

WHITE PAPER

Outsourcing Requirements Management

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About the authors:

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INTRODUCTION

Requirements Management is a key process in any organisation developing or acquiring complex technical systems. However, developing a Requirements Management Capability often prove cumbersome and costly when all the associated activities over the lifecycle are added.

This paper describes how Requirements Management can be outsourced as a very user-focused and cost-effective alternative to building a full Requirements Management Capability in-house.

Syntell has been supporting organisations with Requirements Management for more than 15 years, which has resulted in a thorough understanding of what is required in order for an organisation to have a proper Requirements Management Capability.



Developing a Requirements Management Capability can prove to be cumbersome.

ORGANIZATIONAL CAPABILITY

An organizational capability can be described as the organisation’s ability to utilise its resources to gain competitive advantage. It is built up of Process, Methods, Information, and Tools & IT. It is supported through Training, and operational Support. It is founded on an Organizational structure and a Governance model that recognizes the importance of the capability.

At the same time, the organisation’s capability has to be balanced with the organisation’s needs. The business environment (regulations, competitors, market situation), the products developed or acquired by the organisation (complexity, life span, etc.) as well as the organisation’s internal needs (staff educational level, staff turnover, organizational set-up, geographic spread) together define the required capability level. An organisation developing fighter aircraft will most likely have different demands on e.g. Requirements Management Capability compared with an organisation developing internet web sites.



An organisation’s capability has to be balanced with the business needs.

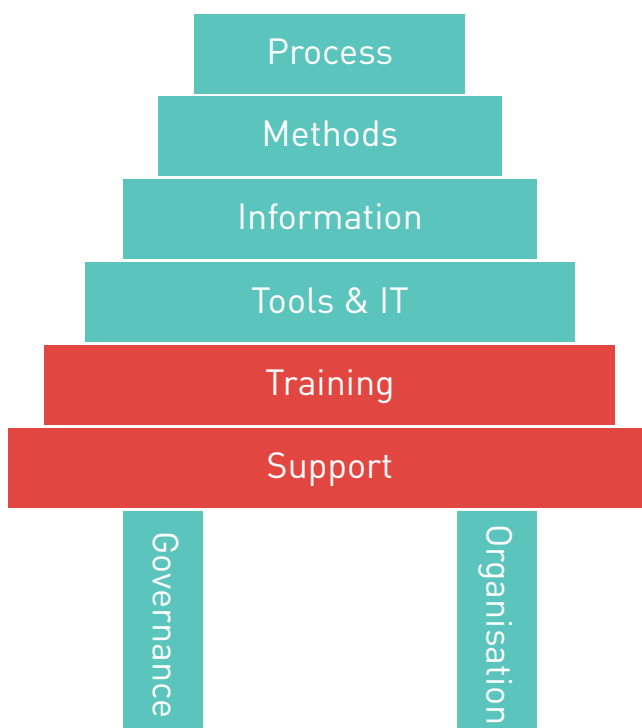
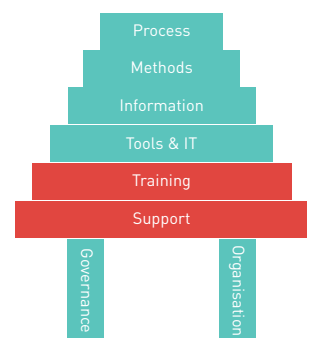


Figure 1: Organizational Capability .

REQUIREMENTS MANAGEMENT CAPABILITY

The Requirements Management Capability, in order to be successful, must address all the layers of organizational capability.

- **Process:** According to ISO/IEC 29148¹, Requirements Management encompasses the tasks that record and maintain the evolving requirements and associated context and historical information from the requirements engineering activities. This implies that Requirements Management is an integrated activity throughout the product's lifecycle. The process layer focuses on describing the Requirements Management process and workflow, its relation to other processes, and to describe the Requirements Lifecycle.
- **Methods:** In this layer, rules, procedures, guidelines and manuals are found. Interaction between Requirements Management and other processes and disciplines, e.g. Configuration Management, is also addressed in this layer.
- **Information:** The structure and properties of all data that is managed within the scope of Requirements Management, e.g. requirements and verification / validation data, is defined here. Consideration has to be made to possible data exchange between different processes and between different tools. A proper definition of all terms is therefore required.
- **Tools & IT:** Tools and IT infrastructure provide both opportunities and constraints as to how data can be handled. This will affect the layers above, and vice versa. However, adopting a tool does not by itself provide a capability. A fact that is obvious but often overlooked in search of an "easy way" to establishing a Requirements Management capability.
- **Training:** The training layer addresses the entire capability. It answers what/how/why/when/who-questions based on all the higher layers in the pyramid.
- **Support:** The support is mainly divided into three parts: Enterprise level definition of the capability, Project adaptation and Operational support. All parts address the entire pyramid from a capability point of view.
- **Governance:** The company culture, mindset, leadership, and strategy must recognize the importance of Requirements Management.
- **Organisation:** There must be clear roles and responsibilities related to Requirements Management, there must be staff with the right competence to perform the work.



1) ISO/IEC 29148 Systems and software engineering — Lifecycle processes — Requirements Engineering

TOOL SUPPORT

In many organisations, Requirements Management is still done by using standard tools, like Microsoft Word or Excel. This kind of tools have some major limitations in providing the basic RM functionality, such as traceability from one requirement (level) to another, version management of requirements and sets of requirements. For this purpose there are specialised tools to support the RM work.

Many engineers working in product development would agree that learning yet another tool would be a major reason for not acquiring a dedicated RM tool. Therefore many organisations are still stuck in the situation where they are using poor tools for one of the more critical processes in the delivery of successful projects².

Outsourcing the Requirements Management is a solution to dealing with this that gives the engineers the possibility to focus on the actual requirements instead of learning a new tool.



Outsourcing Requirements Management enables engineers to focus on their core business.



2) In 1994 the Standish Group surveyed the success of ~8000 (!) software development projects in order to understand why software projects fail. The report became very wide-spread since the result showed that only 16% of the projects were delivered on-time, on-budget, and with all features and functions as initially specified. One of the top-three success factors for the projects that were successful was "Clear Statement of Requirements".

The situation now has improved. The 2012 Chaos results show that 39% of all projects were successful.

In the Chaos Manifesto 2013 one of the identified success points for execution of small projects is formal requirements management throughout the project. "Requirements need to be thought of as living organisms that change as the project evolves."

OUTSOURCING REQUIREMENTS MANAGEMENT

When outsourcing the Requirements Management, the Service Provider will provide support and guidance related to the entire workflow for Requirements Management based on the defined framework of Process/Methods/Information/Tools and IT.

This means that the Service Provider works together with the client to define the processes and methods to be used. The interfaces to other processes are defined and the basic information model is defined, thus setting up the structure for handling information security issues.

Once the basic set-up is done the Service Provider will support the individual projects in adapting the capability to the projects' needs. This includes setting up the information model for the project, defining the requirement attributes, adapting the project organisation to the conditions of the project (geographic spread, size, etc.).

The Service Provider will also manage the actual tool, while the engineers will work in a familiar environment, such as MS Excel. The Service Provider maintains the database, guarantees the integrity of the information (including back-up of the database) and serves the users with a structured import/export of requirements to/from the RM tool.



The Service Provider works together with the client to define the processes and methods.

WHAT ARE THE BENEFITS?

The main benefit is that the organisation can focus on the actual development work and not have to invent and implement procedures, rules, information structures etc in order to be able to develop and maintain all data that is needed during and after the development project. An experienced Service Provider will support the organisation in making project adaptations and define the project specific information structure and requirements lifecycle needed in the project, assuring that the existing process is supported and that the workflow benefits from accumulated best practice.

Not having to learn a new tool as discussed above is another obvious benefit from outsourcing the Requirements Management. Especially for users who are not regularly using the tool this obstacle may seem insurmountable.

Dedicated RM tools are generally quite expensive. In a survey on requirements engineering tools it was found that the “[...] positive correlation found between the average cost per individual license and the analysis, modelling, traceability and specification features indicates that the more expensive a tool is, the better requirements analysis, modelling, traceability and specification support it provides.”³ For an organisation wanting to acquire a competent tool to support their Requirements Management work, this investment can be very high (in the range of \$5,000 - \$15,000 per license). And this is just the tip of the iceberg. Tools training, tools maintenance, tools integration, adaptation to corporate processes are other aspects that add to the total cost. With many simultaneous users in the organisation this quickly amounts to a heavy investment. With an outsourcing solution, however, standard tools, such as MS Excel, that are already in place in the organisation will serve as the main interface to the user. The service provider will support with analysis, traceability, specification support, etc.

Many organisations are distributed to many locations. In many cases this means that although the number of users in the organisation may be quite large, the number of users per site/location is limited. This restricts the possibility for the support organisation to provide good support to all users. The possibility to get support from peers will also be limited. This can leave the organisation with frustrated staff that move back to using the non-dedicated tools previously used, as they are familiar. And then the heavy investment done in good tools didn't provide any improvement in capability at all.

For organisations that have outsourced the IS support, additional costs may occur when new tools are introduced in the IS environment if they were not specified in the original contract with the supplier.



Good Requirements Management tools are more expensive.



3) Requirements engineering tools: Capabilities, survey and assessment, Juan M. Carrillo de Gea. Et al., 20 March 2012. https://investigacion.uclm.es/documentos/fi_1349252217-2012information%20and%20software%20technologycarrillo.pdf

SYNTELL'S OFFERING

With this in mind, Syntell has developed RQplus Outsourcing as a service that can be provided to our clients. Syntell offers a basic package that provides the following.

Process

Most organisations have a development process in place, mostly based on some established model, such as the V-model, SCRUM, or RUP. In addition to this RQplus Outsourcing includes a basic enterprise adaptation of processes for the Requirements Management work. This adaptation includes a Requirements Lifecycle that the process, methods, and information model is linked to.

Methods

RQplus Outsourcing comes with a standard set of methods and ways of working to support the Requirements Management process. This includes routines for creating, reviewing, freezing, changing, exchanging and tracing requirements and verification data. RQplus Outsourcing also provides methods for subcontractor management, e.g. creation of RFQ documents that are integrated to the requirements database, evaluation of quotations and data exchange with the selected suppliers throughout the Requirements Lifecycle.

Information

As part of RQplus Outsourcing there is a standard Information Model. Normally there is a need to do an enterprise-level adaptation of this Information Model, which is included in the basic package. The Information Model has integrated support for handling of verification data related to requirements, reviews, incremental freeze and change management. For each project the information model is adapted to the situation of that specific project.

Tools

Syntell hosts the tool environment which consists of a standard IBM Rational DOORS tool and database together with the DEx Toolkit developed by Syntell. It is an add-in to IBM DOORS combined with an add-in to Microsoft Excel that enables multiple users to work through a structured import/export functionality between DOORS and MS Excel. In this way both the individual requirements and



DEx Toolkit enables the process, methods, and information model to be implemented.

sets of requirements are version managed and all changes are controlled. The DEx Toolkit has been specifically designed and developed to support the workflow and procedures described above. The exports from DOORS to Excel provide full support for all tasks in the workflow and provide extensive capabilities for review and analysis of data that go beyond what is supported in a standard DOORS environment. In addition the DEx Toolkit provides support for generating traceable PDF documents directly from the DOORS database for documentation of formal baselines, contracts and other milestones.

For the organisation that uses RQplus Outsourcing, the only tool needed is the standard MS Excel. No special functions or installations are needed on the user's side. DEx Toolkit supports MS Excel 2007, 2010, and 2013. This has to be in place within the organisation and is not included in the Syntell delivery.

Training

As part of the basic package, Syntell provides the basic user training for using RQplus Outsourcing. It describes the Process, Methods, Information Model, and Tools included in RQplus Outsourcing and gives the users a good foundation for the future work.

Support

Included in the basic package is the enterprise level definition of the capability as well as project adaptations. Also included is off-site support in terms of tool import/export, database back-up and telephone support.

Additional support may be required depending on the Requirements Management Capability maturity level of the organisation. Syntell offers additional support as options to RQplus Outsourcing. Typical support that will be offered include:

- Requirements Engineering Process Development
- Requirements Engineering Method Development
- Requirements Engineering Training
- Requirements Engineering Project Support

The support level will be defined together with each customer on a case-by-case basis in a separate Service Level Agreement (SLA).

CONCLUSION

As a means to acquiring a Requirements Management Capability RQplus Outsourcing introduces a new approach that enables the organisation to focus on their core competences. Instead of having to develop processes, methods, and information models themselves, organisations can now make use of the best practice gathered from other leading organisations from different sectors. They can also take advantage of the advanced requirements analysis, modelling, traceability and specification support dedicated Requirements Management tools can provide, without having to do heavy investments in and learning how to use such tools.

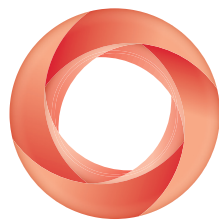
RQplus Outsourcing provides an excellent foundation for building a Systems Life Cycle Management Capability.



*Outsourcing the
Requirements Management
enables the engineers to
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Your challenges – our interest

Whether you work within medtech, energy, aerospace & defence, or transportation, you are probably facing the challenges of complex systems in a complex environment. Syntell offers a proven concept for optimization of your ability to manage complex systems throughout their lifecycles. We ensure a long-term effect through organizational development, training, and project support with our expert consultants.



Syntell

excellence in systems lifecycle management