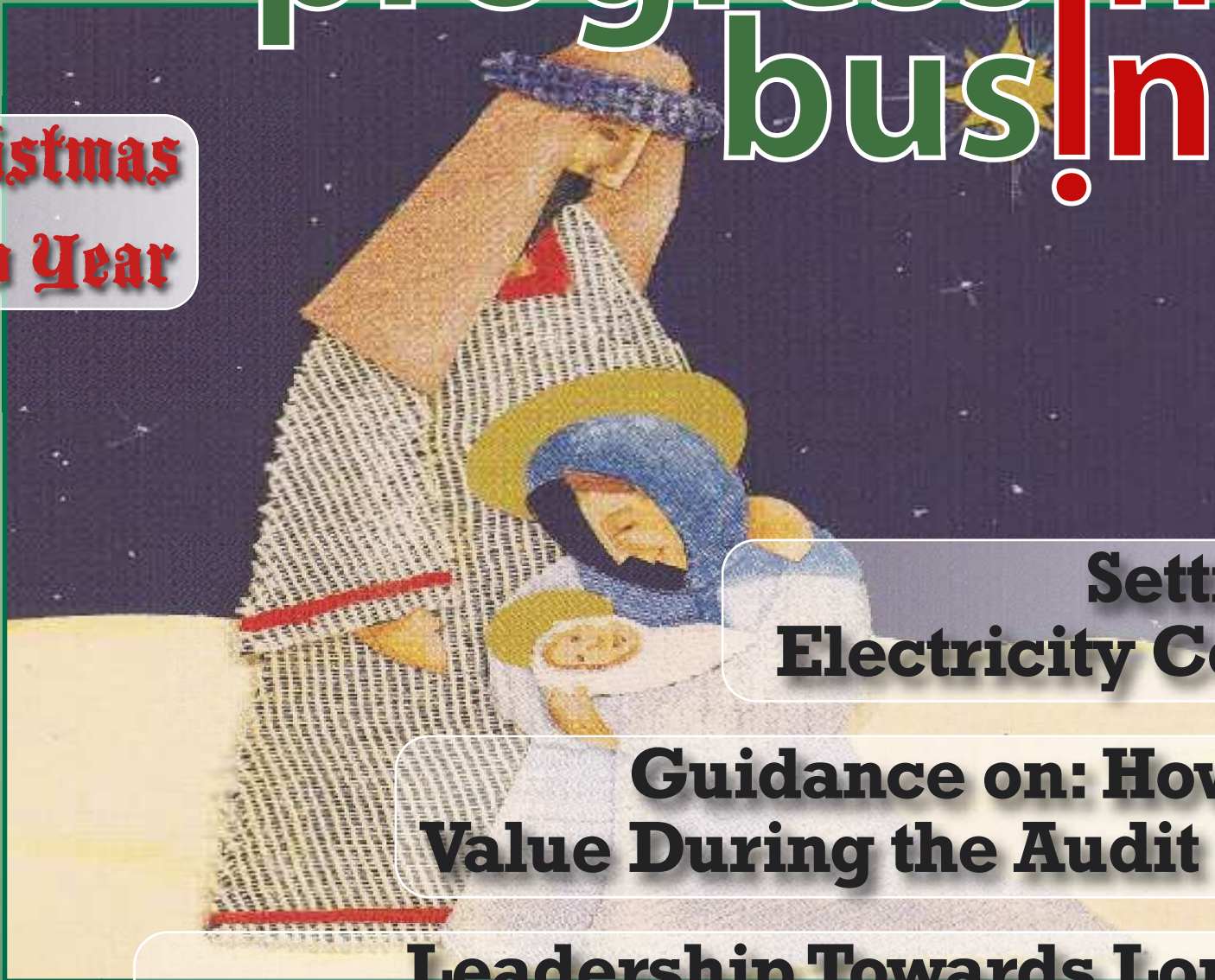


progressing business

**Merry Christmas
and
Happy New Year**



**Setting Your
Electricity Contracts**

**Guidance on: How to Add
Value During the Audit Process**

**Leadership Towards Long Term
Success of a Lean Sigma Program**

Leadership Towards Long Term Success of a Lean Sigma Program

Roger Hilton, Six Sigma Academy

(Paper presented to LeanSixSigma2009 Conference, Melbourne, Victoria, 6th October 2009)

1. INTRODUCTION

It has been widely demonstrated in the literature that many organisations have produced substantial savings and cost reduction through many Six Sigma projects – for example, (Motwani et al., 2004); (Banuelas et al., 2002); (Gabor, 2001). There is some limited evidence for Lean Sigma including a publication in an industry paper (Best Practice, 2005) and an academic journal (Shah et al., 2008).

The success of a Lean Six Sigma program can vary according to the performance measure used to determine success. Using project success is one way to measure the success of a Lean Sigma program (De Koning et al., 2008). Another way is to measure the success using stock price. Goh et al (2003) shows, using stock price as an indicator, that each of twenty Six Sigma program adopters do not have a statistically significant change in the stock price even though other performance indicators change. However, when corporate competitiveness is the measure, Lee et al (2006) propose a research model to test whether Six Sigma management activities improve corporate competitiveness. Empirical results showed that six sigma activities do indeed contribute to process innovation, quality improvement, and finally corporate competitiveness.

O'Rourke (2005) suggests that Xerox defined success for their Six Sigma program as increasing profits, reducing costs, business velocity and increased customer satisfaction whilst another large US business (Selectron) used whether or not they continuously improve metrics in quality, productivity, cross functional collaboration and employee satisfaction as the success measure.

Wiklund et al (2002) suggests that success in most Lean Sigma programs have a short term focus since there is little or no organisational learning that results from the project improvements. What seems to be missing, however, is the need for a systemic approach to organisational change and improvement (Dag, 2008).

A number of questions arise including, what determines the long term success of a Lean Sigma program? Is it the combination of two powerful programs like Lean and Six Sigma? Shah et al (2008) suggests that Six Sigma is more successful if it follows the implementation of Lean principles. Or is it the underlying critical success factors behind the program (Hilton, 2008)? Using case study organisations in Australia, Hilton (2008) suggests that similar factors are critical to the success of a Lean Sigma program and other quality improvement initiatives like Total Quality Management.

In order to adopt this rigid data driven approach to achieve higher quality performance, Huq (2006) suggests that a company must develop a unique combination of resources and competencies that “bring home” the benefits of Six Sigma. This competency-based perspective is based on the premise that a company needs to have the assets, skills and resources necessary to perform some selected activities systematically in order to achieve a better competitive position in the market place ((Eriksen et al, 1996); (Sanchez, 1996)). According to these authors, the competencies have a cognitive aspect in terms of knowledge and skills the company possesses and an action aspect that enables a company to deploy its competencies in a coordinated manner.

According to Huq (2006) these competencies also include both personal and corporate competencies. Personal competencies comprise the technical knowledge and charisma of the Six Sigma facilitators leading the Six Sigma or Lean Sigma deployment, that is the Black Belts and Master Black Belts. Corporate competencies comprise a combination of skills, knowledge and experience that enable a firm to implement and embed a change program successfully (Dunphy et al., 1997).

These skills and knowledge are embedded in a corporate culture and work methods and they can only develop

through continual process improvement efforts (Huq, 2006).

Organisations achieve success through the integrated functioning of people, processes, and technology. The strength of organisation development lies in its roots in organisation behaviour and dynamics, and the application of action research to improve human performance and organisational effectiveness. Six Sigma, itself offers advantages as a complement to use with other, less technical Organisational Development techniques when interventions are required to improve operational processes (Jeffery, 2005).

A company that has gone through a comprehensive quality program that has focused on the following has the necessary competencies needed for Six Sigma implementation (Huq, 2006).

- Customer preferences
- Continual process improvement
- Workforce culture
- Process view of the firm

Most successful adopters of Six Sigma had initially implemented TQM, Baldrige or some other quality improvement initiative (Huq, 2006)). For companies that had emphasised Quality Function Deployment (QFD), problem solving, statistical process control, process capability studies etc. a transition to Six Sigma would be a natural course of action (Huq, 2006).

In this paper we argue the hypothesis that for Lean Sigma to be successful it must have competent facilitators and leaders managing the program and a company must have a unique combination of resources and competencies so that the program is sustained in the long term. A necessary and sufficient condition is that both program leadership and senior management leadership must focus on the above principles to ensure "Organisational and Personal Competence in Lean Sigma".

The leadership must design and implement the Lean Sigma program in such a way as to get more people – not just the Lean Sigma facilitators – to overcome the mental barriers and use statistical analysis in their everyday work (Wiklund et al., 2002).

In section 2 we cover a literature review on the topic of

competency based perspective of Lean and/or Six Sigma programs and the success of a Lean Six Sigma program. In section 3 we summarise:

- which constructs are representative of the personal competencies of the facilitators
- what skills, knowledge and experience that enable an organisation to implement a Lean Sigma program successfully.

In section 4 we present the challenges faced and propose further research work.

2. LITERATURE REVIEW

This review is in two parts – part one is a review of the literature around the competence of Black Belts or Master Black belts to deploy Lean Six Sigma and part 2 is a review of the literature around competence of an organisation to successfully embrace the deployment Lean Six Sigma.

Three Levels of Energy Conservation Audit Training

OFFERED IN PARTNERSHIP WITH WATT UTILITIES

Introduction to Energy Conservation Auditing

The course has been tailor-made to train non-technical or semi-technical energy managers in the high profile field of Energy Conservation Auditing.

Becoming an Energy Champion

Every business should have an Internal Energy Champion. This course provides an understanding of how to become energy efficient using Conservation Energy Auditing Principles.

Advanced Energy Conservation Auditing

Upon completion of this course participants will have a basic knowledge of energy conservation auditing techniques and the skills necessary to conduct an energy conservation audit using an effective framework.

Once you have learnt and can undertake an energy conservation audit you can, with additional training, progress to carrying out a carbon audit and develop the carbon footprint for your organisation.

AVAILABLE IN ALL STATES

More information at www.aqq.org.au/EnergyTrain.htm or call 07 3816 2255



2.1 BLACK BELT COMPETENCE

It is clear that a number of authors have concluded that an effective training and education of the Six Sigma practitioners is a critical factor for the success and sustainability of the program and therefore an impact on the performance of an organisation ((Antony et al., 2002); (Hilton, 2008); (Wessell et al., 2004)).

Also the competency of the Six Sigma facilitator or expert is clearly an important factor in the long term success of Lean Sigma (Antony et al., 2007).

When Black Belts become certified, it does not signify the end of their studies; they must make a commitment to continuous learning, according to Gregory Watson, one of the panel Watson quoted in Snee et al (2003).

Pyzdek (2009) suggests there are seven factors that make a Black belt successful, although he does not define success. These are:

- Overcomes obstacles
- Attitude
- Logical thought process
- Communication skills
- Data driven
- Team experience
- Mathematics skills

Based on some surveys of black belts, Pyzdek weights the factors in order of importance as 34%, 23%, 13%, 9%, 8%, 7% and 6% respectively.

Defeo (2000) suggests the following are key qualities of black belts:

- Demonstrated management and leadership skills
- a background in mathematics, statistics and analysis
- a basic understanding of the business process and of finance
- potential future management or other advanced professional positions.

The key attributes of Six Sigma Black Belts identified from a pilot study of UK manufacturers include: effective communicators, change agents, customer advocates, team builders, results-driven mindset personnel, positive thinkers, etc. (Antony et al., 2007).

Wiklund et al (2002) suggest that Black Belts must have an in-depth knowledge of behavioral science as this is one facet for the basis of increased organisational learning. Hoerl (2001) suggests the following are key to the competence of a Black belt.

- statistical skills
- organisational effectiveness skills e.g. team and project management
- meeting management skills
- clearly present the results of projects
- training skills.

Porras et al (1991) suggests that process improvement consultants must have interpersonal competence; theory based problem solving capability, the ability to create a learning experience and the awareness of one's own assumptions and models.

Interestingly Bennet et al (2008) propose a four-fold action model for building extraordinary consciousness within individuals to produce personal mastery that includes:

- surfacing tacit knowledge
- embedding tacit knowledge
- sharing tacit knowledge
- inducing resonance

The first approach toward building extraordinary consciousness is surfacing tacit knowledge. As individuals observe, experience, study and learn throughout life they generate a huge amount of information and knowledge that becomes stored in their unconscious mind. The second approach toward building extraordinary consciousness is embedding tacit knowledge. Although information is continuously going into our unconscious all of the time, only significant things stay in memory - often without our conscious awareness. The third approach toward building extraordinary consciousness is sharing tacit knowledge. If knowledge can be described in words and visuals then this would be by definition explicit. The fourth approach toward building extraordinary consciousness is inducing resonance. Through exposure to diverse, and specifically opposing, concepts that are well-grounded, it is possible to create a resonance within the receiver's mind that amplifies the meaning of the incoming information, increasing its

emotional content and receptivity (Bennet et al., 2008).

Brue (2004) is not encouraging of Six Sigma practitioners. He states that "the rapid and widespread acceptance of Six Sigma and its phenomenal success have touched off a stampede of self-proclaimed experts all claiming to possess the knowledge to put the methodology into action. Expectations frequently fall short, however, because some of the practitioners are virtual impostors who do not fully understand or practice the true Six Sigma methodology". He further suggests that "the intellectual property looks credible enough to fool a novice and even generates excitement about Six Sigma implementation and also that what's being disseminated now are altered, covered-up, watered-down versions of the original success model and essential tools are being misapplied, resulting in less-than-stellar performances".

Mitra (2004) makes the point that the training of Six Sigma facilitators needs the involvement of academia in designing appropriate courses. In particular he says, "Academia has a critical role to play in ensuring that sound statistical education is an integral part of Six Sigma curricula".

According to Hoerl (2001) there is variation within Six Sigma curricula, of course, as within any other field. While much of the core technical material, such as experimental design and statistical process control, are common across virtually every provider, the breadth and depth of coverage of topics will vary. Hoerl (2001) suggests that it is important to develop training curriculum and follow some basic rules.

Wiklund et al (2002) using a case study organisation in Sweden (Solectron) suggests that training for black belts include the following:

- leadership
- change management
- learning aspects and self knowledge
- supervision strategies
- statistics and finance
- behavioral science

Importantly, these authors suggest that there must be support for the black belt when they start to implement projects. For example, a finance expert should advise them in the project business case, a statistician should advise them

on advanced application of advanced statistics and a behavioral scientist should support their roles as consultants (Wiklund et al., 2002). This suggests the training of black belts may fall short of the critical attributes needed to perform the role of change agent.

2.2 ORGANISATIONAL COMPETENCE

Education, training and participation are factors critical in the implementation of a quality improvement process (James, 1996). Effective implementation is about organisational learning. Without organisational learning there can be no continuous improvement (Wiklund et al., 2002). Organisational learning is also critical otherwise organisations focus on personal mastery rather than “team” learning” and a systems view (Senge, 1990).

Training or team training is not successful unless reinforced by regular follow up of an ongoing systematic change in how work is conducted (Wiklund et al., 2002). Sandvik et al (1997) also discuss this and they state that a lack of quality training causes insufficient implementation of quality methods. They define quality learning as the learning necessary for a permanent change in the way of working to create quality achievements, including both knowledge and ideology.

Shah et al (2008) suggests that organisational competency is the ability of an organisation to “Absorb capacity”. Looking the reverse concept, organisations fail to successfully implement Lean Sigma because of lack of broad based leadership and active support of process owners and poor selection of candidates for black belt training (Byrne, 2003).

Heifetz et al (2009) suggests that leaders in organisations need to adapt to challenges ahead brought about by internal and external changes. These are:

- Elephants in the room are named
- Responsibility for the organisation’s future is shared
- Independent judgment is expected
- Leadership capacity is developed
- Reflection and continuous learning are institutionalised.

The last point is particularly relevant since it relates to the learning organisation of (Senge, 1990). Information systems and innovation are key elements that should be included in

every company’s list of core competences (Unland et al., 1996). According to Dixon (1994) the continuous flow of cross functional information and knowledge supports organisational learning.

Interestingly, the system of profound knowledge (Deming, 1993) is comparable to the concept of organisational learning and the concepts have been known for some time. To embed an improvement into the culture of a business is to integrate the improvement process as a procedure into the Quality Management Systems (Pfeifer et al., 2004).

3. SUMMARY OF RESULTS

In table 1 we summarise the attributes of black belts across a number of writers.

BB ATTRIBUTE	PYZDEK	DEFEO	ANTONY	PORRAS	HOERL
Overcome obstacles/ Change agents	✓		✓		
Attitude/Positive thinkers	✓		✓		
Logical thought process	✓			✓	
Clear and effective communicators	✓		✓		
Data and results driven	✓		✓		✓
Team/meeting management and team builders	✓	✓			✓
Mathematical, statistical and analysis skills	✓	✓			✓
Leadership skills		✓			
Training skills					✓
Ability to transfer knowledge					✓
Finance skills		✓			
Potential to become senior management		✓			
Customer focused			✓		
Interpersonal traits				✓	
Awareness of one’s own assumptions and models of the world				✓	

Table 1: Summary of attributes of black belts suggested by a number of writers

In table 2 we summarise the organisational competencies necessary for the long term successful deployment of Lean Six Sigma.

Organisational Competence construct

- 1 An environment that supports Education and training
James, Sandvik
- 2 An environment that supports participation
James
- 3 Focus on team learning as adjunct to personal mastery
Wiklund
- 4 Continuous improvement as an underlying philosophy
Wilund
- 5 An environment that supports quality learning throughout the organisation
Sandvik, Wiklund
- 6 Knowledge gathering organisations
Dixon
- 7 Ability to select the right BB candidates
Byrne
- 8 Ability to absorb capacity
Shah et al
- 9 Systems thinking organisation
Wiklund
- 10 An environment that supports innovation
Unland
- 11 An environment that supports cross functional collaboration
Dixon
- 12 Embed program in Management systems
Pfeifer

Table 2: Summary of the organisational competencies necessary for the long term successful deployment of Lean Six Sigma

4. CHALLENGES

It would be useful to develop a model between Lean Sigma program success and Black Belt competencies and organisational competencies.

It will also be useful to compare the above attributes of Black Belts with the training that they obtain to determine their competence. One might suggest as a hypothesis that the competency of the Lean Sigma facilitators is partly due to the training and assessment that they have received.

The attributes of the black belts will provide an important

basis for the design of a black belt training program. The RABQSA has produced a set of competencies and these competencies need to be expanded.

Given the descriptions and characteristics of tacit knowledge and considering their value in an organisation, it would be useful to investigate how the leadership should manage the organisational environment for, and nurturing the creation and utilisation of, tacit knowledge in support of sustainable high performance (Bennet et al., 2008).

REFERENCES

- Antony J, Banuelas R. 2002. Key ingredients for the effective implementation of a Six Sigma program. *Measuring Business Excellence* 6(4): 20-27
- Antony J, Douglas A, Antony FJ. 2007. Determining the essential characteristics of Six Sigma Black Belts. *The TQM Magazine* 19(3): 274-281
- Banuelas R, Antony J. 2002. Critical success factors for the successful implementation of six sigma projects in organisations. *The TQM Magazine* 14(2): 92
- Bennet D, Bennet A. 2008. Engaging tacit knowledge in support of organizational learning. *VINE* 38(1): 72
- Best Practice L. 2005. Lean, Six Sigma & TQM: Top Companies Document Their Success, PR Newswire: 1
- Brue G. 2004. Get the Real Thing with Six Sigma. *American Banker* 169(93): 11-12
- Byrne G. 2003. Ensuring optimal success with Six Sigma implementations. *Journal of Organizational Excellence* 22(2): 43
- Dag N. 2008. Lean, six sigma and lean sigma: fads or real process improvement methods? *Business Process Management Journal* 14(3): 269-287
- De Koning H, De Mast J, Does RJMM, Vermaat T, Simons S. 2008. Generic Lean Six Sigma Project Definitions in Financial Services. *Quality Management Journal* 15(4): 32-45
- DefEo J. 2000. Six Sigma Black Belts kicking quality to a new standard. *The Corporate University Review* 8(3)
- Deming E. 1993. *The New Economics for Industry Government and Education*. MIT: Cambridge, MA
- Dixon N. 1994. *The Organizational Learning Cycle*. McGraw-Hill: Maidenhead
- Dunphy D, Turner D, Crawford M. 1997. Organizational learning as the creation of corporate competencies. *Journal of Management Development* 16(4): 232
- Eriksen B, Mikkelsen J. 1996. Competitive Advantage and the concept of core competency, in Foss, N. J. and Knudsen, C., *Towards a Competitive Theory of the Firm*: 38-53. Routledge: London, New York
- Gabor A. 2001. *Quality Revival, Part 2: Ford Embraces Six Sigma*, *New York Times*: C.5
- Goh TN, Low PC, Tsui KL, Xie M. 2003. The impact of Six Sigma implementation on stock price performance. *Total Quality Management and Business Excellence* 14(78): 753-763
- Heifetz R, Grashow A, Linsky M. 2009. *The Practice of Adaptive Leadership* (2009 ed.). Harvard Business Press: Boston, Massachusetts
- Hilton R. 2008. Critical Success Factors for Six Sigma in a Hospital. *TQM and Business Excellence* 19(9): 1-16
- Hoerl R. 2001. Six Sigma Black Belts - What do they need to know. *Journal of Quality Technology* 33(4): 391-406
- Huq Z. 2006. Six-Sigma implementation through Competency Based Perspective (CBP). *Journal of Change Management* 6(3): 277-289
- James P. 1996. *Total Quality Management*. Prentice Hill: London
- Jeffery AB. 2005. Integrating Organizational Development and Six Sigma: Six Sigma as a Process Improvement Intervention in Action research. *Organizational Development Journal* 23(4): 20-31
- Kun-Chang L, Bong C. 2006. Six sigma management activities and their influence on corporate competitiveness. *Total Quality Management and Business Excellence* 17(7): 893
- Mitra A. 2004. Six Sigma Education. A Critical Role for Academia, *The TQM Magazine* 16(4): 293-302
- Motwani J, Kumar A, Antony J. 2004. A business process change framework for examining the implementation of six sigma: a case study of Dow Chemicals. *The TQM Magazine* 16(4): 273-283
- O'Rourke P. 2005. A Multiple Case Comparison of Lean Six Sigma Deployment and Implementation Strategies. *ASQ World Conference on Quality and Improvement Proceedings* 59(Milwaukee): 581-591
- Pfeifer T, Reissiger W, Canales C. 2004. Integrating Six Sigma with Quality Management Systems. *The TQM Magazine* 16(4): 241-244
- Porras JI, Silvers RC. 1991. Organization development and transformation. *Annual Review of Psychology* 42(1): 51
- Pyzdek T. 2009. Reviewing Success Factors of a Six Sigma Black Belt, *Quality Insider*, Vol. July 2009:
- Sanchez R. 1996. Dynamics of competence-based competition, Theory and Practice in the new strategic management. Pergamon: UK
- Sandvik WP, Karrlson S. 1997. Critical Aspectson quality method implementation. *Total Quality Management* 8: 55-66
- Senge P. 1990. *The Fifth Discipline - The Art and Practice of the Learning Organization*. Doubkeday: New York
- Shah R, Chandrasekaran A, Linderman K. 2008. In pursuit of implementation patterns: the context of Lean and Six Sigma. *International Journal of Production Research* 46(23): 6679-6699
- Snee RD, Hahn G, Hoerl RW, Hill W, J. 2003. What does it take to be a master black belt? Part II. *ASQ Six Sigma Forum Magazine* 2(4): 45
- Unland M, Kleiner BH. 1996. New developments in organizing around core competences. *Work Study* 45(2): 5
- Wessell G, Burcher P. 2004. Six sigma for small and medium-sized enterprises. *The TQM Magazine* 16(4): 264-267
- Wiklund H, Wiklund S. 2002. Widening the Six Sigma concept: An approach to improve organizational learning. *Total Quality Management* 13(2): 233-239

More information request *Hilton0206* to
progbus@pbinsitute.net

*Have your product advertised
throughout Australia, New Zealand and
other overseas countries.
Very competitive rates.
Contact progbus@pbinsitute.net*

BRISBANE'S LEADING PROVIDER OF OUTSOURCED TRAINING FACILITIES

www.cliftons.com



- Computer Training Facilities
- Conference/Seminar Facilities
- Video Conferencing Facilities
- Facility Management

STOP PRESS: CLIFTONS BRISBANE HAS EXPANDED!

- 10 fully equipped training / conference rooms
- All rooms with natural lighting
- Breath taking views of Brisbane city, river and lush hinterland areas



CONTACT CLIFTONS TODAY, ARRANGE A SITE INSPECTION AND SEE HOW CLIFTONS CAN ASSIST YOUR ORGANISATION.

“Cliftons are always willing, friendly, extremely helpful and very customer focused. Nothing is too much trouble... Cliftons provide a great environment to enable learning.”

VICKI THOMPSON, LEARNING SERVICES MANAGER, LEARNING @ BORAL

T: 1800 629 088

enquiries@cliftons.com | www.cliftons.com

BRISBANE

SYDNEY

CANBERRA

MELBOURNE

ADELAIDE

PERTH

NEW ZEALAND

HONG KONG

SINGAPORE



Continuity Forum^{PTY LTD}

Sharing knowledge, experience and promoting best practice in business continuity and disaster recovery planning



We are an active network of organisations that share an interest in seeing that their business continuity and disaster recovery plans are resilient and continually reviewed.

Our goals:

- Provide a forum for discussion on business continuity and disaster recovery
- Educate and inform members and the business continuity community
- Encourage development and implementation of business continuity plans

Our members:

A variety of blue-chip companies from:

Banking and Finance
Government
Security
Transport
Utilities
IT and Telecommunications
Manufacturing
Retail

Member benefits:

- Member and specialist meetings in Australia and New Zealand
- Conferences and Training
- Surveys and Benchmarking
- Resources and Member Support

Business Continuity Summit 2010

24-25 March

Sydney, NSW, Australia

Visit our website www.continuity.net.au for more information or email support@continuity.net.au to be added to our email alert list.