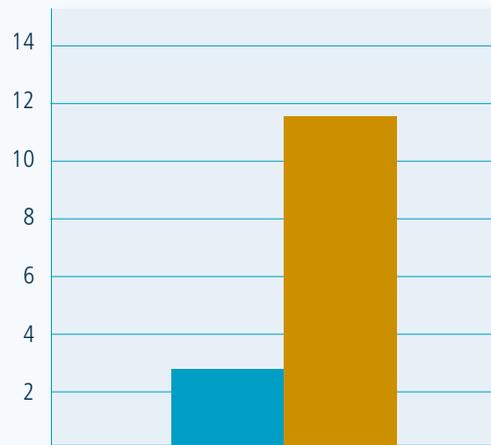
Project Description

The customer is a leading national pension provider. The project involved the development of a web portal through which more than one million participants of sixty different pension funds have self-service access to view the status of their pension plan and update personal data. The portal is a single application that delivers a tailored user experience based on the style guide of the specific pension fund in which the individual participates.

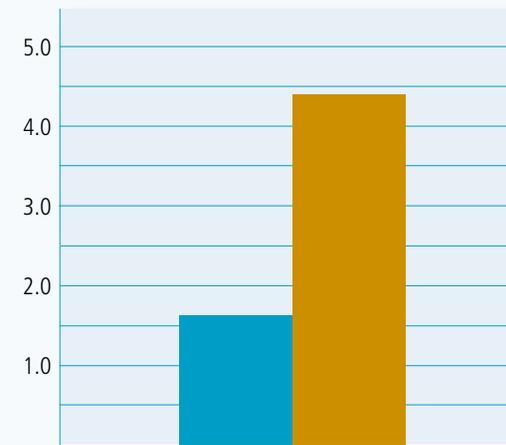
Explanation of the graph

The first graph shows the productivity in terms of the average number of hours spent on the project.

The second graph shows the average team size.



Average Hours per FP



Average Staff (FTE)

Comparison with the market average

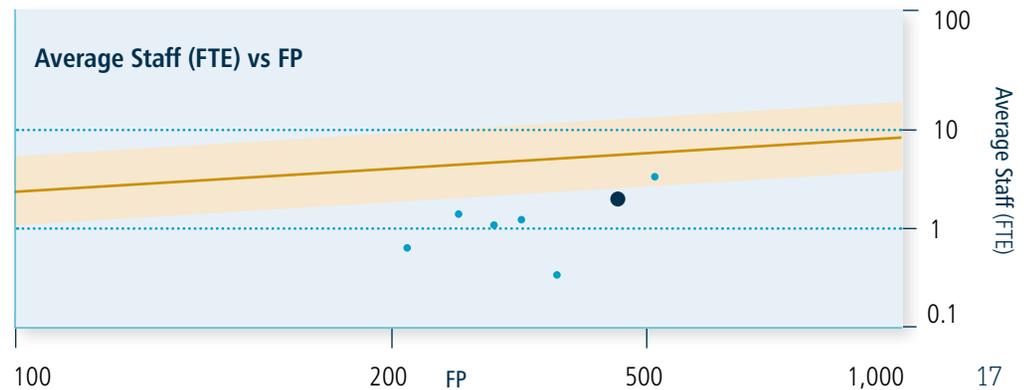
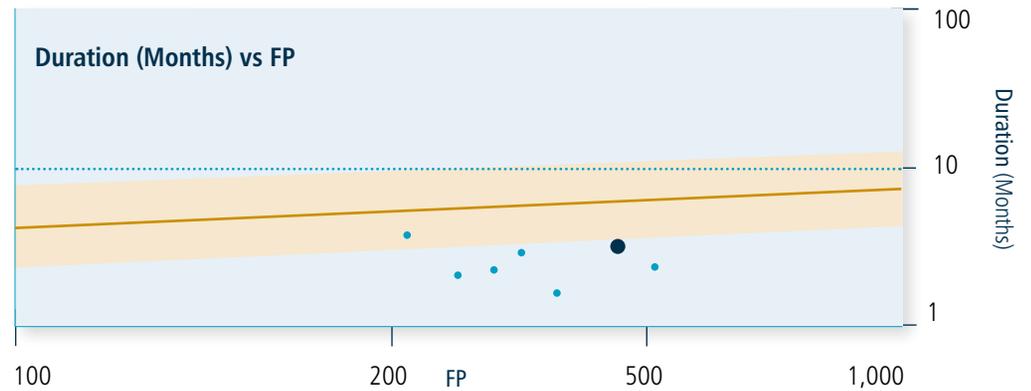
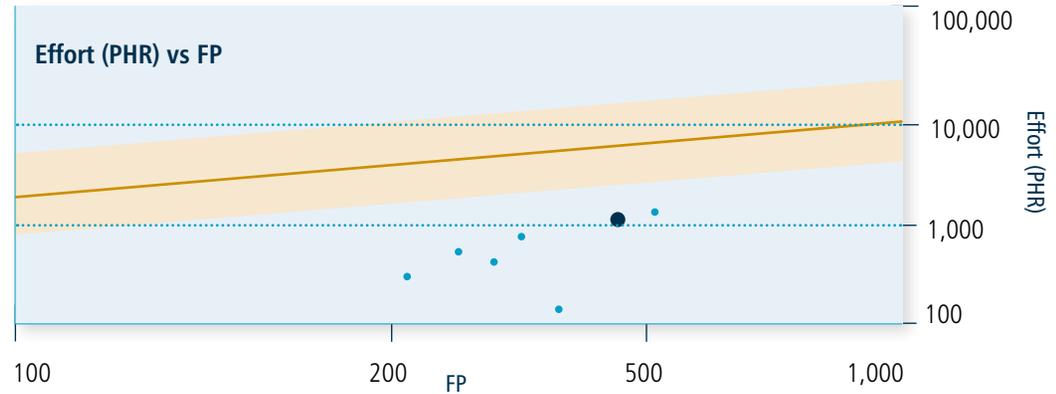
- Build cost with Mendix is four times lower.
- Overall QSM benchmark team size is three times larger.

Leading National Pension Provider | Details

Overview core metrics

- Leading National Pension Provider ●
- Mendix project ●
- 1 Sigma band ■
- QSM Business —

Project Summary		
Size	478	Function Points
Duration	3.4	Months
Effort	1,141	Person Hours
Peak Staff	2.5	People (FTE)
MTTD	2.4	Days
PI	19.7	
PI=19.7 Size=478 FP		



Global Beauty Care Company

Project Description

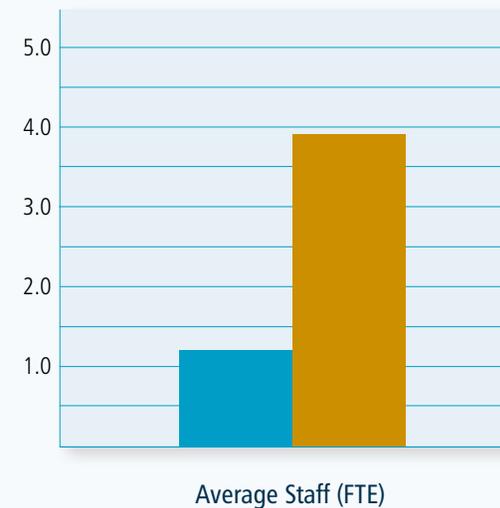
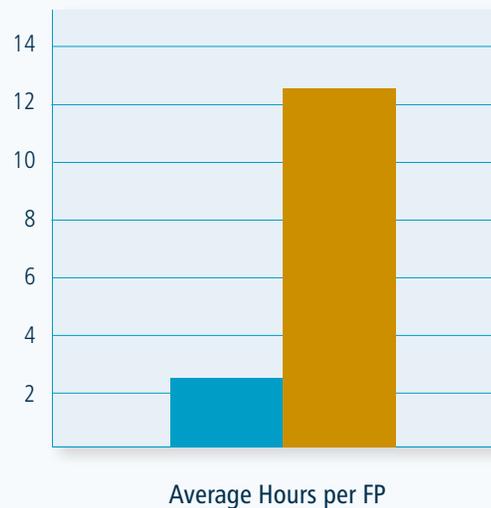
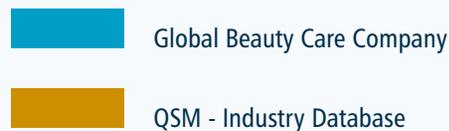
The customer is a leader in premium, world-renowned beauty-care brands that are sold through retail and salon channels. The objective of this project was to streamline the processing of orders from the salon channel by providing sales representatives with a mobile application that integrates with the ERP back-office application. The customer has standardized the back-office on SAP, while the sales representatives work with an iPad application. The

project concerned the middleware solution between the native iPad app and SAP. The system manages the security aspects of the iPad application as well as the exchange of information between SAP and the iPad application, including product information, promotions and orders. The application is rolled out in twelve countries.

Explanation of the graph

The first graph shows the productivity in terms of the average number of hours spent on the project.

The second graph shows the average team size.



Comparison with the market average

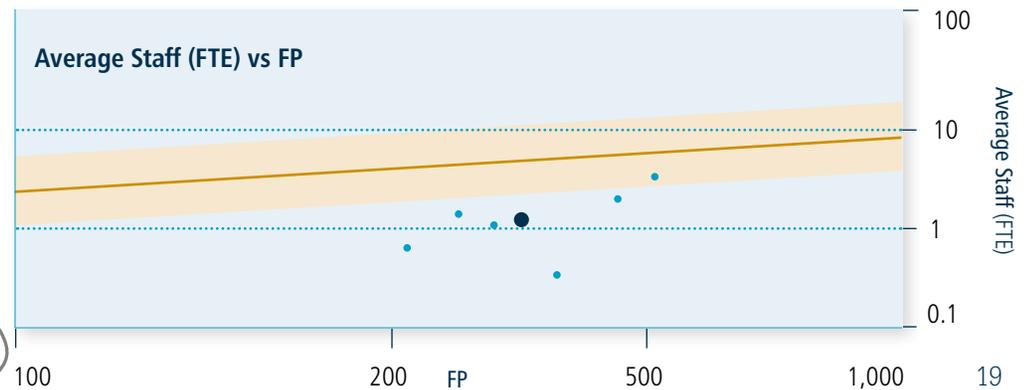
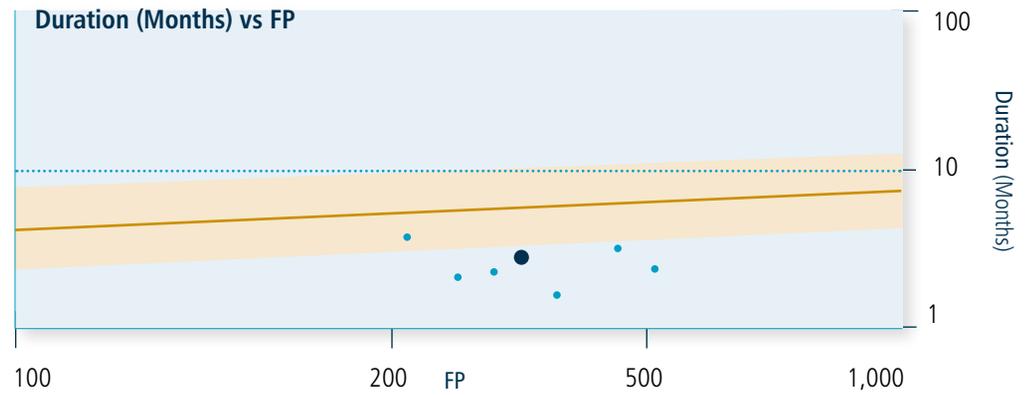
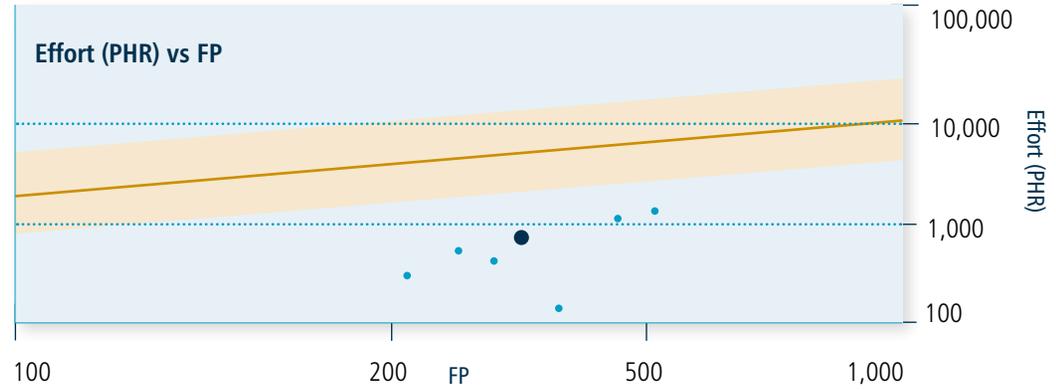
- Build cost with Mendix is five times lower.
- Overall QSM benchmark team size is three times larger.

Global Beauty Care Company | Details

Overview core metrics

- Global Beauty Care Company ●
- Mendix project ●
- 1 Sigma band ■
- QSM Business —

Project Summary		
Size	368	Function Points
Duration	3.3	Months
Effort	662	Person Hours
Peak Staff	1.5	People (FTE)
MTTD	3.4	Days
PI	19.5	
PI=19.5 Size=368 FP		



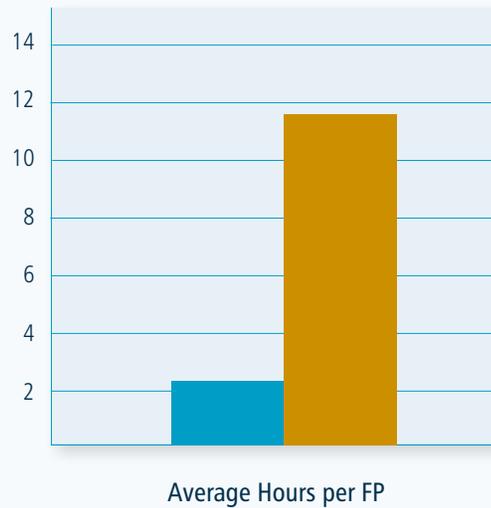
European Postal Services Company

Project Description

The customer's core activity is providing postal services. There was a need in the HR domain for better support of job mobility and career planning processes. This project was to build such solution with built-in flexibility for making dynamic changes as per evolving rules and regulations. The application is integrated with SAP HR, being the system of record for employee data, and SAP BW for business intelligence and reporting.

Explanation of the graph

The first graph shows the productivity in terms of the average number of hours spent on the project. The second graph shows the average team size.



Comparison with the market average

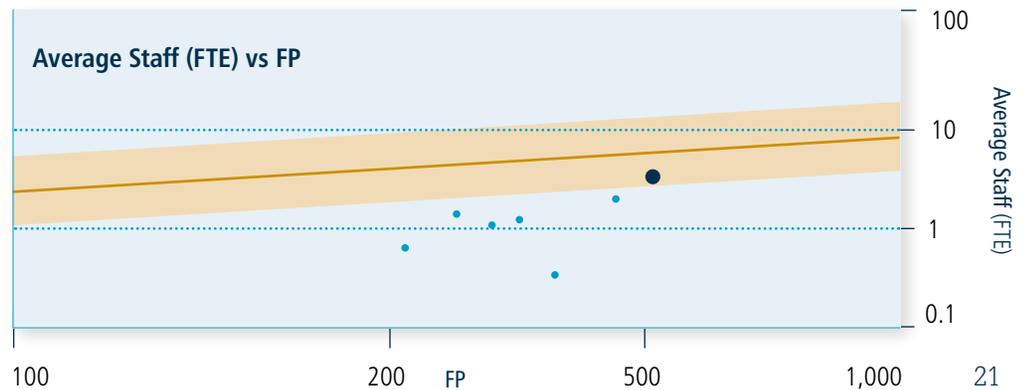
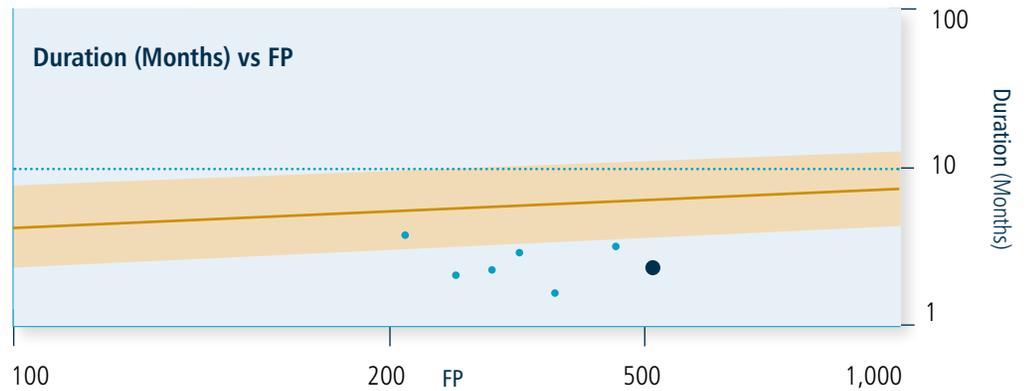
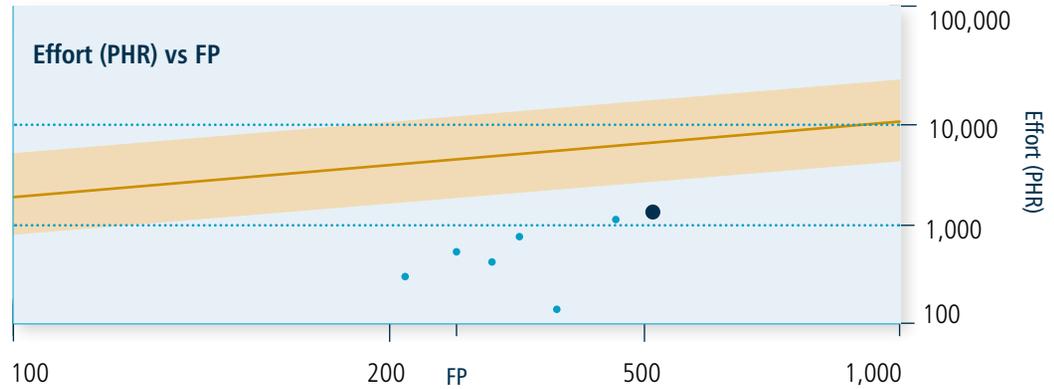
- Build cost with Mendix is five times lower.
- Overall QSM benchmark team size is 35% larger.

European Postal Services Company | Details

Overview core metrics

- European Postal Services Company ●
- Mendix project ●
- 1 Sigma band
- QSM Business

Project Summary		
Size	533	Function Points
Duration	2.2	Months
Effort	1,203	Person Hours
Peak Staff	3.6	People (FTE)
MTTD	1.5	Days
PI	22.5	
PI=22.5 Size=533 FP		



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Global Logistics Service Provider

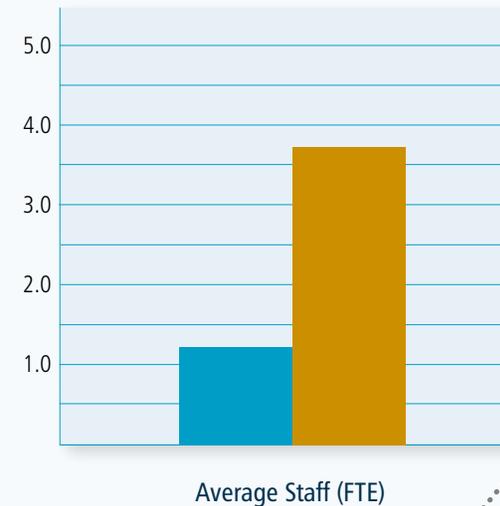
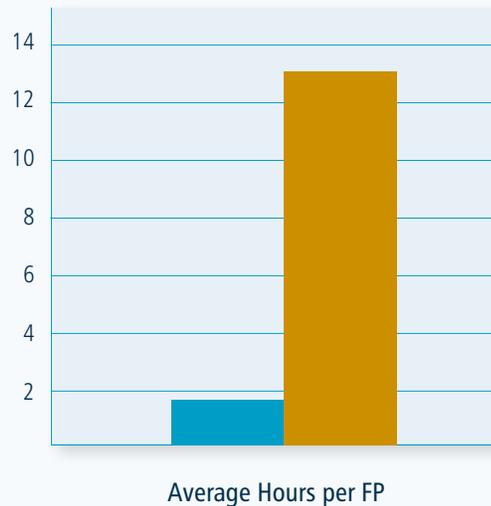
Project Description

The customer is a global logistics service provider. The scope of this project was to build a single workflow solution for custom pricing to be used across multiple countries to replace a disparate set of locally developed solutions. The customer processes more than three million requests per year.

The application supports various pricing models for specific offerings and handles the workflows for approval of pricing requests. The application is multilingual and is integrated with a document management system.

Explanation of the graph

The first graph shows the productivity in terms of the average number of hours spent on the project. The second graph shows the average team size.



Comparison with the market average

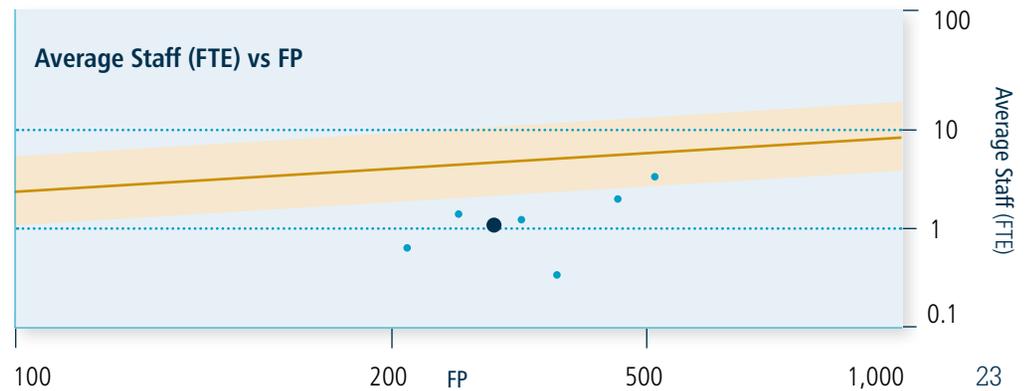
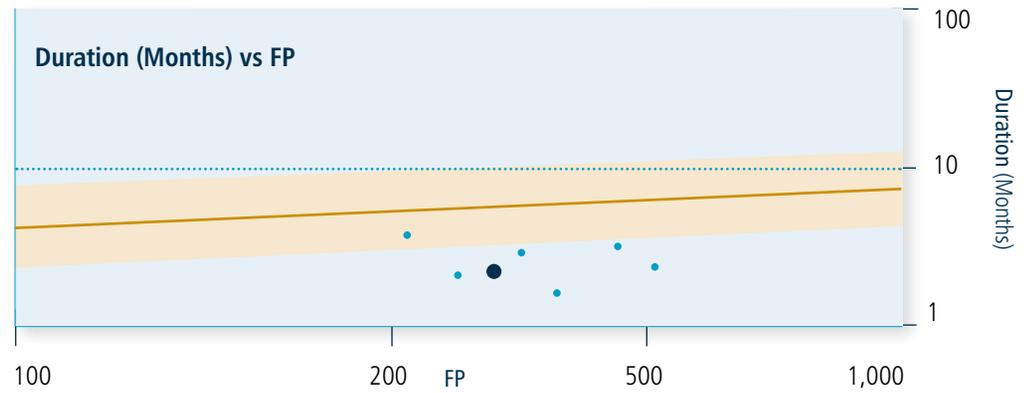
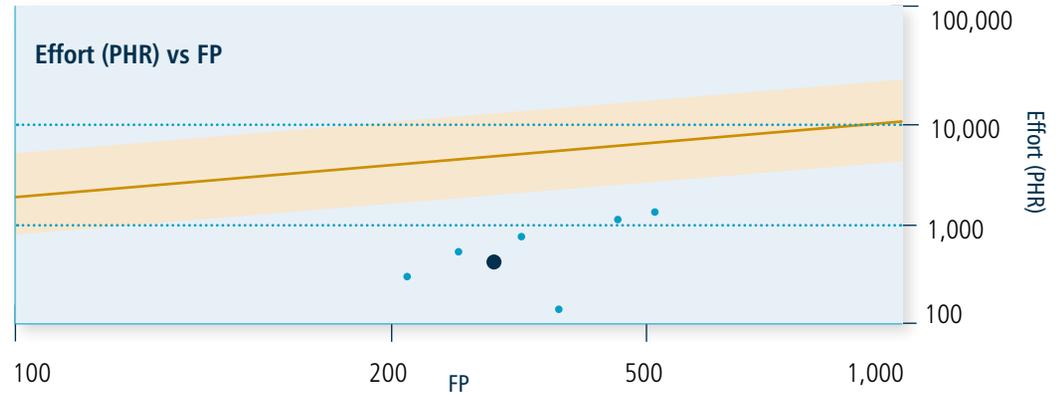
- Build cost with Mendix is seven times lower.
- Overall QSM benchmark team size is three times larger.

Global Logistics Service Provider | Details

Overview core metrics

- Global Logistics Service Provider ●
- Mendix project ●
- 1 Sigma band
- QSM Business

Project Summary		
Size	325	Function Points
Duration	2.4	Months
Effort	457	Person Hours
Peak Staff	3.6	People (FTE)
MTTD	3.4	Days
PI	21.0	
PI=21.0 Size=325 FP		



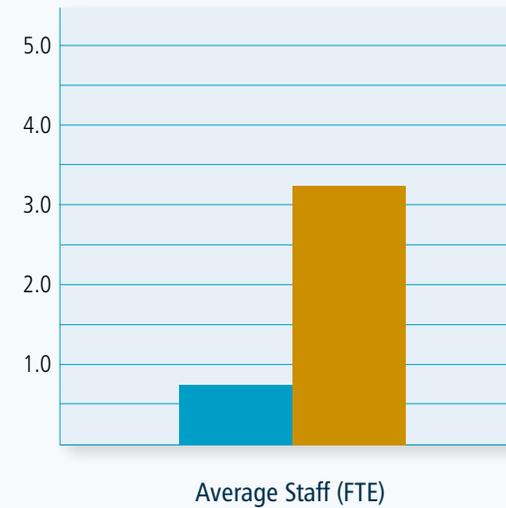
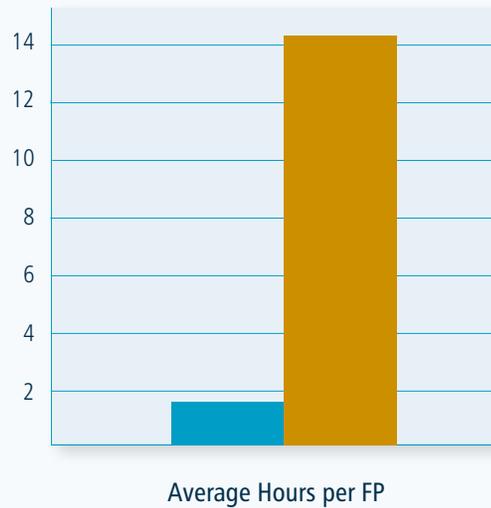
Public Sector Agency

Project Description

The customer is a Public Sector Agency. The IT organization was faced with the challenge to optimize use of software licenses across the organization. The project was to build a central administration of software licenses and a marketplace to trade these licenses within the organization, respecting conditions and constraints associated with the respective license contracts.

Explanation of the graph

The first graph shows the productivity in terms of the average number of hours spent on the project. The second graph shows the average team size.



Comparison with the market average

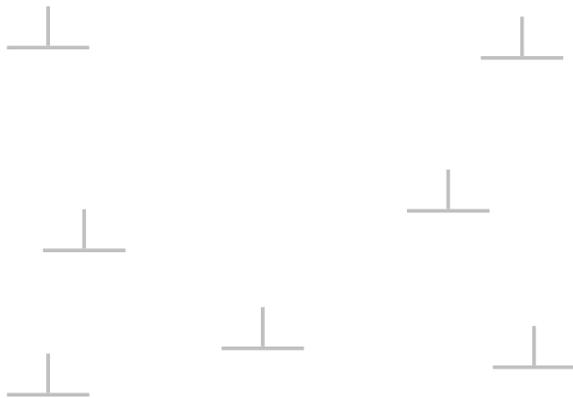
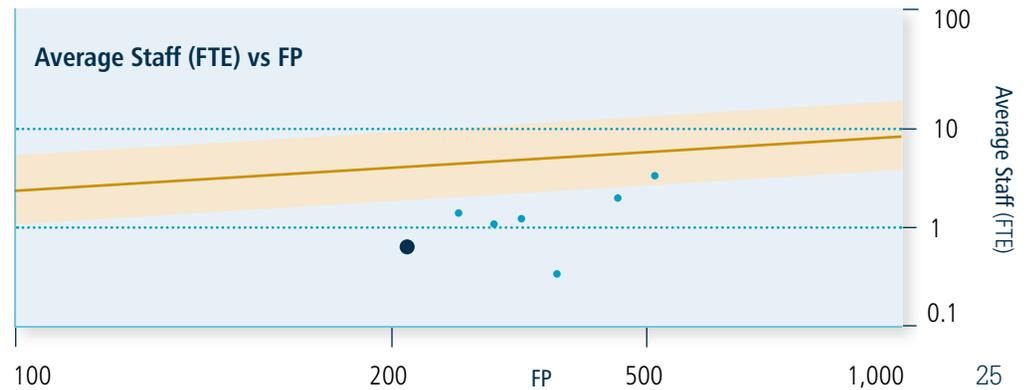
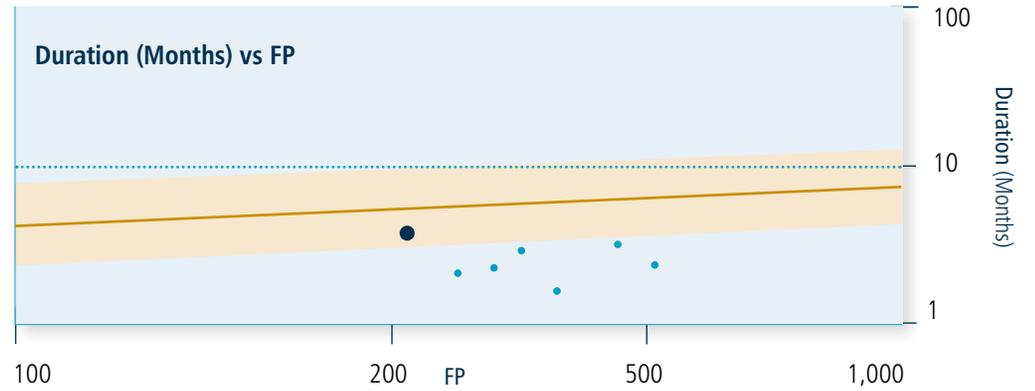
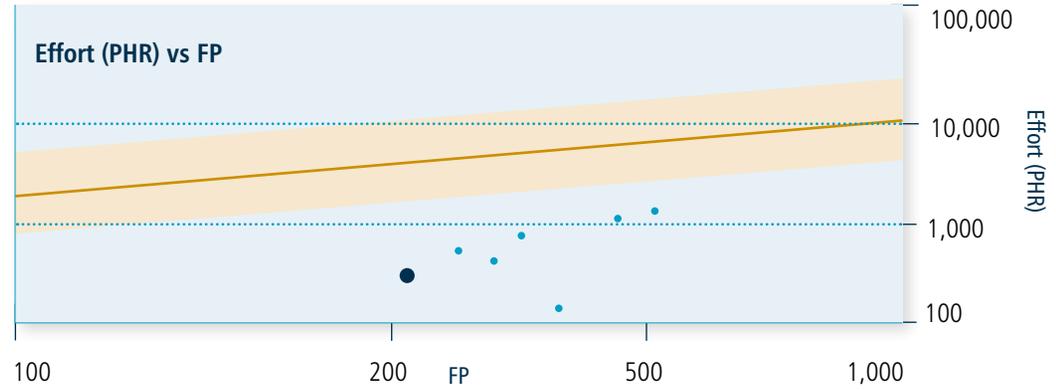
- Build cost with Mendix is seven times lower.
- Overall QSM benchmark team size is four times larger.

Public Sector Agency | Details

Overview core metrics

- Public Sector Agency ●
- Mendix project ●
- 1 Sigma band
- QSM Business

Project Summary		
Size	242	Function Points
Duration	3.7	Months
Effort	415	Person Hours
Peak Staff	0.9	People (FTE)
MTTD	5.5	Days
PI	18.0	
PI=18.0 Size=242 FP		



Global Information Services Company

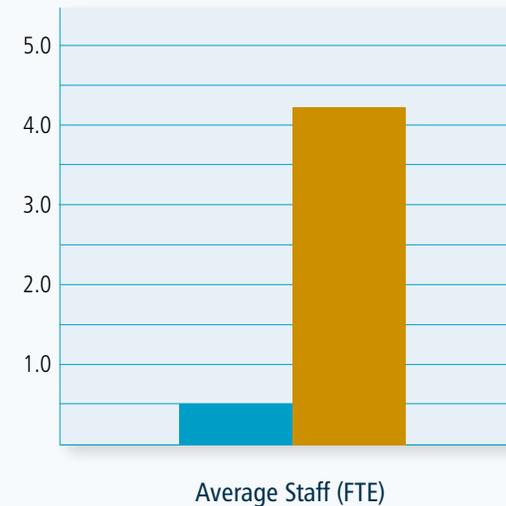
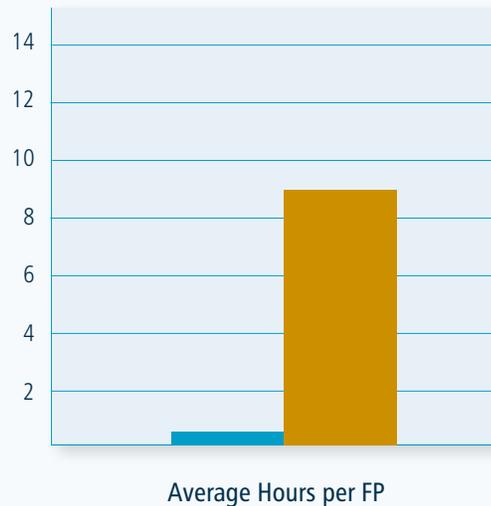
Project Description

The company's core business is providing information services and consulting based on market research in the information technology domain. The aim of this project was to automate the workflows and information gathering from technology companies to support the research. This process had been manual and based on exchange of spreadsheets. The application is a secure portal for companies participating in the research to submit their data and inputs.

Explanation of the graph

The first graph shows the productivity in terms of the average number of hours spent on the project.

The second graph shows the average team size.



Comparison with the market average

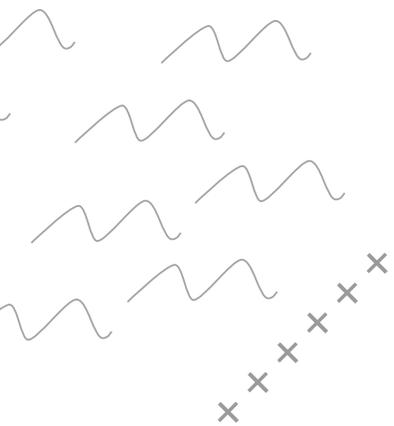
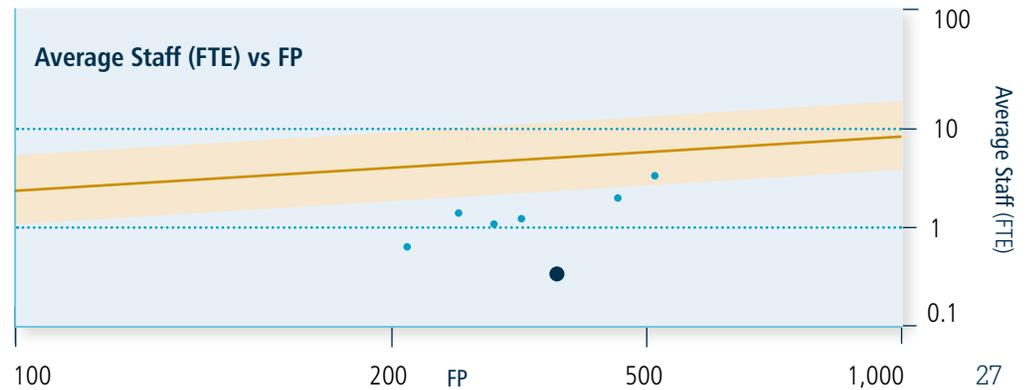
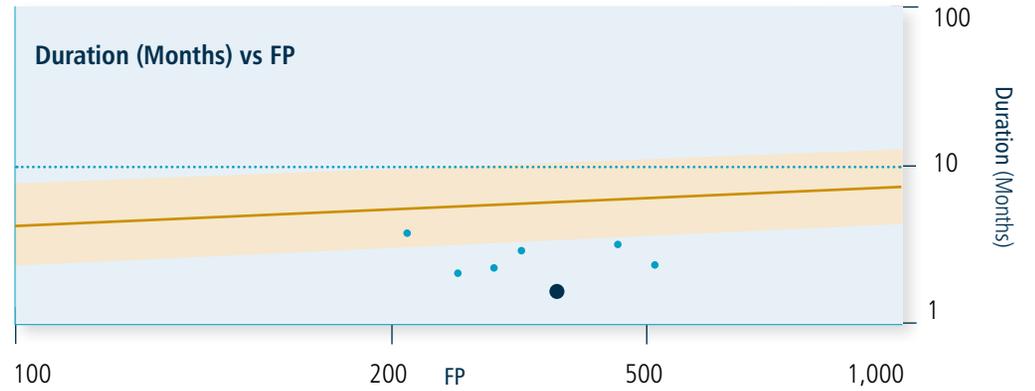
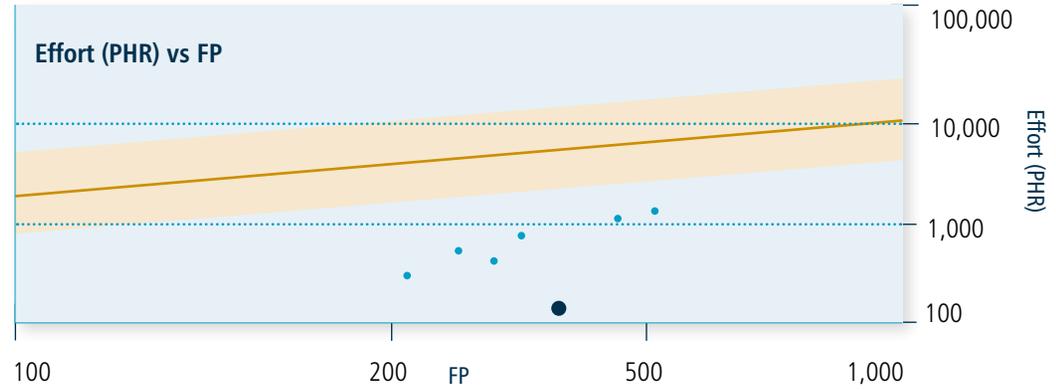
- Build cost with Mendix is thirty times lower.
- Overall QSM benchmark team size is eight times larger.

Global Information Services Company | Details

Overview core metrics

- Global Information Services Company ●
- Mendix project ●
- 1 Sigma band ■
- QSM Business —

Project Summary		
Size	421	Function Points
Duration	1.6	Months
Effort	146	Person Hours
Peak Staff	0.6	People (FTE)
MTTD	3.6	Days
PI	26.1	
PI=26.1 Size=421 FP		



QSM Project Service Portfolio

QSM offers various services in the startup phase, during the project implementation phase and when the project is completed. In all these phases, the information provided by QSM is 100% fact-based. We perform these services independently or implement them in the client organization. To ensure objectivity, QSM avoids active participation in projects.

Project Sizing

Sizing is arguably the most challenging part of any software estimate. Without a notion of functional size it's quite difficult to estimate realistic schedules on the set development time. QSM has a specialized unit which determines the size of projects unambiguously. This team plays an important role in offering project transparency and project predictability.

Project Scenarios

On the basis of project size and benchmark data, QSM identifies the scenarios that are located within the acceptable ranges. The Project Scenario Services provide a set of feasible scenarios for the successful delivery of the relevant software project.

Project Snapshots

QSM standard services provide factual insight into the status of a project. It makes clear whether the project is progressing as expected. This project snapshot also provides an image of the expected results, if and when the project continues unchanged.

Project Benchmark

The QSM database is essential in all of our consulting service engagements. It represents the largest and most complete set of validated and completed software project data in the world.

Based on this data we can provide factual insight into delivery of a project, in relation to its own or industry standard productivity trends. These metrics are highly useful for defining scenarios for future projects. Project Benchmark services also determine the extent to which the project delivery complies with the initial agreement or contract.





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The Intelligence Behind
Successful Software Projects

