



Software Process Improvement Case Study



Funded by the European
Commission Project Number
23873

Ireland No. 010 (English)

February 1998



Overview

Relmar provides Enterprise Resource Planning software systems to small production facilities in the aircraft component maintenance industry.

Relmar's participation in the SPIRE project was aimed at introducing some basic procedures to a small, fast-growing company needing to formalise bidding, document management and project planning and monitoring.

Substantial progress was made in raising awareness of the company's inherent way of doing business and how procedures might be used to improve the level of service and productivity. A set of procedures was completed with the participation of most staff members and they were used on test projects with clear improvements.

Key lessons included the formalisation of tasks which were previously carried out according to the styles and habits of individuals: preparing a proposal and measuring attainment of project schedules can now be carried out by a range of individuals with greater reliability and consistency.

The Organisation and its Environment

Relmar was set up in 1996 and combines technical and business skills in IT implementation, concentrating on the technical aviation industry. The directors have substantial management experience in the commercial operation of aircraft and jet engine maintenance facilities, as well as strong skills in current production engineering and information systems disciplines.

The company's philosophy is one of integrating business processes using current technology to allow clients to develop improved relationships with their customers: the company's name is an abbreviation of the term "relationship marketing".

Relmar has seven staff consisting mainly of programmer analysts who have qualifications in engineering, business and computer science.

As a small but expanding company, Relmar needs to formalise many of the routine tasks that it performs to enhance co-ordination between colleagues and control of the company's operations. At the same time, there is an ever-present need to apply new technologies and continue

with an ambitious product development program to meet commercial goals and offer the best solutions in the market sector.



Michael MacDonnell,
Director

Starting Point

At the time that Relmar proposed a SPIRE project, the company was engaged mostly in small, one-off software development contracts, which were often managed and completed by one person. In developing a specialised suite of products for the aviation market, Avalon™, the nature



of the company's activity has been changing, raising a need for co-ordination, formal project management and an increased administrative and support workload. Most SPICE capabilities were very low at that time, with little planning or documentation being applied.

Relmar's strategic goal is to provide a well-developed system for implementation at many sites of a similar type, namely a complex engineering environment. By having a stable configurable product, the company can cut installation times, increasing sales levels and profitability. In order to fulfil this wish, Relmar needs rigorous procedures to manage the customer relationship from initial proposal through the project management of an installation to customer support and administration.

The Improvement Project

The improvement project was designed in such a way as to be in keeping with the company's structure and mode of operation at that time, namely that the company consists of a small team who in many cases operate autonomously on different projects. Most projects are carried out at customer sites and require remote management control, calling for regular review meetings with customers and staff. The lack of procedures in the company's process of conducting business meant that much reliance was placed on individuals to manage the progress of a project.

The approach in developing procedures was thus to come up with simple, workable solutions to be used by any responsible staff member.

The main steps in the improvement project plan were:

1. Formulation of a basic project goal and review with management team
2. Completion of the project plan
3. Completion of initial assessment
4. Management team workshops to identify the critical areas of operation that would benefit most from procedures
5. Drafting procedures
6. Review of procedures by management team and all staff
7. Revision of procedures
8. Limited operation of procedures on test projects

9. Observation of effect of procedures on work processes
10. Completion of final assessment
11. Completion of final report and case study documents

Some or all of these steps had been carried out in an ad hoc fashion in previous projects, but were not planned as discrete steps and were thus not arranged with adequate monitoring or control. The improvement project was organised by giving primary responsibility for progress of the project to a team leader, in this case the company's business manager, who is responsible for administration and support of development projects. The Managing Director and Technical Director were involved in providing specific knowledge of the business and contributing to the development of procedures.

The only tools used were the SPIRE assessment system, BootCheck and standard software applications: Excel for project planning and control and Access for administration. It is intended to develop Access applications to standardise and control the use of procedures and forms for project proposals, administration and project management. The main methodology employed was the company's existing (informal) project management structure, based on simple Gantt charts divided down to the task level, with actual performance measured against plan and staff resource availability charted and matched with project requirements.

The main impact of cultural and human issues was the need to segregate management and staff time to dedicate without distraction to the project. This was difficult to achieve, and with the combined circumstances of a late start, a major project over-run and staff holidays, the problem was compounded. As a non-profit making activity, there was serious cultural difficulty in sacrificing profitable time in large amounts to work on the improvement project. However, the development of leadership and ownership of the project helped to create respect for the value of the work with other members of the company.

The Results

The following was achieved:

1. The company's existing calibre in terms of quality management was clearly measured, identifying the major areas that would benefit from improvement.
2. Management and staff were given an introductory awareness of the need for quality management.



3. Procedures were created that cover a substantial portion of the company's non-core activity, i.e., the tasks surrounding the trade of developing software.
4. These procedures, and their associated forms and charts, were shown to offer greater control and coordination, resulting in better work and communication.

The procedures developed included:

1. Document control: a system for indexing and tracking all business documentation.
2. Company procedure preparation: steps in drafting and completing a procedure document.
3. Project monitoring: creating a project plan and recording progress against the plan.
4. Project proposal: evaluating requirements for a bid and preparing a proposal to address these requirements and make a commercial offer to trade; follow-up and monitoring of bid progress.
5. Installation: commissioning, testing and acceptance of a software system at a customer site.

The main problems encountered were:

1. The opportunity cost of the project: even though the project was funded, the activity required to bid for the project, carry it out and complete all requirements occupied substantial management time during a critical phase in the company's development. This was addressed by working longer days on many occasions.
2. Staff availability and opportunity cost: during a short project time scale and a very pressured period for the company, it was difficult and not generally desirable to divert staff from core tasks to discuss quality management, review procedures, etc. Their exposure to the project was thus necessarily limited as far as possible.
3. The scope for refining procedures and generating case study data was very limited by the project deadlines. The procedures will continue to be refined after the end of the project period.

Goals and objectives were broadly achieved: a set of procedures have been created that will definitely be applied to future work. The completion of case study research has been refined to project phases, rather than entire projects.

Costs and benefits are not quantifiable at this stage: costs have exceeded those being claimed from funding for the project, but it is hoped in the long run to maintain a quality philosophy and work toward fully equipping the company with comprehensive procedures for all aspects of the business. The area of product quality has not been addressed and would be suitable for more detailed consideration with greater availability of resources. Procedures have been used to improve document management and there is an immediate benefit to the transparency of project files for common use. In addition, procedures have been applied to project proposals and project monitoring: it is too early to claim that new business has been generated or projects have been completed with higher productivity or greater reliability as a result of using procedures. However, the qualitative assessment of recent changes in the company's business processes certainly indicates an improvement in the way that the relevant tasks are carried out.

Lessons Learned

The following were the main conclusions of the project:

Management commitment and planning of dedicated time are vital to any quality management initiative. This was achieved with difficulty and will need to be provided for as a core company activity in the future, with resources planned and measured for any other work.

Quality management is a task like any other: as above, all time spent by any staff or management on workshops, analysis, planning, preparation of procedures, etc., needs to be planned and recorded as a use of resources. It is not good enough to steal time after hours or between scheduled activities, since the tasks then become a burden and are not given comprehensive coverage.

Quality costs resources, so the benefits need to be clearly identified and pursued.

The ownership of procedures and quality management in general is essential to its success: management lip service will not generate results.

The single largest factor affecting the success of continued quality management is the recognition of its importance through potential benefit, which must lead to ownership and commitment on the part of those involved.



Plans for the Future

There are many ways in which the company will continue to benefit from a structured approach to prescribing and managing its work. It is envisaged that the set of procedures generated will be complemented with detailed project planning, management and reporting structures, marketing planning formulation and general administrative functions like accounts and personnel.

Should the growth of the company permit, it is intended to appoint a dedicated quality manager, who will be charged with both quality management (generation, control and application of procedures) and quality assurance (planning and documenting software development to enhance reliability and productivity).

Acknowledgements

This case study is published by CSE Ltd, Dublin for the SPIRE project.

Thanks are due to the staff of Relmar Limited, especially Michael McDonnell.

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