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IT 4Q02

Historically, having a quality management system and gaining a registration against an ISO standard has been seen as the province of the 'larger' company. Now, more and more small to medium sized companies are taking the plunge! Here is a case study from Jonathan Lowe of a small, young company realising the benefits from the introduction of a quality management system into their fast-growing, predominantly Rapid Application Development/ DSDM environment. Yes, and by the way, they did achieve ISO9001:2000 TickIT registration in the process!

Mike Forrester

Many quality or business improvement managers will have been confronted with the standard question from their bosses: "*Just what return on investment will the company get if we embark on a quality management system or improvement initiative?*" Well we have an article from David Rico, which might just help in responding to this, and convince your management that there really is a strong business case for such initiatives.

Finally, there has been much debate over the past few months about the benefits of 'Combined Assessments' to reduce the number of times an organisation's core systems are evaluated, thus reducing the level of interruption to business and, hopefully, cost. Indeed, Bal Matu discussed the issue in his article on security in 2Q02. The question was put to a UKAS Director when he visited a recent CSSA (now called Intellect) Quality Group meeting and gained a positive response. So we invited UKAS to make a statement on the subject.

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TickIT 4Q02

TickIT & DSDM for e-commerce: A Case Study

by Jonathan Lowe

This case study covers the definition of a business management system for the Ultimate People Company ('UPCO'). UPCO is a young company – three years old, employing around 30 staff – offering software solutions and change management consultancy (principally knowledge transfer programmes) to a corporate client base.

Their methodologies for both software and knowledge solutions are based on Rapid Application Development (RAD) / Dynamic Systems Development Methodology (DSDM) V4 and PRINCE 2.

I believe that companies like UPCO are underrepresented in the ISO registration stakes. I wonder what proportion of businesses with the following characteristics have achieved ISO 9000/TickIT registration?

- Recently established,
- offering leading edge solutions and highly adaptive to new technology exploitation,
- 'flat' structures (that is, little hierarchy, no line management).

This article seeks to examine what ISO 9000 and TickIT have to offer such businesses. In particular, it covers:

- UPCO's motivations for the programme and background,
- a 'rough guide' to RAD/DSDM,
- how – and why – DSDM was applied to UPCO,
- ISO 9001:2000 – an overview of the changes,
- an overview of the management system, and how key areas of ISO 9001:2000 were tackled,
- conclusions: what difference the management system and its methods have made.

Motivations

UPCO has enjoyed very good growth rates (turnover, headcount, acquisition of new clients) in a depressed market – so **why did UPCO bother** to develop a management system?

- **Support growth** of the company. The company has been growing at a steady rate since its inception, but many of the current staff had been recruited within a relatively small network; all staff had been known directly by UPCO employees. However. it is recognised that the next phase of growth is likely to recruit from outside of the group.
- **Support succession** – by capturing the knowledge of the current process experts and establishing best practice, the dependency on key individuals is reduced. The company is then less exposed to risk of people leaving or being deployed in new roles.
- **Establish best practice** to support consistent achievement of excellence in software solutions and consulting projects.
- **Provide a framework for developing and adapting** the best practice model to meet the demands of changing technologies, markets and offerings.

UPCO: Who Are They?

UPCO provide software solutions and change management consulting. There is no standard product – client engagements usually involve the development of bespoke software or change management solutions.

Significant differentiators in UPCO's approach include:

- An offering of **Knowledge Transfer Programmes**. UPCO's clients use these programmes to enhance client staff development, plan for succession and reduce (or eliminate) dependencies on contractor or outsourced effort.
- **Support for the software solutions provided is *not* offered**. UPCO hand over ownership of solutions to their clients once satisfaction has been established by their clients. UPCO refer to this as *empowerment* of customers, freeing them of vendor dependency and operational costs of bought-in software. UPCO's target market consists of corporate clients who are 'IT literate' (and have IT departments capable of 'owning' the solutions provided).

The programme involved defining a business management system to cover all aspects of UPCO activities. Registration to ISO 9001:2000/TickIT was included as part of the programme, with an understanding that **if the standard imposed overhead or required practices not beneficial to UPCO then it would be invited to take a flying leap**; registration would not be sought but the management system programme would continue.

This refreshing attitude typifies the confidence of new businesses – frequently associated with e-commerce – who often opt to ignore ISO registration. It's an interesting contrast to organisations who let themselves be led by the standard rather than their own

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needs. Businesses with similar motivations are likely to enjoy a far more beneficial outcome from management system implementation; read on to find out if it worked for UPCO …

A Rough Guide to Dynamic Systems Development Method – 'DSDM'

This section provides an introduction to DSDM. It covers:

- introduction and overview of project types best suited to DSDM,
- key principles of DSDM and how they are applied to projects,
- an overview of the development flow,
- key topics such as 'MoSCoW' *prioritization* and *timeboxing*.

For further information, visit the DSDM web site www.dsdm.org which contains details of training available, and how to join the DSDM Consortium and purchase copies of the DSDM manual. There is also a DSDM TickIT guide available at www.tickit.org/dsdm.htm

Rapid Application Development (RAD)/Dynamic Systems Development Methodology (DSDM) offer a *framework* for managing projects in a changing ('dynamic') environment.

Its creators – the DSDM Consortium – encourage users to pick and choose/adapt DSDM to the needs of their organisation.

It is also made clear that the methodology is not limited to software development and can be applied to any projects (for example, change management programmes).

DSDM has been designed to achieve project completion with *fixed resources* and *fixed timescales*. Requirements are prioritized and in a dynamic environment where new requirements are identified and priorities change; it is the deliverable itself that is not fixed. This is quite different to the traditional method (see Figure 1).

DSDM is not a panacea – not all systems are suited to its application. The DSDM Consortium identify characteristics for systems suited to the methodology in their manual; a selection is provided below:

- interactive, with functionality demonstrable at the user interface; this allows users to assess prototypes, which may be presented as screens or reports,
- requirements can be prioritized,
- requirements are unclear or subject to frequent change,
- time-constrained, that is, where there is a fixed completion date.

What is DSDM Based On?

DSDM has several **principles**. A selection of key principles and their purpose and application is provided in Table 1.

The DSDM Life Cycle

The DSDM life cycle is shown in Figure 2. Each of its phases is described below:

- Feasibility Study

The use of DSDM is examined by applying a DSDM Suitability Filter, which is a checklist provided in the DSDM manual. Whether or not a feasible solution exists is assessed; if so, the most appropriate is chosen. This phase should be short, applying a DSDM philosophy of 'do just enough'; further detail of the solution should be developed in the Business Study increment.

- Business Study (requirements and software architecture identification, project planning)

In this stage, facilitated workshops are used to gain consensus of development priorities. Appropriate client staff are identified for roles such as ambassador users. A prioritized requirements list is produced; the

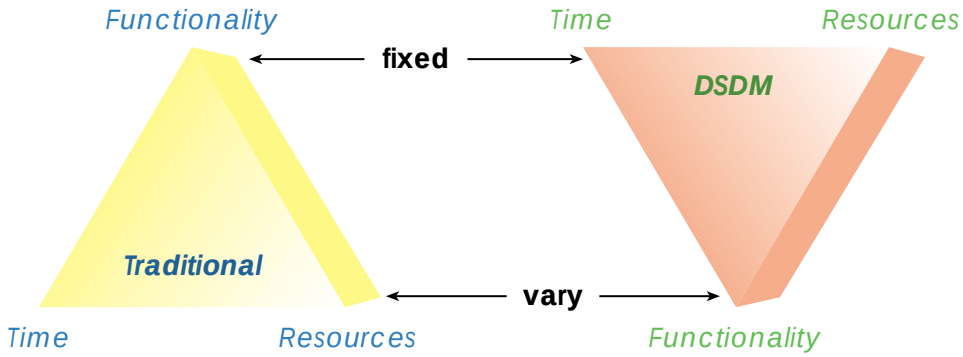

Figure 1: Traditional methods have fixed functionality and varying time and resources; DSDM has fixed time and resources, but varying functionality.

Principle	UPCO Practice
"High degree of User involvement"	Client representatives are involved throughout the project – in shaping a solution, identifying and prioritizing requirements, reviewing prototypes and incremental releases. Facilitated workshops with clients are frequently used to identify a solution or to review a model.
"DSDM teams empowered to make decisions"	User roles must include ambassador user representatives, who review and approve prototype software and can make other design decisions, including the prioritization of requirements. Without these users, decision making can become protracted and cause delay; it is essential that the client identifies suitable users (that is, granting appropriate authority to suitably competent staff) who can sustain their commitment throughout the programme.
"Frequent delivery of product"	Several 'software drops' may be planned to provide users with functionality earlier than a single 'complete' release. Software may also be made available for evaluation.
"Fitness for purpose is the principal acceptance criterion"	The requirements are not fixed, but are prioritized. The project must deliver at least 'the minimum workable set of requirements'.
"Use of iterative and incremental development to converge on solution"	Workshops/prototyping and frequent software drops are used to ensure the product is matching high level needs, and that requirements prioritization continues to reflect the needs of the client organisation.
"Testing is integrated throughout life cycle"	At each timebox (which equates to each delivery) the latest set of the changes and the product as a whole must be tested.
"Collaborative and co-operative approach between stakeholders is essential"	It is imperative that the client organisation understands the extent of their involvement and their responsibilities (for example, provision of empowered users). Flexibility in the nature of the final deliverable, and its acceptance judged on fitness for purpose must be understood and accepted by the client.

Table 1: DSDM key principles – their purpose and application

system architecture definition is created to establish the software architecture, development and operational platforms. A development plan is produced to establish approaches to modelling/prototyping/timeboxing/configurationmanagement/testing and so on.

- Functional Model Iteration:

Here the required functionality is demonstrated using:

  – functional models – that is, working software prototypes,
  – static models, such as data models or class models.

- Design and Build Iteration:

  In this increment the product is engineered and a tested system is the increment deliverable – that is, a system that can be safely provided to users.

- Implementation:

  The objective of this stage is to cutover from development to the operational environment. Of key importance is the outcome of the Implementation Review, which may conclude that work is completed or that there should be a return to one of the life cycle iterations. Possible review outcomes are:

1. All requirements satisfied.
2. Major area of functionality discovered during development that had to be ignored. This will require a return to the Business Study iteration.
3. Lower priority functionality was not done due to time constraints and is to be added. This requires a return to the Functional Model iteration.
4. Lower priority area was omitted; this can be addressed by returning to the Design and Build iteration.

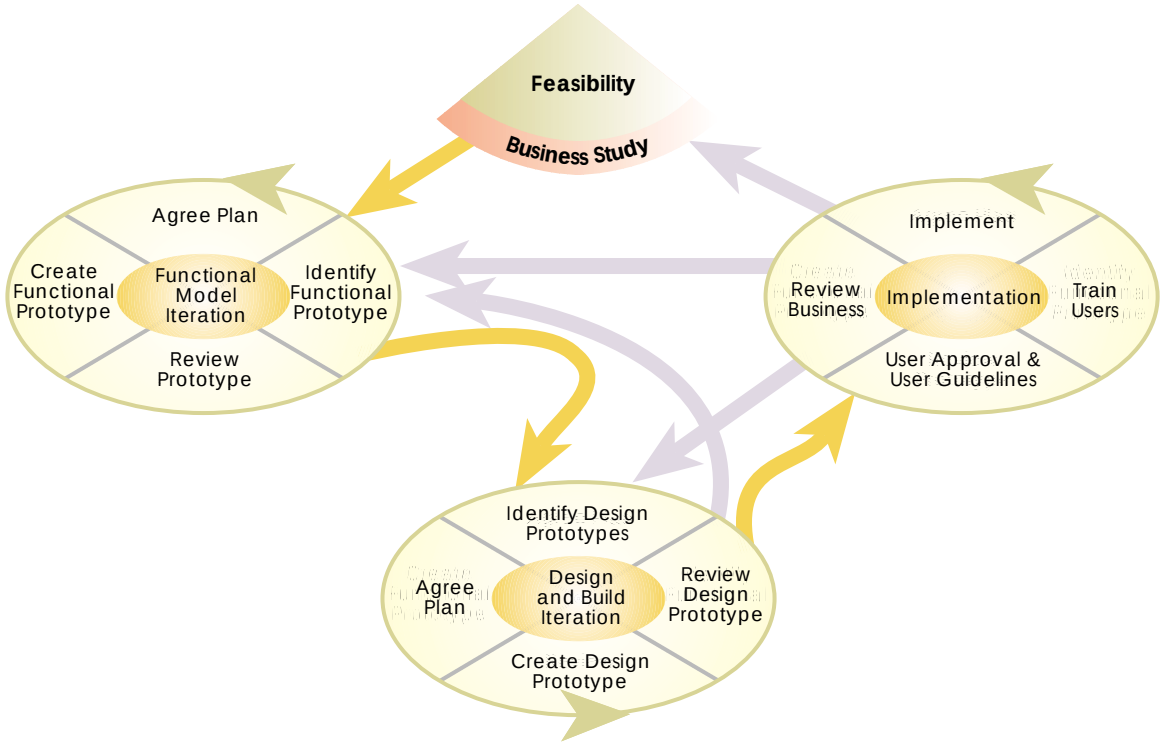

Figure 2: The DSDM Life cycle. This shows the incremental nature of DSDM, moving anticlockwise from the top. The orange arrows show the transfer points from one phase of the life cycle to the next; the lilac arrows show points where development may need to return to an earlier phase.

- Key Concepts:
  '**M**o**SC**o**W**' **prioritization** and **timeboxing**.

Prioritization – RAD/DSDM requirements are expressed by a high level business objective and then as individual requirements. The individual requirements are prioritized according to:

Must have
o
Should have
Could have
o
Wish list.

This 'MoSCoW' prioritization, which allows flexibility with requirements, is used to achieve fixed timescales with a fixed resource. A minimum usable subset of requirements is defined, and development timeboxes are used to partition groups of mixed priority requirements.

Timeboxing is a fundamental part of RAD/DSDM. A timebox is a development stage in which a subset of the requirements of mixed priorities is targeted for implementation. The objective of a development timebox is to implement as many of its requirements as possible, working down the priorities. Within each timebox, both the latest set of changes is tested, and the complete system-to-date. This helps to ensure that the latest set of changes have not affected other parts of the system.

PRINCE 2: How was PRINCE used?

The main contribution from PRINCE 2 was the concept of project definition captured in a Project Initiation Document ('PID'). The project PID is produced as part of the Feasibility Study and covers:

- scope,
- roles and responsibilities,
- deliverables,
- risks, issues and assumptions,
- milestones, review points and the outline design flow,
- project reporting.

Each PID undergoes independent review before submission to clients to check the proposed project flow.

The PID provides a mechanism for project managers to tailor a project flow to suit each client engagement under the guidance of the business management system. This overcomes one of the major reservations that UPCO had about ISO 9001:2000 imposing a restrictive, rigidly defined flow. Use of the PID:

- allows project managers **flexibility** in defining how to deliver a solution,
- encourages **creativity** and **innovation** in project planning and management,
- prevents the management systems methods becoming a 'straight jacket',
- retains UPCO control and approval of methods by the independent review that is applied to PIDs.

Why Choose DSDM?

UPCO have no standard product; usually client engagements produce bespoke software or change management programmes for clients. Clients often present a problem with an indicative budget and defined timescale needs.

Typically, clients either seek proposals for solutions or are open to alternatives to their own ideas. Eliciting requirements and converging on solutions is often approached by discussions with the various client stakeholders (programme sponsors, visionaries, expert users and so on), and the use of facilitated workshops to understand the challenges of the requirements, the client's motivations, and to gain feedback on prototypes.

Working with clients/prospective clients in this way is particularly well supported in the DSDM framework. Gaining a consensus for a solution invariably requires compromise and flexibility from those involved; establishing a partnership approach and the trust that is necessary for a DSDM programme is one of the outcomes of a successful programme definition phase. Clients come to appreciate the benefits to themselves of the flexibility and adaptability of DSDM, which include:

- Incremental release for evaluation or operation, bringing the benefits of working software early.
- The opportunity to re-plan (re-schedule) and re-prioritize requirements throughout the programme without heavy management costs associated with the review and authorisation of changes to costings. Once the programme vision and minimum usable subset are established, it is up to the empowered users to dynamically manage (prioritize) the requirements.
- The client-focused approach to requirements elicitation. Presenting working models and running workshops can take less client time and is a more natural medium for clients to understand requirements and proposed solutions. This also allows a solution provider to control client approvals, particularly with respect to scheduling and reduces risk of protracted approvals and interruptions to design or development work. The demonstrations/workshop approach frequently results in less need to produce extensive documentation; this is usually appreciated by clients and developers alike. It lets developers concentrate on the core task of producing software, rather than writing specifications.

DSDM's emphasis on prototyping has been embraced by UPCO, who produce 'Proof of Concept' models as a standard part of solutions.

Proof of concept plays a vital role in validating the solution proposed; it establishes technical feasibility and is used to gain client approval early in the life cycle. This contributes significantly to reducing project risk. It also enhances the client relationship and provides assurance to project sponsors and stakeholders (ambassador users and so on), which is especially useful in new client relationships or where clients are not used to DSDM partnerships.

A proof of concept model is engineered for re-use, so that the effort spent in creating it is not wasted. This is achieved by applying the standard software engineering rigour on the proof of concept model.

Sometimes the DSDM Suitability Filter will identify projects or parts of projects that are not suitable for DSDM. A *hybrid* approach can be adopted where DSDM and sequential ('waterfall') methods are used together. Where a project has a mixture of business and user-centred elements, this part may be well suited to DSDM. Elements that must be delivered in their entirety and 100% correct may be best served by a sequential ('waterfall') approach.

For such projects the *hybrid* approach may be used (see Figure 3).

UPCO's Knowledge Transfer Programmes also use a methodology that is based on the DSDM framework guidance. For example:

- Facilitated workshops are used to define a programme and establish measures of success
- MoSCoW prioritization is applied to knowledge transfer programmes. Elements of knowledge can be prioritized to guide knowledge transfer relationships between individuals; the prioritization can be used to achieve the transfer within strict time limits. This can help greatly in realising target savings when reducing or eliminating contractor dependence.

Other methodologies were considered but did not suit UPCO's requirements as well as DSDM.

A **waterfall methodology** does not provide a framework for such a value added approach. Waterfall does not provide a framework for *partnership* (continued involvement) and *adaptability* that is central to DSDM's effectiveness in converging on a solution and the capability to change elements of a solution throughout the project.

Spiral methodology was reviewed, but whilst it does advocate an iterative approach, it does not appear to place the same emphasis as DSDM on the achievement of fixed programme deadlines and development costs (that is, effort). For these reasons, a spiral approach was not pursued.

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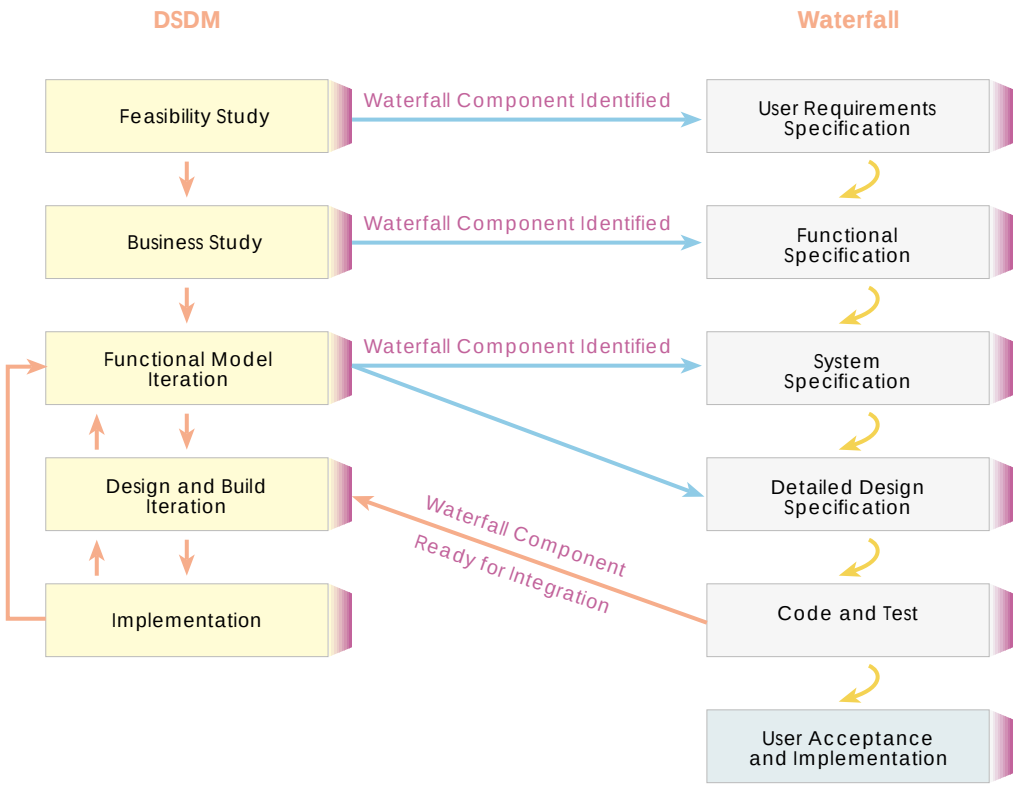

Figure 3: The Hybrid Approach. This shows the points at which it may be decided to move a part of the system from DSDM to a waterfall development, and where waterfall elements are 'cut back' into the Design and Build iteration stage of the sub-system that will use them.

Regarding Agile software development methods, UPCO's approach is largely consistent with the Agile Manifesto which states:

Agile value

Working software

over

Comprehensive Documentation

Customer Collaboration

over

Contract Negotiation

Responding to Change

over

Following a Plan

These elements are entirely consistent with UPCO practices. The Agile Manifesto also states:

Agile value

Individuals and Interactions

over Processes and Tools

UPCO have a more balanced view of the importance of people (individuals) and processes. UPCO strive to develop their people and welcome innovation, improvement and challenges to existing methods and practices; one of the objectives of the programme was to establish best practice (that is, process definition) to support the next phase of growth and succession. Achieving consistent excellence in the delivery of solutions and knowledge programmes was thought to be best supported by a process approach providing a framework; people are free to propose a project flow for each client engagement by capturing it in a Project Initiation Document (PID).

Whether or not UPCO's application of DSDM is truly 'Agile' is a question for theoreticians … and is not an issue that I intend to lose much sleep over. However, it is interesting to note that a recent survey of Agile Development Methods (Abrahamsson et al) does include DSDM with Extreme Programming, Scrum and so on.

ISO 9001:2000 – Quality, but not as we know it…

This section addresses how the ISO 9000 standard has changed in its re-issue of 2000.

ISO 9001:2000 focuses on managing organisations by process and driving improvement for business success.

The level of documentation is much reduced – for example, smaller quality manuals are encouraged. Mandatory documentation requirements (that is, where a process/procedure must be documented) are now focused on maintenance of the management system. This covers activities such as audit, document and record control, problem resolution and avoidance (corrective and preventive actions) and product problem resolution. Consequently, whatever else there is in your management system will be there because your organisation chooses to have it, and ***not*** because the ISO standard mandates its existence.

Of course, it's still possible to create a management system that does not bring benefit to an organisation, but the size and nature of the system is determined to a far greater extent by the organisation itself. ISO guidance on documentation (www.iso.ch) advises organisations to consider the following when deciding whether or not to document a process:

- the complexity of the process,
- the competence of the people involved,
- the risk of customer dissatisfaction,
- the effect on efficiency and effectiveness.

This approach is hugely significant and represents a quantum leap forward for the ISO standard.

The standard introduces 'the customer': how the organisation determines market needs, both current and future, how the organisation assesses customer satisfaction, and how the organisation finds out what its customers want (as opposed to what they have asked for, which may be quite different from what they want).

Measurement is a new addition to the standard, which now seeks to assess:

- organisational 'positioning' or 'aspirations' and how they are expressed and their achievement is measured,
- how measurement is applied to both product and process,
- the role of measurement in identifying improvement and its use in assessing the success of improvement actions.

How will those who implement management systems cope with their new found freedom? It is my hope that they apply a 'customer focus' and be sure they correctly identify their customers: the organisations for whom they are providing the system and ***not*** the certification bodies and their assessors. Process managers and consultants should place the needs and aspirations of organisations firmly as the top priority. The most important outcomes of a management system implementation programme should be a sustainable process framework that succeeds in getting the buy-in of its stakeholders (management, practitioners and so on) and assists in the achievement of organisation objectives.

I believe that the forerunners of ISO 9001:2000 (ISO 9001:1994, BS5750) produced a culture of system assessment geared to the needs of certification bodies rather than their clients. "BS5750 Considered Harmful" as Dijkstra[1] might have put it! ISO 9001:2000 now places due emphasis on the needs of organisations seeking registration, and of their clients.

The Business Management System

A process based approach was used, with four tiers connected by a series of hyperlinks (see Figure 4).

- A **top level process model** showing the main business processes (taken from Bernard Hawkes' excellent article 'Engineering the Business through QMS Design' in TickIT International 1Q01).
- Where appropriate the main business processes were represented by **deployed flow charts**. These charts show the task breakdown for processes, and the sequencing/iteration of tasks, as well as the ownership of tasks.
- A simple narrative for each task detailing **activities, objectives** and **deliverables**.
- **Templates** and **checklists** to support the processes.

Such a model was used to achieve programme objectives for the management system:

- an intuitive, simple to use, 'model based', hierarchical system,
- conciseness – this implementation is a lot shorter than a procedural based system,
- clarity – the use of process models and flow diagrams gives a particularly clear presentation.

Benefits of the style include:

- Ease of production – workshops with process experts readily produce process flows and agreement of activities, objectives and deliverables. There is no need for lengthy write-up of workshops – the process flows are produced within the workshops. This also means that the review process can start immediately, whilst the definition is still 'fresh' and avoids protraction and speeds closure of definition.
- Ease of review of flows – the brevity and simplicity reduces the effort required by reviewers.
- Ease of maintenance – again, the brevity and simplicity facilitate change that maintains the consistency of the system.

Key Areas of ISO 9001:2000 and How They Were Addressed

The **process approach** has been outlined in the previous section; other key areas are discussed below.

Measurement and Improvement

Measures were deliberately kept simple. Key measures for software solutions were identified as:

- planned effort against actual effort,
- defect analysis (volumes and causes of defects).

The measurement programme has baselined performance. This will help in assessing:

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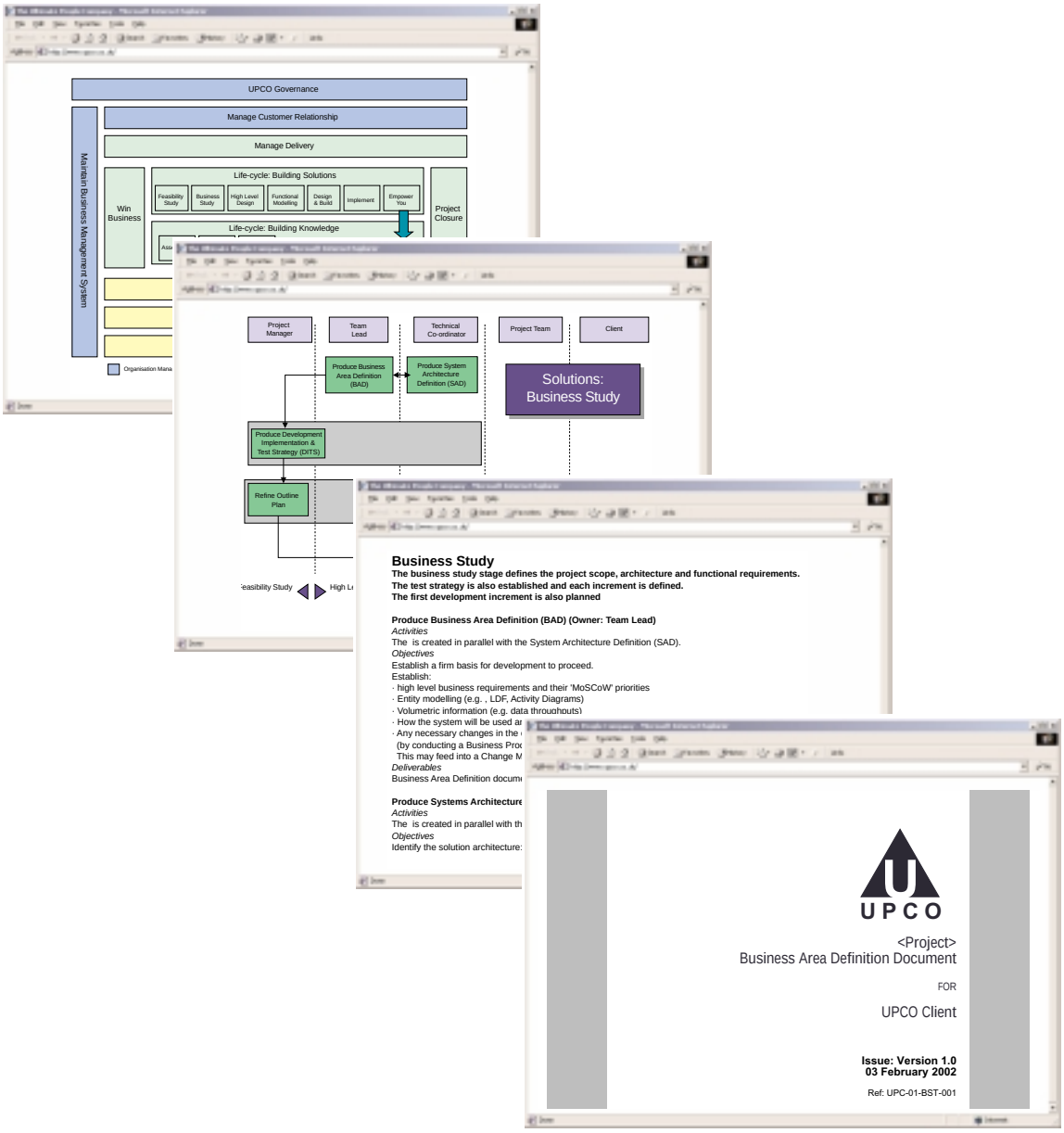

Figure 4: UPCO's Business Management System. The system hierarchy is shown. UPCO's top level process model Business Study Process (Life cycle: Building Solutions) is linked to the Business Study flow diagram; the 'Produce Business Area Definition' task is linked to a description showing Activities, Objectives and Deliverables; the descriptive text is linked to a Business Area Definition document template.

- how well new practices deal with challenges,
- how well the methods apply to future engagements (new technologies and so on),
- how well the next generation of project managers and their teams perform.

Post implementation review is used as a key tool in identifying improvement opportunities. Lessons have been learned from trend spotting in defect data and looking for causes where deviation is seen between planned and actual effort. For projects completed to date, this has prompted earlier consideration of performance testing and a review of unit test methods to check consistency and rigour of current practice.

By looking at the data from future projects, it will be possible to determine if the improvement actions have worked and improvement is achieved.

Competence

Competence is a key area in ISO 9001:2000, especially for a provider of software solutions and consulting. This is because it is not feasible to inspect project deliverables for their satisfaction of requirements; for software solutions, defects become apparent when the system is operational.

Consequently, the competence of project managers, designers, developers and so on assumes more significance; processes for its management and identification are critical to business success.

UPCO maintain a matrix of skill/knowledge levels. For each skill, there are eight levels of achievement; ratings are provided for each individual's 'current' and 'desired' levels. For each of the eight levels there are detailed criteria to support the consistent application of the ratings.

The matrix is used in planning meetings to match staff to projects, to optimise people allocation to projects and fulfil developmental aspirations.

Risk Management (Preventive Action)

Project reporting includes a *risk log*, which is an ordered list of risks with the most serious at the head of the list. This encourages active risk management by project managers because the risk log is reviewed and re-ordered, if necessary, each time a status report is issued. The risk list is part of the client progress reporting, and provides an effective escalation mechanism by communicating the most serious project threats to the client organisation.

Conclusions

What difference has the management system made to UPCO?

Consider what has been achieved:

1. Implementation of a system covering all activities. From a standing start in January 2002, a Business Management System has been created, launched and tested by intensive assessment in six months.
2. Best practice has been baselined and methods communicated throughout the company.
3. A highly intuitive, easily navigable management system is in place.
4. The system encourages 'everyday' use by the provision of templates and checklists.
5. The system has been tested by intensive internal audit to examine its suitability, effectiveness and efficiency. Issues captured in audit have been resolved to prove the flexibility/adaptability of the system & its methods.
6. A set of metrics has been baselined for performance relating to methods (processes) and client solutions ('product'). Analysis of the metrics demonstrated:
   – the value of measurement in identifying areas where improvement can be sought,
   – suitability of the metrics as indicators of performance.

The metrics will be one of the methods used to monitor performance levels as UPCO grows and the management system is used by new staff, on new technologies, in new markets, on new offerings and so on.

ISO 9001:2000/TickIT registration has also been achieved; BVQI assessed UPCO in August 2002 and granted registration. Their report provided valuable benchmarking feedback and commended the 'excellent' practices seen within projects and management commitment, as well as the Business Management System itself, highlighting the structured processes and navigability/usability. Compliance with the standard and maturity of the processes applied was also satisfactorily demonstrated; no non-conformities were identified. This is unusual for an initial assessment, but reflects UPCO's professionalism and application of a 'customer-first' culture.

Processes 'on Probation'

One of the objectives set for the management system was that it should not impose overhead or direct effort to activities whose value does not justify their effort. It has been established that the vast majority of the system provides appropriate direction (guidance) and support for practitioners, but some processes are 'on probation' while their value is determined.

For example, client relationship management had a process flow determined and is being piloted to establish its worth. An alternative to the flow's formalised account planning activities has been established; a forum for account status reviewing by the management team, with simple action definition and tracking, is also being used.

Has ISO 9001/TickIT Added Value?

The previous sections covered the achievements of the management system and its methods, the issues it has introduced and the challenges it will need to meet to prove its value in the longer term.

A question worth posing at this stage is **was it worth it?** Consider the cost of the programme:

1. consultancy investment,
2. effort of the process experts and management team,
3. ISO 9001:2000 Registration/Assessment,
4. cost of standards (ISO 9001:1994, TickIT Guidelines), DSDM Consortium membership.

Are the benefits that the system and ISO 9001:2000/TickIT registration bring to UPCO a reasonable return on this investment?

The key stakeholder viewpoints are provided:

Joint Managing Director, Gary Parlett, considers the programme well worth the investment: "The Business Management System provides a clear and concise view of *what* we do and *how* we do it in a single repository. It promotes a common understanding and pro-

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vides our customers with the utmost consistency in our approach.

The registration process provided an excellent basis from which to improve the clarity of our processes. Our hope that an ISO 9001:2000 and TickIT compliant management system would:

- reflect and, where possible, enhance how we operate
- ***not*** impose processes that make us less agile or impede our responsiveness to our customers and our markets … has been more than realised."

e-commerce Solutions Director, Finbarr Joy, states "There has been an immediate commercial benefit from achieving TickIT registration; the BMS has proved an invaluable aid to pre-sales discussions and marketing, and was highly influential in a recent major new business win".

Projects Director, Richard Corney, on Knowledge Solutions states "The BMS programme helped us to formalise our methodology around a project management approach aligned to that of our Solutions group. It also prompted the development of a central repository of standard materials and templates, bringing greater efficiencies in responding to prospective client requirements and generating source material for each individual client programme.

We are now well positioned to accelerate the growth of our Knowledge Solutions practice to meet the demands of a rapidly expanding market".

Perhaps, most importantly, we should seek the customer viewpoint. What do UPCO's clients think of their services?

Edinburgh-based bank 'Intelligent Finance' Business Design and IT Director, Julie McClelland, says "We are reducing our reliance on outside consultants and need to ensure we have captured their knowledge and expertise before each of them leaves. UPCO has considerable experience in this field. They are helping us develop a flexible and highly skilled IT team that can turn their hand to any technology or business opportunity".

The conclusion of this case study is that ISO 9001:2000 and TickIT can be applied to the benefit of SMEs in a new generation of technology-based, highly adaptive businesses providing leading edge B2B/B2C solutions and services. Competitiveness, consistency, efficiency, responsiveness to customers and markets can be enhanced with the effective application of a business-wide management system.

Reference:

1 Dijkstra famously advanced the cause of Structured Programming by submitting a letter to the editor of the ACM titled 'Go To Statement Considered Harmful' (Communications of the ACM, 11(3) 147-148)

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Acknowledgments:

Diagrams adapted by kind permission of the DSDM Consortium.

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Further reading:

Agile Software Development Methods: Review & Analysis (2002): Abrahamsson, Pekka, Salo, Ronkainen, Warsta & Juhani
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Guidance on the Documentation Requirements of ISO9001:2000
www.iso.ch/iso/en/iso9000-14000/iso9000/2000rev7.html

Jonathan Lowe was engaged by The Centre for ISO 9000 to provide ISO9000/TickIT consultancy to UPCO. Jonathan worked with UPCO's BMS Programme Manager and Technical Authority, Jane Gregson, to define the processes and the management system framework and to assess the system once it had been launched.

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Jonathan's consulting specialisms include: management system definition, support for transition to ISO 9001:2000 definition and implementation of measurement programmes, assistance with risk management methods and practice, process reviews/management system 'healthchecks', audit/assessment.

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The Return on Investment in Quality

by David F. Rico

Introduction

ROI is the quantification of the financial return of an investment. In more technical terms, ROI is the actual value developed by comparing program costs to benefits, measuring the magnitude of benefits relative to costs, the net benefit after expending some level of resources, or profit computed by dividing net income by assets used.

This article shows software managers and engineers how to estimate ROI early, quickly, and accurately by applying practical top-down methods for rapidly producing authoritative estimates of ROI for popular approaches to Software Process Improvement (SPI) It is based on Rico [1]. These approaches include:

- Inspections,
- Personal Software Process sm (PSP),
- Team Software Process sm (TSP),
- Software Capability Maturity Model (SW-CMM),
- ISO 9001, and
- Capability Maturity Model Integration sm (CMMI).

Model

While one can spend months and years analyzing the literature and searching for relevant approaches to defining and estimating ROI, Phillips [2] provides one-stop shopping on this seemingly futile journey. Phillips defines the basic model for estimating ROI, as well as a complete process for applying these simple equations in a professional manner. Phillips' ROI model consists of two basic equations:

- **Benefit/Cost Ratio (B/CR)**: B/CR is a simple process of dividing the benefits of SPI by the costs of SPI.
- **Return on Investment (ROI%)**: The ROI% equation is similar to the B/CR equation, except that the costs of SPI are subtracted from the benefits of SPI before dividing by the costs.

Examples

This section provides simple, but powerful, authoritative, and relatively accurate examples of how to apply Phillips' basic equations for estimating the ROI of six major approaches to SPI (as shown in Figure 1). Phillips' B/CR and ROI% equations will be applied to benefit data from Rico [3] as well as other authoritative sources of SPI data.

The six approaches to SPI are:

- **Inspection**: The software inspection process is a highly-structured and facilitated group meeting to objectively identify the maximum number of software defects, with the purpose of improving software quality.

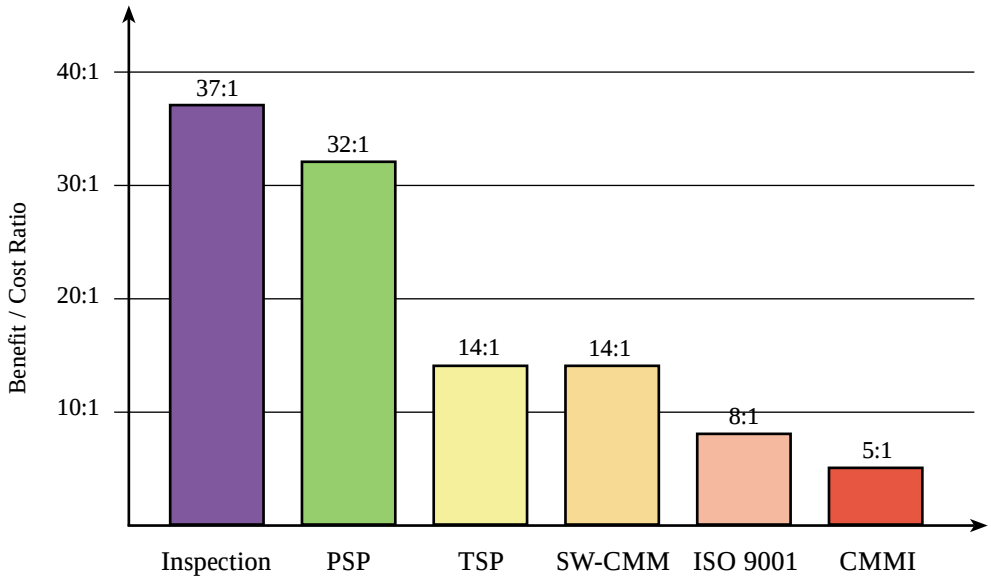

Figure 1: Examples for ROI

- **PSP**: The PSP is a training curriculum to teach simple but powerful techniques in software project management and quality management.
- **TSP**: The TSP is an extension of PSP, which introduces group software project management techniques versus the individual focus taught by PSP.
- **SW-CMM**: The SW-CMM is a supplier selection model created by the US DoD to evaluate and select software contractors that practice minimum software project management techniques.
- **ISO 9001**: ISO 9001, like the SW-CMM, is a supplier selection model created by the International Standards Organization to evaluate, identify and select suppliers that practice minimum quality management techniques.
- **CMMI**: The CMMI, which is the newest version of SW-CMM, is also a supplier selection model created by the US DoD to evaluate and select systems engineering contractors that practice minimum systems engineering management techniques.

Inspection

Let's examine the dynamics of Inspection cost, benefit, and ROI analysis using Phillips' equations for B/CR and ROI%.

- *Training Cost*: Let's begin by modelling the training costs for implementing Inspections on a four-person project. The average market price for Inspection training is about $410 per person. The average length of time for Inspection training is three days, or 24 business hours. At a minimum cost of $100 per hour, training time comes to $2,400. Add $410 to $2,400 for a total of $2,810 per person for Inspection training. Multiply $2,810 by four people and that comes to $11,240 to train four people to perform Inspections.
- *Implementation Cost*: Now let's examine the cost of implementing Inspections by our four trained inspectors. Let's assume the project will develop 10,000 software source lines of code (SLOC), which is not unlikely for a web project in modern times. (Inspections of requirements, designs and tests drive the Inspection costs even higher, but are omitted for simplicity's sake.) At an Inspection rate of 240 SLOC per meeting, that comes to approximately 41.67 meetings. Since each Inspection run requires about 17 hours for planning, overviews, preparation, meetings, rework and follow-up, we then multiply 41.67 by 17 for a total of 708.33 hours. Once again, at $100 per hour, that comes to $70,833 for our four trained inspectors to perform Inspections on 10,000 SLOC.

Pinpoint High–ROI Factors

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- *Total Cost*: So, we add the training cost of $11,240 to the implementation cost of $70,833, and we arrive at a total cost of $82,073 for four trained inspectors to Inspect 10,000 SLOC.
- *Total Life Cycle Benefits*: The estimated maintenance hours for 10,000 SLOC after our four trained inspectors perform their Inspections are 11,806. The estimated maintenance hours for 10,000 SLOC with no Inspections are 41,800. So, our four trained inspectors have saved 29,994 maintenance hours on their very first implementation of Inspections. Multiply 29,994 by $100 and the estimated savings are an eye-popping $2,999,400.
- **B/CR**: (The formula for B/CR is benefits divided by costs.) Therefore, divide $2,999,400 by $82,073 and the B/CR for Inspections is 37:1.
- **ROI%**: (The formula for ROI% is benefits less costs divided by costs times 100.) Therefore, first subtract the $82,073 in Inspection costs from the $2,999,400 in Inspection benefits, divide the results by the $82,073 in Inspection costs and multiply by 100 for an impressive ROI% of 3,555%.

Target High–ROI Approaches

PSP

Now, let's examine the dynamics of PSP cost, benefit, and ROI analysis using Phillips' equations for B/CR and ROI%.

- *Training Cost*: Let's begin by modelling the training costs for implementing PSP on a four-person project. The Software Engineering Institute's (SEI's) price for PSP training is $5,000 per person. The costs of the airline, hotels, meals and parking are about $5,400 for two weeks. The length of time for PSP training is 10 days, or 80 business hours. Each hour of classroom time requires approximately one hour of non-classroom time – a total of 80 more hours. At a minimum cost of $100 per hour, training time comes to $16,000. Add $5,000, $5,400, and $16,000 for a total of $26,400 per person for PSP training. Multiply $26,400 by four people and that comes to $105,600 to train four people to perform PSP.
- *Implementation Cost*: Now let's examine the cost of implementing PSP by our four PSP-trained engineers. Let's assume the project will develop 10,000 software source lines of code (SLOC), once again, which is not unlikely for a web project in modern times. At an average productivity rate of 25 SLOC per hour, that comes to approximately 400 hours. At $100 per hour, that comes to $40,000 for our

Minimize Cost Incurrence

four PSP-trained engineers to produce 10,000 SLOC using PSP.

- *Total Cost*: So, we add the training cost of $105,600 to the implementation cost of $40,000, and we arrive at a total cost of $145,600 for four PSP-trained engineers to produce 10,000 SLOC using PSP.
- *Total Life Cycle Benefits*: The estimated maintenance hours for 10,000 SLOC after our four PSP-trained engineers apply PSP are zero. The estimated maintenance hours for 10,000 SLOC without PSP are 41,800. So, our four PSP-trained engineers have saved 41,800 maintenance hours on their very first application of PSP. Typical software development hours for 10,000 SLOC are 5,088. However, software development hours with PSP are only 242, for an additional saving of 4,846 hours. Add 41,800 maintenance hours saved to 4,846 development hours saved – a total of 46,646 saved software maintenance and development hours. Multiply 46,646 by $100 and the estimated savings are an impressive $4,664,600.
- **B/CR**: (The formula for B/CR is benefits divided by costs.) Therefore, divide $4,664,600 by $145,600 and the B/CR for PSP is 32:1.
- **ROI%**: (The formula for ROI% is benefits less costs divided by costs times 100.) Therefore, first subtract the $145,600 in PSP costs from the $4,664,600 in PSP benefits, divide the results by the $145,600 in costs, and multiply by 100 for an impressive ROI% of 3,104%.

TSP

Now, let's examine the dynamics of TSP cost, benefit, and ROI analysis using Phillips' equations for B/CR and ROI%.

- *Training Cost*: Let's begin by modelling the training costs for implementing TSP on a four-person project. The SEI's price for TSP training is $4,000 per person. The costs of the airline, hotels, meals, and parking are about $2,700 for one week. The length of time for TSP training is 5 days, or 40 business hours. At a minimum cost of $100 per hour, training time comes to $4,000. Add $4,000, $2,700, and $4,000 for a total of $10,700 per person for TSP-specific training. Add the $26,400 for PSP training to the $10,700 for TSP training and the total overall TSP costs come to a breath-taking $37,100 per person. Multiply $37,100 by four people and that comes to a budget-busting $148,400 to train four people to use TSP.
- *Implementation Cost*: Now let's examine the cost of implementing TSP by our four TSP-trained engineers. Let's assume the project will develop 10,000 software source lines of code (SLOC), once again, which is not unlikely for a web project. At an average productivity rate of 6.12 SLOC per hour, that comes to approximately 1,634 hours. At $100 per hour, that comes to $163,400 for our four TSP-trained engineers to produce 10,000 SLOC using TSP. (See Humphrey [4] for an in-depth analysis of TSP metrics, models, effort, and costs.)
- *Total Cost*: So, we add the training cost of $148,400 to the implementation cost of $163,400, and arrive at a total cost of $311,800 for four TSP-trained engineers to produce 10,000 SLOC using TSP.
- *Total Life Cycle Benefits*: The estimated maintenance hours for 10,000 SLOC after our four TSP-trained engineers apply TSP are zero. The estimated maintenance hours for 10,000 SLOC without TSP are 41,800. So, our four TSP-trained engineers have saved 41,800 maintenance hours on their very first application of TSP. Typical software development hours for 10,000 SLOC are 5,088. However, software development hours with TSP are only 1,634, for an additional saving of 3,454 hours. Add 41,800 maintenance hours saved to 3,454 development hours saved – a total of 45,254 saved software maintenance and development hours. Multiply 45,254 by $100 and the estimated savings are an impressive $4,525,400.
- **B/CR**: (The formula for B/CR is benefits divided by costs.) Therefore, divide $4,525,400 by $311,800 and the B/CR for TSP is 14:1.
- **ROI%**: (The formula for ROI% is benefits less costs divided by costs times 100.) Therefore, first subtract the $311,800 in TSP costs from the $4,525,400 in TSP benefits, divide the results by the $311,800 in TSP costs and multiply by 100 for an impressive ROI% of 1,351%.

Avoid Cost-Intensive Approaches

SW-CMM

Now, let's examine the dynamics of SW-CMM cost, benefit, and ROI analysis using Phillips' equations for B/CR and ROI%.

- *Deployment Cost (Level 2)*: Let's begin by modelling the deployment costs for implementing SW-CMM for four projects as a representative sample of a software producing organization. Rico [5] makes the following estimates: 66 hours for 6 policies, 264 hours for 24 procedures, 512 hours for 32 documents, 304 hours for 76 work authorizations, 464 hours for 116 records, 544 hours for

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136 reports, and 304 hours for 76 meeting minutes. The total deployment hours for SW-CMM Level 2 are 2,458. Multiply 2,458 by $100 and that comes to $245,800.

- *Deployment Cost (Level 3)*: Rico [5] makes the following estimates: 77 hours for 7 policies, 154 hours for 14 procedures, 1,280 hours for 80 documents, 176 hours for 44 work authorizations, 592 hours for 148 records, 336 hours for 84 reports, and 192 hours for 48 meeting minutes. The total deployment hours for SW-CMM Level 3 are 2,807. Multiply 2,807 by $100 and that comes to $280,700.
- *Assessment Preparation Costs*: Let's estimate four projects of five people in 13 indoctrination courses at 2 hours each, which totals 520 hours. Let's similarly estimate four projects of five people in 13 response-conditioning courses at 2 hours, each which also totals 520 hours. Finally, let's estimate four projects of five people in one 40 hour mock assessment or two 20 hour mock assessments for a total of 800 hours. Now, let's add 520 indoctrination hours, 520 response conditioning hours, and 800 mock assessment hours for a total of 1,840 hours. Finally, let's multiply 1,840 by $100 for a total of $184,000 in assessment preparation costs.
- *Total Deployment Costs*: Combine $245,800, $280,700, and $184,000 for a total SW-CMM Level 2 and 3 deployment cost of $710,500.

Avoid Training-Intensive Approaches

- *Assessment Cost*: The SEI estimates that an assessment requires up to 3,208 hours of internal labour (not including the assessor's effort). However, for our four projects of five people, let's estimate 62 hours for planning, 234 hours for preparation, 646 hours for the appraisal itself, and 57 hours of follow-up, which totals 1,000 hours. (This doesn't include the assessor's time, and the SEI estimates over three times more internal effort.) So, now multiply 1,000 by $100 for a total labour cost of $100,000 plus $40,000 in assessment fees for a total assessment cost of $140,000.
- *Total SW-CMM Cost*: Take a deep breath and add the $710,500 in total deployment costs to the $140,000 in assessment costs for a total SW-CMM cost of $850,500.
- *Total Life Cycle Benefits*: Let's assume each of our four projects also build 10,000 SLOC software products. Let's also assume that each of our four projects apply Inspections to satisfy their SW-CMM Level 3 goals. Now, we're ready to begin estimating the benefits. Let's assume each of our four projects saves an average of 27,867 maintenance hours by performing Inspections for total

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Look for Low-Cost Automated Solutions

maintenance savings of 111,466 hours. Now, let's assume our productivity doubles at SW-CMM Level 3 as reported by Diaz [6], which results in a per project saving of 2,544 hours for a total of 10,176 development hours saved. Add the 111,466 hours in maintenance savings to the 10,176 hours in development savings for a total of 121,642 hours saved at SW-CMM Level 3. Multiply 121,642 by $100 to arrive at an estimated savings of $12,164,200.

- **B/CR**: (The formula for B/CR is benefits divided by costs.) Therefore, divide $12,164,200 by $850,500 and the B/CR for SW-CMM is 14:1.
- **ROI%**: (The formula for ROI% is benefits less costs divided by costs times 100.) Therefore, first subtract the $850,500 in SW-CMM costs from the $12,164,200 in SW-CMM benefits and divide the results by the $850,500 in costs and multiply by 100 for an impressive ROI% of 1,330%.

ISO 9001

Now, let's examine the dynamics of ISO 9001 cost, benefit, and ROI analysis using Phillips' equations for B/CR and ROI%.

- *Deployment Costs*: Let's begin by modelling the costs for ISO 9001 in a 20-person software organization. El Emam's [7] cost model results in 2,184 hours to prepare for ISO 9001 registration. Multiply 2,184 by $100 and that comes to $218,396.
- *Assessment Costs*: Let's estimate four projects of five people at 32 hours each, which totals 640 hours to prepare for the assessment. Multiply 640 by $100 for a total of $64,000 in assessment preparation costs. Add a $48,000 assessment fee to the $64,000 assessment preparation cost for a total assessment cost of $112,000.
- *Total Deployment Costs*: Combine $218,396 and $112,000 for a total ISO 9001 deployment cost of $330,396 for ISO 9001 registration.
- *Total Life Cycle Benefits*: Let's assume each of our four projects also build 10,000 SLOC software products. Now, we're ready to begin estimating the benefits. Let's assume each of our four projects has a 15% increase in maintenance savings, which is consistent with ISO 9001 experiences. Multiply 41,800 maintenance hours by 15% for 6,270 maintenance hours saved per project. Multiply 6,270 by 4 for a total maintenance savings of 25,080 hours. Now, let's assume each of our four projects has a 13% increase in productivity, which is consistent with ISO 9001 experience. Multiply

5,088 development hours by 13% for 661 development hours saved per project. Multiply 661 by 4 for a total development savings of 2,646 hours. Now, add the 25,080 maintenance hours saved to the 2,644 development hours saved for a total of 27,726 total maintenance and development hours saved. Finally multiply the 27,726 maintenance and development hours saved by $100 for a total of $2,772,600 in savings by using ISO 9001.

- **B/CR**: (The formula for B/CR is benefits divided by costs.) Therefore, divide $2,772,600 by $330,396 and the B/CR for ISO 9001 is 8:1.
- **ROI%**: (The formula for ROI% is benefits less costs divided by costs times 100.) Therefore, first subtract the $330,396 in ISO 9001 costs from the $2,772,600 in ISO 9001 benefits, divide the results by the $330,396 in ISO 9001 costs and multiply by 100 for an impressive ROI% of 739%.

CMMI

Now, let's examine the dynamics of CMMI cost, benefit, and ROI analysis using Phillips' equations for B/CR and ROI%.

- *CMMI Policies and Procedures*: Let's begin by modelling the costs for implementing CMMI policies and procedures for four projects as a representative sample of a systems engineering organization. Rico [8] makes the following estimates: CMMI Level 2 requires 2,091 hours to develop 56 policies and procedures and CMMI Level 3 requires 3,771 hours to develop 101 policies and procedures. So, 5,862 hours are required to develop CMMI Level 2 and 3 policies and procedures. Multiply 5,862 by $100 and that comes to $586,200. Half of this is software engineering, which amounts to $293,100.
- *CMMI Evidence of Use*: Rico also makes the following estimates: CMMI Level 2 requires 10,304 hours to develop 138 products for four systems engineering projects and CMMI Level 3 requires 20,533 hours to develop 275 products for these projects. So, 30,837 hours are required to develop CMMI Level 2 and 3 products. Multiply 30,837 by $100 and that comes to $3,083,700. Half of this is software engineering, which amounts to $1,541,850.
- *CMMI Implementation Costs*: Now add $293,100 for CMMI Level 2 and 3 policies and procedures and $1,541,850 for CMMI Level 2 and 3 products for four projects, which is $1,834,950 for software engineering.
- *Assessment Preparation Costs*: Let's estimate four projects of ten people in 20 indoctrination courses at 2 hours each, which totals 1,600 hours. Let's similarly estimate four projects of ten people in 20 response conditioning courses at 2 hours each, which also totals 1,600 hours. Finally, let's estimate four projects of ten people in one 40 hour mock assessment or two 20 hour mock assessments for a total of 1,600 hours. Now, let's add 1,600 indoctrination hours, 1,600 response conditioning hours, and 1,600 mock assessment hours for a total of 4,800 hours. Finally, let's multiply 4,800 by $100 for a total of $480,000 in assessment preparation costs. Half is software engineering, which amounts to $240,000.
- *Total Deployment Costs*: Combine $1,834,950 and $240,000 for a total CMMI Level 2 and 3 deployment cost of $2,074,950 for software engineering.
- *Assessment Cost*: For our four projects of five people, let's estimate 636 hours for the plan and prepare for appraisal stage. Let's estimate 1,018 hours for the conduct appraisal stage. And, let's estimate 106 hours for the report results stage. This totals to 1,760 hours. Multiply 1,760 by $100 for an internal labour estimate of $176,000. Add an assessment fee of $64,615 for a total assessment cost of $240,615. (Assessment costs were based on labour distributions from Carnegie Mellon University [9].)

Use Professional Methods for Analyzing ROI

- *Total CMMI Cost*: Once again, take a deep breath and add the $2,074,950 in total deployment costs to the $240,615 in assessment costs for a total CMMI cost of $2,315,565.
- *Total Life Cycle Benefits*: Let's assume each of our four projects also build 10,000 SLOC software products. Let's also assume that each of our four projects apply Inspections to satisfy their CMMI Level 3 goals. Now, we're ready to begin estimating the benefits. Let's assume each of our four projects saves an average of 27,867 maintenance hours by performing Inspections for total maintenance savings of 111,466 hours. Now, let's assume our productivity doubles at CMMI Level 3 as with the SW-CMM, which results in a per project saving of 2,544 hours for a total of 10,176 development hours saved. Add the 111,466 hours in maintenance savings to the 10,176 hours in development savings for a total of 121,642 hours saved at CMMI Level 3. Multiply 121,642 by $100 to arrive at an estimated savings of $12,164,200.
- **B/CR**: (The formula for B/CR is benefits divided by costs.) Therefore, divide $12,164,200 by $2,315,565 and the B/CR for CMMI is 5:1.
- **ROI%**: (The formula for ROI% is benefits less costs divided by costs times 100.) Therefore, first subtract the $2,315,565 in CMMI costs from the $12,164,200 in CMMI benefits, divide the results by the $2,315,565 in CMMI costs and multiply by 100 for an impressive ROI% of 425%.

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Recommendations

This is an important part of the article. It is one of discovery, reflection, and future direction:

- **Pinpoint High-ROI Factors**: It's unnecessary to identify every cost and benefit factor when producing early, top-down estimates of ROI. The law of diminishing returns applies. There are only a few significant drivers of costs and benefits.
- **Target High-ROI Approaches**: This article is sufficient to point out approaches to SPI which yield the greatest benefits at the least possible cost. And, it reminds the reader that the best approaches are yet to come.
- **Minimize Cost Incurrence**: Choose low-cost, low-risk approaches to SPI. Using low-cost solutions to SPI guarantees successful, early returns.
- **Avoid Cost-Intensive Approaches**: This article sufficiently exposes the approaches to SPI which are sure to drain your organization's assets.
- **Avoid Training-Intensive Approaches**: Training-intensive approaches are generally unsuccessful in the marketplace because of their great expense, immense difficulty, and lack of sufficient tools for deployment beyond the classroom.
- **Look for Low-Cost Automated Solutions**: The future of SPI isn't in large bureaucratic and manually-intensive approaches to SPI. The future is in low-cost, non-invasive automated tools that perform complex tasks in spite of us.
- **Use Professional Methods for Analyzing ROI**: This article guides readers toward relevant methods in ROI analysis and estimation. However, even the process of ROI is subject to low-cost automation. Look for low cost automation to ROI embedded in web-based project management tools.

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Combined Assessments

Earlier this year the Intellect (previously known as the Computing Services and Software Association [CSSA]) Quality Group released a position paper on the opportunity and benefits from combining assessments. A quotation from the paper states:

"There are many reasons for a company to maintain additional registrations beyond those for Quality Management. These might include: safety, security, export controls and process maturity. Additionally, a company may also need to include other sector schemes which may include: defence, aerospace, telecommunications, motor industries and pharmaceuticals.
The opportunity for realising benefits from combining such assessments is significant, as most of these schemes have a degree of commonality; if they are conducted independently they consume effort and cost in examining the same common elements a number of times. There is also a significant risk of two (or more) auditors taking contrary views about these common elements, with the risk that following their advice will result in divergence of a company's system rather than convergence."

If you wish to view the full paper then go to
http://www.intellectuk.org/groups/quality/Getting_value_from_assessment.pdf
Following a presentation to the Intellect Group by UKAS's Graham Talbot, which supported the industry's wish, we are pleased to publish the following information:

Benefits of Accredited Certification – United Kingdom Accreditation Service (UKAS)

The United Kingdom Accreditation Service is the sole accreditation body recognised by the British Government to assess, against internationally recognised standards, organisations that provide certification, testing, inspection and calibration services. As a key contributor to this framework, UKAS operates under a Memorandum of Understanding from the Department of Trade and Industry (DTI), on behalf of Government.

In this role, it is UKAS' responsibility to assess certification bodies against international standards of competence and impartiality, and it is itself subject to regular assessment by its international peers and to oversight by the Government. Accreditation by UKAS confirms the organisation is competent, impartial and capable of sustaining the required level of performance.

At a recent Intellect Quality group meeting, Graham Talbot, UKAS' Technical Director (Operations), delivered a presentation to representatives of the software industry where he touched on the subject of combined assessments. The presentation was met with a series of questions about combined assessments and it was clear the issue requires clarification. Consequently, UKAS feels it is appropriate to clarify its position on the value of accreditation and the combining of assessment activities.

The IAF Guidance on the application of the accreditation standard for certification bodies provides for the combining of management audits. In observing and supporting the Guidance, UKAS accreditation of certification bodies does not prevent integrated assessments.

Combined assessments are applicable so long as experts with the appropriate matching competencies carry them out, and the certification body sticks to the defined accreditation criteria. The IAF Guidance also confirms that following a successful audit, accredited certificates may be issued as a combined certificate.

It is important that industry is aware that combined assessments for different management system standards are permitted. A combined assessment, done properly, may save an organisation money in the long run.

UKAS believes that too many of Britain's companies run the risk of undermining their long-term success by purchasing independent evaluations that are not UKAS accredited. UKAS encourages and advises purchasers to look for the National Accreditation Marks (featuring the Royal Crown) which UKAS and UKAS-accredited organisations are able to use under a licensing agreement with DTI as a sign of Government recognition.

To this end, the DTI and a number of other Government departments are supporting an Accreditation Awareness Campaign, run by UKAS, to ensure the benefits of using the services of UKAS,accredited certification bodies are properly understood.

The Awareness Campaign, which features a series of business briefings held throughout the UK, was launched by the Science and Innovation Minister, Lord Sainsbury, in November 2000, with the aim of specifically targeting Government and business.

In its attempt to inform and educate the market, UKAS aims to draw attention to the fact that certification bodies that have accreditation have demonstrated their impartiality, technical competence and performance capability against international standards.

Risk management is critical in many aspects of the UK economy. UKAS underpins the management of that risk by accrediting the evaluators, who certify, test and inspect products, services and personnel. Its services provide major assistance to both government and business by reducing risk and increasing confidence.

Accreditation by UKAS is the key to ensuring that consumers, suppliers, purchasers and specifiers can have confidence in the quality of goods and in the provision of services throughout the supply chain. The benefits of accreditation apply to UKAS' direct customers – the certification bodies, their customers and purchasers – by building confidence in a range of suppliers and enabling choice. It also encourages free but trustworthy markets, enabling innovation and reduced regulation.

There is no legal requirement for the providers of certification services to be accredited, yet the UK Government recommends the use of UKAS-accredited certification services wherever this is an option.

Businesses are being encouraged to choose wisely by looking for the UKAS Mark featuring the Royal Crown when purchasing certification services.

Note: For more information on UKAS or the accreditation awareness campaign, contact Marc Cranfield-Adams (mca@ukas.com).

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SPICE Conference
on Process Assessment and Improvement
17 March 2003 – Call for papers

ESA and the SPICE User Group are co-organising the Joint ESA – 3rd International SPICE Conference on Process Assessment and Improvement.

The joint conference has two parts:

- A two day conference focused primarily at personnel from the space industry, space agencies and other organisations in the space domain.
- The two day SPICE conference aimed at the general community of process assessment and improvement.

The conferences are linked by half-day tutorials of joint interest on the second day, and a full day of tutorials on the day following both conferences. Delegates will be able to attend either or both conferences, with the combination of the tutorials as an option.

ESA has been active in the development and use of frameworks for Process Assessment and Improvement, conformant with ISO 15504 (SPICE), in the areas of software processes and quality management systems. The SPICE User Group has for many years organised successful world-wide SPICE conferences and seminars and this is the 3rd in the series of the International SPICE Conferences.

The SPICE User Group also hosts the SPICE Network that has taken over from the SPICE project.

Contributions should be submitted by **22 November 2002**. Those requiring further information or interested in submitting tutorials should contact spice2003@isospice.com