Quality in the 21st century

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Involvement with the British Computer Society

Margaret Ross is involved with many aspects of British Computer Society and other bodies including:

- Council Member of the BCS
- Vice-Chair of The BCS Quality Specialist group
- Vice-Chair of the BCS Green IT Specialist Group
- Vice-chair of the BCS e-learning Specialist Group
- Member of JTISC (Joint TickIT Industry Steering Committee)
- European Editor for Software Quality Journal
- Conference Director from BCS SQM (Software Quality Management) conferences
- Conference Director for BCS INSPIRE (International Software Process improvement through Research and Education) conferences

Trends in Quality

- The new TickIT*plus* scheme,
- Offshoring issues
- The Six Sigma approaches,
- The need for businesses to achieve quality to demonstrate compliance and professionalism
- GreenIT as part of the overall IT Quality programme to achieve EU CleanTech 2020.

Involvement with TickIT

- The TickIT scheme was originally set up as a certification scheme, based on ISO 9001, for the IT sector, using auditors with IT experience.
- It is overseen by the Joint TickIT Industry Steering Committee,
- Margaret Ross and Geoff Staples represent the BCS on this committee
- Their main involvement over the past two years has been on Working Parties developing TickIT*plus,* led by Derek Irving, http://www.tickitplus.org/

Issues with the current TickIT scheme

- Many software development companies have TickIT certification
- The simple “pass/fail” approach of ISO 9001:2000 does not give potential clients any way of differentiating between them.
- Some major clients have been considering their own capability model, with first party audits, which is expensive for them and for their suppliers.

Issues with the current TickIT scheme

- Although ISO 9000:2000 requires organisations to undertake process improvement, there is no structured approach to this, unlike CMMI.
- Organisations now have to comply with many standards and legislation.
- To avoid additional audits, there is great interest in the possibility of joint audits, where one audit team checks for conformance to several related standards.

The TickIT*plus* Scheme

Based on ISO/IEC 15504-2

- **Bronze** Level 2: Managed
  (can transfer from current TickIT)
- **Silver** Level 3: Established
- **Gold** Level 4: Predictable
- **Platinum** Level 5: Optimising

The TickIT*plus* Scheme

- Integrated with ISO 9001 Accredited Certification
- Capability and Process Dimensions
  - Process Capability based on ISO15504-2
    - 4 organisational maturity grades
  - Extended standards option
    - ISO/IEC 20000 – **Service Management**
    - ISO/IEC 27001 – **Information Security**
    - ISO/IEC 25030 – **Product Measurement**

The TickIT*plus* Scheme

- Non-certificated (self and independently assessed) options
- Requirements based scheme - with guidance and support
- TickITplus Office controlling Auditors' registration, training and examination
- Formal improvements – part of certification

The TickIT*plus* Scheme

- Revised qualifications and skills for Auditors and Practitioners
- Revised documentation structure
- Base Processes Library – used to build assessed Process Reference Model
- Web based support infrastructure

TickIT*plus* Auditors

- There is a need for more highly trained auditors, experienced in capability assessment and a wide range of IT disciplines and standards requirements.
- TickITplus allows existing auditors to migrate to the new scheme without this additional requirement.
- They will need to understand and use the Process Reference Model, at the basic level that could be covered with computer based training.

TickIT Scheme Documentation

- At present the TickIT scheme documentation is guidance material.
- The TickIT Guide is the definitive document for the scheme and this has been maintained by JTISC as the scheme has evolved.
- Under TickIT*plus* this material will be expanded and made into a set of requirements

Process Reference Model

- Formal model – key feature of the scheme, which will include all the processes that will be covered by the audits
- Process types:
  - Type A – Mandatory as defined by ISO 9001 or other standards
  - Type B – Scope dependant – implicitly or explicitly in scope statement
  - Type C – Scope dependant – supporting processes
  - Type M – Maturity processes – Gold and Platinum only
- Based on Base Processes Library
  - Key deliverable from TickIT*plus*

Base Processes Library

- Key component of TickIT*plus* – must be used
- Ensures **consistency of assessment** approach
- Identifies references to Standards
- Defines process Outcomes, Base Practices, Work Products – and their references
- Enables **Scope and Capability Profiles** to be defined
- Used by companies to build their process reference model
- Based on ISO/IEC 15288 and 12207

Continuous Improvement

- Although this is a key ISO 9001 requirement, it is difficult to measure
- In TickIT*plus*, it is based on capability grade
  - **Silver**: Improvement **plan submitted** to an auditing body and approved
  - **Gold**: Plan drives surveillance planning and assessment based on set target achievements.
  - **Platinum**: Optimising capability measured, improvements have **to be sustained**, an improvements optimising process must be used

TickIT*plus* Assessments

- **Bronze grade**
  - Transfer level (from existing TickIT)
  - Provide Process Reference Model to auditing body
  - Minimal additions to ensure level 2 conformity approach and consistency with ISO 9001
  - Introduction to process assessment
- **Silver – Platinum grades**
  - Increasing levels of assessment to meet ISO 15504 compliance requirements at levels 3 - 5
  - Improvements monitoring

TickITplus Auditor grades

- Grading matches assessment levels
  – Bronze, Silver, Gold, Platinum
- Transition from current TickIT to TickIT*plus* Bronze with Foundation course and examination
- Specialist IT skills defined using **SFIA** (Skills Framework for the Information Age) model – no longer focused on software development only
- No compulsion to progress beyond Bronze grade

TickIT*plus* Practitioners

- Intended for non-auditors, i.e. quality managers, developers, consultants etc.
- Formal assessment roles
- Foundation, Practitioner and Advanced Practitioner grades
- SFIA based skills profiles
  www.sfia.org.uk

TickIT*plus* documentation

Revised, **on-line, regularly updated**, free or low cost as appropriate

- Marketing and business justification material
- Scheme introduction and guide
- Quick start and self assessment guide
- Certification requirements and guide to development of model
- Auditor and practitioner requirements
- Certification scheme requirements

TickIT*plus* – Project schedule

- Launch October 2009 – non-accredited initially
- Ongoing trials programme
- Current status:
  - Final stages of design, skills and training criteria
  - Trials underway – report on phase1completed
  - New TickIT*plus* website running
  - Base Process Library database under development
  - Development of Training Course underway

TickIT*plus* migration

- 3 years from Accreditation
- Existing TickIT certificates – Bronze grade after re-assessment
- Existing TickIT Auditors – Bronze grade after Foundation training and examination

Involvement with Outsourcing

- A major change in the last decade has been the wide use of outsourcing,
- initially of software development, followed by IT services.
- This has been reflected in papers at the SQM conferences and in the Software Quality Journal, on effects on software quality and service quality, particularly relating to offshore outsourcing.

Offshore Outsourcing

When selecting a partner for offshore outsourcing, client companies need assurance that

- the outsourcing company can provide services of the **required quality**,
- an effective **working relationship** can be developed with the outsourcing company.

Early Experiences

Clients need to be assured that the quality of work provided by the outsourcers is at an agreed level.

Initially this was not always the case with offshoring.

- An analysis by Dataquest states that,
  "*Between **20% to 25% of all** outsourcing relationships fail in a **two year** period and almost **two thirds fail within 5 years***".
- An analysis by India Infoline states that **50%** of offshore outsourcing projects fail due undeliverable bottom line promises.

Offshore Outsourcing

- In order to overcome this problem various quality models and standards were introduced
- These include e-SCM, which recognises that both the service provider and the client need to work together to ensure success
- The **E-Sourcing Capability Maturity Model for service providers (e-SCM SP)** was developed by a consortium led by **Carnegie Mellon University** in 2001, covering a wider range of functions than CMMI.

e-SCM for Service providers

The main objective of this model is to:

- **Improve the service provider's capability** across the sourcing life cycle by providing guidance to them.
- Provide the clients with the capability of the service providers by **evaluating** them.
- Provide the service provider a standard to **differentiate** themselves from the competitors.
- Provide a process framework for the formation and **management of enduring outsourcing relationships** between service provider and clients. It is specifically developed to meet the challenges in IT and process management outsourcing.

Levels in e-SCM SP (Service providers)

Level 1:

- The organisation **lacks proper management practices** with improper procedures and unformulated systems.
- The organisation has **no particular performance measurement** activities or procedures.
- Due to this situation the projects meet frequent **crises** and also exceed their **budgets and time** schedules.

Levels in e-SCM SP (Service providers)

Level 2:

- Captures and understands the **client's requirements** and then designs and deploys the service to meet the requirements.
- Provide the necessary services at agreed service levels and **manage all the risk**.
- Providing **proper training** or acquiring personnel for required skills and also they maintain the **up-to-date** technology and the required infrastructure for this contract.
- Maintain a **proper service** to collect and disseminate the information to control and **track service delivery**.

Levels in e-SCM SP (Service providers)

Level 3:

- It is **more mature** with respect to market sector targets, cultural attributes and it will be able to keep the activities under control and measured.
- These activities are obtained from previous experience and **sharing the knowledge** gained from their **previous** engagements and documentation of the phases.
- Able to monitor and control infrastructure and be able to reward personnel performance.
- **Risk** involved during the relationship and the project development will be **forecast and prevented**.

Levels in e-SCM SP (Service providers)

Level 4:

- **Customize their services** with respect to different sector of client projects.
- **Predict their performance** with respect to their previous success case studies and proactively improve performance.
- **Encourage innovation** and **bench marking** the organisational performance.
- Incorporate the appropriate **technology advances** by performing systematic evaluation.

Levels in e-SCM SP (Service providers)

Level 5:

- The supplier has attained **complete maturity**
- They will be rewarded for **sustaining** enhancement over a period of time
- They require **level 4 performances** during certification evaluations.

Structure of the relationship Phases

In this model, practices are defined for each organisational element.

- Each organisational element contains,
  - Overall Practices
  - Phase Specific Practices
- The phase specific practices are,
  - Pre Contract
  - Contract Execution
  - Post Contract.

Organisational Elements

The main elements that are involved in IT service and IT solution organisations are:

- Organisational Management.
- People Management.
- Business Operations.
- Technology.
- Knowledge Management.

E-SCM CL (for Clients)

The main objectives of this model are to:

- Provide guidance to the client organization that will **improve** their capability across the sourcing areas.
- Provide **client** organisations with an objective means of **evaluating their sourcing capability**.
- To help the client organisation to efficiently **manage** their service providers and reduce their deficiencies in performance.

Levels in e-SCM CL (for Clients)

Level 1 Performance Sourcing;

- the client organisation has not fully implemented the best practices stated in level 2
- there is a high **chance** for the Outsourcing **relationship to fail**.

Level 2 Consistently managing sourcing;

- the client organisation has fully implemented the capability level 2 practices
- They are able to manage the sourcing activities and **get executive** support.

Levels in e-SCM CL (for Clients)

Level 3 Managing Organisational Sourcing Performance

- the client organisations are **able to manage** their sourcing activities according to their strategy
- they have to implement all level 2 practices along with level 3 practices to achieve this level.

Levels in e-SCM CL (for Clients)

Level 4 Proactively Enhancing Value;

- the client concentrates on **enhancing their performance** across the sourcing relationship and also **use innovations** to achieve objectives;
- apart from capability level 2 and 3 practices more practices have to be implemented for this level.

Level 5 Sustaining Excellence;

- the clients demonstrate measurable, **sustained and consistent** performance by effectively implementing all the practices of level 2, 3 and 4.
- In this level no additional practices are required.

Results of our Research on e-SCM used by Indian Outsourcing Companies

For offshore outsourcing, e-SCM for SP and CL were found to be the best models which

- **enable both** the clients and service providers to form a **good relationship**
- benefit both in terms of cost and time.

Involvement with Six Sigma

- ISO 9001, TickIT*plus*, CMMI and e-SCM all require the use of Process Improvement
- Papers to SQM and the Software Quality Journal have often used the Deming "Plan-Do-Check-Act" cycle as a basic approach to Process Improvement
- Recently, a number of papers have described the successful use of Six Sigma as a Process Improvement methodology for IT.

Six Sigma – Typical Case Study

Using the Six Sigma " Define, Measure, Analyse, Improve, Control" method, the activities were as follows.

Six Sigma – Typical Case Study

Define

- A diagram defining the process's key suppliers, inputs, process steps, outputs and customers was produced.
- This helped to define the goals of the project focusing on specific customer requirements.

Six Sigma – Typical Case Study

Measure

- The process steps were measured during the original project.
- The data collected, represented 240 transactions, which produced 37 errors.
- The errors took 3 people a total of 6 days (45 hours) to trace and resolve.

Six Sigma – Typical Case Study

Analyse

- For the Analyse phase a Cause and Effect diagram was created using the data collected in the Measure stage.
- This identified the root cause of the errors.

Six Sigma – Typical Case Study

Improve

- When the solutions were identified, a test system was set up.

Control

- To reduce the risk of errors re-entering the system, a control mechanism was put in place.

Six Sigma – Typical Case Study

Risks

- Most of the potential risks associated with implementing Six Sigma are prevalent in all ‘change projects’.
- These include obtaining and **retaining senior management** buy in.
- If a project is **not ‘defined’ accurately** with a full cost benefit analysis, the true cost of the project can exceed the budgets set.
- Additional risks associated with a project of this nature are that if **poorly trained staff** undertake Six Sigma projects they could cause more damage than they originally set out to repair.

Compliance and Professionalism

- Recently, major financial scandals have led to legislation intended to reduce the possibility of such events.
- An example is the **Sarbanes-Oxley Act** in the US, with the EC planning to introduce similar legislation.
- Major redesign of IT systems has been needed to ensure that detailed records of decision making are kept that will ensure compliance to this legislation

Compliance and Professionalism

- The BCS is concerned that many people working in IT are not **"professionals"** in the way that doctors, lawyers and accountants are.
- The BCS believes that this, in part, accounts for the high failure rate of IT projects
- Recent reports by the BCS and other bodies discuss this issue, and recommend that organisations should consider giving preference to applicants with Chartered status for IT related jobs
- The use of "professionals" could be used as a **defence** for employers in legal cases as well as **attracting** potential clients.

Involvement with GreenIT

British Computer Society's commitment to quality and green issues

- Green issues in BCS's SQM and INSPIRE conferences (http://go.to/sqm)
- BCS GreenIT Specialist Group (Margaret Ross is Vice Chair/Secretary)
- BCS Data Centre Specialist Group (represented the UK in the development of the EU Code of Conduct for Data Centres, launch 2008, http://localevents.theiet.org/register.php?event=dcdd99)

EU “CleanTech”

“To promote the mobilisation of technologies which enable both businesses and individuals to perform everyday activities in a more energy efficient way in order to ensure the advancement of targeted reductions by **2020**

i.e. saving **20%** of primary energy consumption, reducing greenhouse emissions by **20%** and raising the share of renewable energy to **20%.**

“To create transparency and common ways of measuring energy performance”

EU “CleanTech”

How?

- the IT sector will be invited to **set targets** and reach a collective **agreement on measurement** methodologies.
- working partnerships between the IT sector and other major energy using sectors will be encouraged to identify potential roles of ITs in improving efficiency and reducing emissions.
- Member States will be called upon to enable the EU-wide roll out of the IT tools likely to effect **behavioural change** and drive demand for IT solutions.

In UK (From Carbon Trust)

- IT consumes 15% of UK office power, expected to rise to 30% by 2020
- Data storage grew by 50% in 1 year from 2005

In total IT power consumption
- already represents 10% of total UK energy consumption
- or 4 Nuclear Power stations!!

BCS Qualifications in GreenIT

Foundation qualifications, launched 2009
- Multi-choice questions, typically 1 from 4, with 40 questions
- Completed online
- Immediate result
- Courses available
- Available world wide
- Examined under BCS's Information Systems Examination Board quality standards

Topics include:
- Legislation
- Auditing
- Raising awareness etc

BCS Qualifications Under Development

Diploma in Green IT

- Typically two week course
- Requiring a further knowledge beyond Green IT Foundation qualification
- Assessment based on candidate's own department, small-business, or local firm or charity

Undertake:

- Green IT audit of their system
- identify road map to improve the "Greeness"
- Produce business case for to undertake the changes, including proposed cost, times scale, return on investment
- Benefits in terms of finance, Carbon Footprint reduction, and intangible benefits

BCS Qualifications Under Development

Data Centre Diploma, due 2009

- Aimed at those who manage software, select IT equipment, mechanical and electrical equipment, manage plants and those that procure or offer data centre space or services
- Optional 3 day Practitioner course
- 1 hour ISEB Diploma examination.

The syllabus is based on the **EU Code of Conduct for Data Centres**

- Understand the best practices, why they were selected and how to apply them together with the ability to understand how to implement the Code and the potential benefit of each practice.
- The roles of both participants and endorsers of the Code will be considered
- How to complete the appropriate applications to participate.
- Performing an internal audit to determine the compliance to the Code,
- Identifying potential cost in time and resources

Based on 5 level model

Level 2

- Recycling paper and cartridges
- Sign indicating switching off of lights/machines
- Timing out of machines
- Double-glazed windows
- Use of recycling of output (paper etc)
- Arranging time/shifts/meetings to encourage car-sharing/alternative travel arrangements
- Encouraged teleworking where appropriate, understand the need for advice and training, and be aware of the possible negative greening aspects
- Monitor final disposal of equipment
- Understand the basic measurement of carbon footprint
- Measure the use of electricity etc

Based on 5 level model

Level 3

- Purchase of recycled paper
- Designed Data centres for changing from air cooling to water cooling (building with suitable plumbing and floor strength)
- Online conference facilities to reduce travel
- Taking account of greening issues when purchasing goods (manufacturing, running and disposal)
- Company cars chosen with greening considerations (energy efficiency, increased time before replacement etc)
- Consider location (transportation of components etc) and method of manufacture of goods
- Consider if updates necessary (requiring full replacement or only parts)
- Require to see greening of suppliers/outsourcers, including the final outsourcers
- Collection and monitor relevant data, identifying trends (power usage etc)

Level 4 of the model

- Heat to be re-used for the building
- Water cooling of servers
- Check carbon footprint on staff travel
- Consider energy efficiency and carbon footprint in the manufacturing of equipment
- Consider energy efficiency and carbon footprint in the delivery of equipment
- Consider energy efficiency and carbon footprint in the running of equipment
- Consider the distance for the delivery of spare parts and servicing of equipment
- Free advice/help on greening of teleworkers' homes,
- Monitor policy for greening and recycling by suppliers
- Monitor policy full greening and recycling by outsourcers including their final outsourcers
- Check and require proof of the implementation of the policies for primary and secondary suppliers
- Check and require proof of the implementation of the policies for outsourcers and their suppliers and supply chain
- Maintain quantitative data records
- Maintain an Action Plan for greening improvement

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Level 5 of the model

- Generate own power (solar power, wind turbines etc)
- Use surplus heat outside the organisation
- Free advice/help on greening of employees' homes
- Free advice and help on greening issues to suppliers
- Free advice on greening issues to customers
- Action Plan to be regularly reviewed and updated
- Constantly looking for methods to improve greening within the organisation and beyond.

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Quality and GreenIT

Advantages of Green IT include:

- Enhanced Reputation (Green image)
- Feel Good factor (making a difference, saving the polar bears)
- Reduce energy bills (Carbon comes from energy and energy costs money)
- Reduce future energy requirements by purchasing green assets, services and consumables
- Use IT to facilitate working from home, and reduce the cost of travel, remote meetings