High involvement innovation through continuous improvement

John Bessant and Sarah Caffyn,
Centre for Research in Innovation Management,
University of Brighton, UK.

Introduction

‘Continuous improvement’ (CI) is a widely used phrase which has taken on a variety of meanings. For many people it is synonymous with ‘innovation’, the continual quest to make things better in products, processes, customer service, etc. For others, it is a core value which lies at the heart of organisational renewal programmes like total quality management. For others it implies a preoccupation with sustained incremental change and with attention to the detail of waste reduction and quality improvement.

Our concern in this paper is to bring a little more focus to the idea of CI. We suggest that an important usage of the term surrounds efforts to increase participation in the innovation process within organisations. Traditionally innovation has been the province of the specialist who often works apart from the mainstream of the organisation’s operations - for example, in R&D or IT functions. The roots of this division of labour can be traced back at least to the late 19th century and the emergent mass production models based on ‘scientific management’. Here emphasis was placed on a belief in ‘one best way’ - in the way work was organised, in the products and services offered, etc. – and any interference with the designs produced by innovation specialists was seen as disruptive. Such separation of ‘head’ and ‘hand’ became institutionalised in the functional and hierarchical modes of organisation which became the dominant blueprint for much of the 20th century.

The limitations of such an exclusive model of innovation quickly become clear. Innovation is fundamentally about creative problem-solving and as environments become more turbulent and uncertain, so the requirement for this capability increase. With uncertain markets, rapidly changing technological threats and opportunities, increasing regulatory pressures, shifting customer and competitive requirements, and a host of other variables to deal with the likelihood of getting the ‘right’ innovative response is low. Organisations need to increase their innovative capacity, and one powerful mechanism for doing so is to extend participation in the process to a much wider population.

This simple point has been recognised in a number of different fields, all of which converge around the view that higher levels of participation in innovation represents a competitive advantage. For example:

• in the field of quality management it has become clear that major advantages
accrue from better and more consistent quality in products and services. Crosby’s work on quality costs suggested the scale of the potential savings (typically 20-40% of total sales revenue), and the experience of many Japanese manufacturers during the post-war period provide convincing arguments in favour of this approach. (Crosby, 1977; Deming, 1982; Dertouzos M, Lester & Thurow, 1989; Garvin, 1988) But the underlying recipe for achieving ‘total quality’ is an old one, originally articulated in the early part of this century and making extensive play on the contribution which participation in the process of finding and solving quality problems could make. (Deming, 1986; Juran, 1985; Oakland, 1989)

• the concept of ‘lean manufacturing’ emerged from detailed studies of assembly plants in the car industry. (Womack, Jones & Roos, 1991) This work highlighted significant differences between the best and the average plants along a range of dimensions including productivity, quality, and time. Efforts to identify the source of these significant advantages revealed that the major differences lay not in higher levels of capital investment or more modern equipment, but in the ways in which production was organised and managed. “…our findings were eye-opening. The Japanese plants require one-half the effort of the American luxury-car plants, half the effort of the best European plant, a quarter of the effort of the average European plant, and one-sixth the effort of the worst European luxury car producer. At the same time, the Japanese plant greatly exceeds the quality level of all plants except one in Europe - and this European plant required four times the effort of the Japanese plant to assemble a comparable product…” (Womack et al., 1991) Central to this alternative model was an emphasis on team working and participation in innovation - for example, the average number of suggestions offered by workers in Japanese ‘lean’ plants was approximately 1 per week; in contrast the European average was around half a suggestion, per worker, per year!

• lean manufacturing brought a sense of urgency and focus to a discussion which had been going on for at least the previous decade surrounding what were loosely called ‘Japanese manufacturing techniques’. (Schonberger, 1982) This bundle of approaches (which included umbrella ideas like ‘just-in-time’ and specific techniques like poke yoke) were credited with having helped Japanese manufacturers gain significant competitive edge in sectors as diverse as electronics, motor vehicles and steel making. (Bessant, 1991; Shingo, 1983; Suzaki, 1988) Underpinning these techniques was a philosophy which stressed high levels of employee involvement in the innovation process, particularly through sustained incremental problem-solving – Kaizen. (Imai, 1987; Kaplinsky, 1994; Lillrank, 1990)

• the transferability of such ideas between locations and into different application areas has also been extensively researched. It is clear from these studies that the principles of ‘lean’ manufacturing can be extended into supply and distribution chains, into product development and R&D and into service activities and operations. (Lamming, 1993; Leonard-Barton, 1992; Leonard-Barton & Smith, 1994; Wheelwright & Clark, 1992) Nor is there any particular barrier in terms of national culture; high involvement approaches
to innovation have been successfully transplanted to a number of different locations. (Ishikure, 1988; Kaplinsky, den Hertog & Coriat, 1995; Schonberger, 1985; Schroeder & Robinson, 1991)

• studies of high performance organisations, especially those which achieve significant productivity improvements through their workforces place considerable emphasis on involvement in innovation. Characteristic of such cases is a blurring of the lines of responsibility for the innovation process, moving away from specialists and towards higher levels of participation by others in incremental innovation as a complement to specialist activity. (DTI, 1995a; Pfeffer, 1994)

• work on the successful implementation of advanced technologies in manufacturing and services also points towards the value of high levels of involvement. The 1980s was a decade of high investment in powerful IT-based technologies for automating and integrating different functions, but despite high levels of adoption contributions to productivity and performance improvement were disappointing. It became apparent that success depended on securing commitment through participative design, and on extensive problem-solving activity around reconfiguring both technology and the organisational context. (Bessant, 1991; Burnes.B, 1992; Ettlie, 1988; Jaikumar, 1986; Majchrzak, 1988)

• much recent discussion has focussed on the concept of ‘learning organisations’, seeing knowledge as the basis for competition in the next century. Mobilising and managing knowledge becomes a primary task and many of the recipes offered for achieving this depend upon mobilising a much higher level of participation in innovative problem-solving and on building such routines into the fabric of organisational life. (Garvin, 1993; Leonard-Barton, 1995; Nonaka, 1991; Senge, 1990)
The challenge of continuous improvement

Our definition of ‘continuous improvement’ is one which builds upon this idea of high involvement innovation. We see CI as ‘… an organisation-wide process of focussed and sustained incremental innovation …’, recognising that most innovative activity is not of the ‘breakthrough’ variety, but incremental in nature, depending for its effect on sustained and focussed attack. The metaphor of wearing down a rock through dripping water on it over an extended period of time provides a good image for CI of this kind.

There is nothing new nor difficult in this concept; indeed, it would be hard to disagree with the premises that we need as much creative problem-solving as possible and that everyone has the basic wherewithal to do it. It is also a theme which recurs in the literature on innovation; many studies report on the importance of involvement and participation in sustained incremental improvement. (Hollander, 1965; Tremblay, 1994) Such high involvement innovation lies at the heart of the ‘learning curve’ theory which has had such a strong impact on strategic thinking; learning curves only work when there is the commitment and enabling structure for participative problem-solving. (Bell, Bessant & Hoffman, 1992; Garvin, 1993)

The difficulty comes not in the concept but its implementation. Mobilising high levels of participation in the innovation process is unfamiliar and, for many organisations, relatively untested and apparently risky. Many factors militate against its widespread practice, including the following:

- fear of uncontrolled change
- expectations of short-term returns
- disbelief in the ability of employees to contribute - ‘not everyone is creative’
- embedded belief in specialists as the problem-solvers and ‘big bang’ solutions
- inappropriate organisational structures to support CI
- lack of skills in innovation amongst non-specialists
- etc.

It is clear from this that there are likely to be considerable barriers to CI, arising from a mixture of lack of understanding of the concept, lack of organisational skills to implement it and lack of the organisational will to move down this road. The first two of these represent challenges to the acquisition of new behaviour patterns - organisations need to learn the habits of CI. We will return to a discussion of this learning process and how it might be enabled later in this paper.

Before doing so it will be useful to review the evidence for the importance and potential strategic advantage associated with CI, and to argue the case for commitment towards this goal.
Why bother with continuous improvement?

There is now substantial evidence to support the view that innovation matters as a key strategic resource. Organisations which are able to renew their products and services and the processes whereby they create these have distinctive and defensible competitive advantages. (Hamel & Prahalad, 1994; Kay, 1993) But most innovation is not of the ‘breakthrough’ variety; it is much more a process of systematic elaboration and development of original ideas. As Edison recognised, most innovative activity is around the perspiration rather than the inspiration end of the spectrum, and studies of successful innovative organisations testifies to the importance of systematic learning and consolidation as the core of their success.

Innovation can take many forms - capturing market share with new products, increasing profitability through reducing internal costs, creating successful partnerships with customers on the basis of innovative service, developing novel processes, etc. But they all share the common feature that they involve high levels of incremental problem-solving concerned with systematically improving understanding and operation of the innovations. Whilst specialist inputs will be critical to success, there are limits on the capacity of such specialists to deal with all the problem-solving tasks involved. - and the question of appropriate use of such expensive and scarce resources is also raised. So there is a strong *a priori* argument in favour of increasing levels of involvement, especially in the incremental problem-solving associated with innovation.

There is a growing body of empirical evidence to support this contention. For example:

- studies of Japanese manufacturing organisations provide data on the numbers of suggestions offered and implemented by many organisations. Even if we make the assumption that the majority of these suggestions are of a low-level incremental nature, the sheer volume - often running into millions per year - means that their aggregate effect is likely to be significant. Table 1 reproduces some examples:

<table>
<thead>
<tr>
<th>Company</th>
<th>Total suggestions</th>
<th>Ideas per worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kawasaki Heavy Engineering</td>
<td>6,980,870</td>
<td>426.5</td>
</tr>
<tr>
<td>Nissan</td>
<td>6,043,344</td>
<td>126.9</td>
</tr>
<tr>
<td>Toshiba</td>
<td>4,166,864</td>
<td>76.6</td>
</tr>
<tr>
<td>Matsushita</td>
<td>4,114,398</td>
<td>43.7</td>
</tr>
<tr>
<td>Mazda</td>
<td>2,417,264</td>
<td>113.0</td>
</tr>
<tr>
<td>Toyota</td>
<td>2,003,646</td>
<td>35.0</td>
</tr>
<tr>
<td>Olu Tyre</td>
<td>1,475,707</td>
<td>83.1</td>
</tr>
<tr>
<td>Nihon Victor</td>
<td>1,247,523</td>
<td>226.8</td>
</tr>
<tr>
<td>Nissan Diesel</td>
<td>1,169,745</td>
<td>88.1</td>
</tr>
<tr>
<td>Fuji Heavy Industry</td>
<td>998,359</td>
<td></td>
</tr>
</tbody>
</table>
similar data is now beginning to emerge from non-Japanese sources; for example, the textile firm Milliken now reports receiving an average of 1 suggestion from each of its employees every week, and they attribute much of their success in winning awards for high and consistent performance to this source. In Perkins Diesels around 60% of all staff have been involved in over 500 different projects.¹

a recent study of 142 UK firms, carried out in conjunction with ‘Works Management’ magazine as part of a wider European review of CI experience, found that two thirds had initiated a sustained application of CI. Around a third had been practising CI for between two and four years with a further 20% having been working in the field for over 4 years. Almost all (89%) felt that CI had had an impact on at least one dimension of performance, with 73% reporting productivity increases, 72% quality improvements and 70% better delivery performance. 65% of the sample felt CI to be of strategic importance to their businesses.²

case histories of individual companies provide another source of support for CI, with a growing recognition of the benefits which high involvement in the innovation process can offer - especially in areas like cost reduction and quality improvement. Examples drawn from the CIRCA research database include Lucas Diesel Systems, reporting annual savings of around £0.75m, Baxi Heating reporting a contribution of around 20% to its profits from CI (equivalent to £1m in 1993), and Glaxo Manufacturing reporting a 7% cost reduction during 1994/5 in its manufacturing operations. These match well with other reports. (Leonard-Barton, 1992; Lillrank, 1990; Robinson, 1991; Sirkin & Stalk, 1990)

surveys of award-winning companies which have been recognised (by their peers votes, by external performance measures, by independent auditing, etc.) to have achieved high class competitive edge increasingly converge in the importance attached to employee involvement and participation in CI. For example, winners of the UK ‘Best Factory’ award like TLG, Rover and Unipart, and of the European Quality Award (ICL/D2D, Xerox, Ericsson) lay particular emphasis on the importance of CI in achieving these goals. Similarly a recent study by the UK Department of Trade and Industry of ‘winning’ firms (in terms of various performance measures across a range of firm sizes and sectors) highlighted active employee involvement in problem-solving as a critical determinant of success. (DTI, 1995b)

So there is a considerable weight of experience now available to support the view

¹ Based on CIRCA research

² To be published in Works Management, July, 1996
that enhanced performance can and does result from increasing involvement in innovation through CI. But there is also a secondary effect which should not be underestimated; the more people are involved in change, the more receptive they become to change itself. Since the turbulent nature of most organisational environments is such that increasing levels of change are becoming the norm, involvement of employees in CI programmes may provide a powerful aid to effective management of change.

There is also the critical argument about learning. If organisations are increasingly competing on the basis of what they know and how they deploy knowledge, then they need to look to mechanisms which mobilise and manage knowledge effectively. (Garvin, 1993; Leonard-Barton, 1995; Nonaka & Kenney, 1991; Senge, 1990) Significantly learning organisation prescriptions and practices - increasingly highlight processes which are about high levels of participation in innovation, since it is through problem-solving that learning takes place. (Bessant & Caffyn, 1996)

**Routines for continuous improvement**

Assuming that there is the organisational will to develop continuous improvement the question is then raised about how organisations can acquire and embed the new behaviour patterns associated with this approach. There is a connection here to innovation theory in the concept of 'routines' - clusters or patterns of behaviour which represent a particular way which an organisation has learned to deal with some aspect of the innovation process - in this case, the challenge of enabling high levels of sustained involvement. (Nelson & Winter, 1982)

Routines of this kind are not mindless patterns; as Giddens points out ‘… the routinised character of most social activity is something that has to be ‘worked at’ continually by those who sustain it in their day-to-day conduct…’ (Giddens, 1984). It is rather the case that they have become internalised to the point of being unconscious or autonomous. They become part of ‘the way we do things round here’ - in other words, part of the dominant culture of the organisation.

Innovation routines are increasingly recognised as contributing to competitive advantage; being able to mobilise high levels of involvement does make a difference, as studies such as those of ‘lean manufacturing’ have demonstrated. (Womack et al., 1991) But another important strategic advantage is that such routines cannot be simply copied from one context to another; they have to be learned and practised over a sustained period of time. (Pavitt, 1991) Thus, for example, the Toyota Production System with its high levels of CI participation took over forty years to evolve and become embedded in the culture. (Monden, 1983) Whilst it is easy for Toyota executives to demonstrate this to others, it is not possible to replicate it; the Fords and General Motors of the world need to go through their own learning processes and come up with their own firm-specific versions of the idea. (Adler, 1992; Wickens, 1987)
The CIRCA research programme

How do organisations learn and develop CI behaviours? And which behaviours are important? Our view is that the problem is not one of concept but of implementation, and this led us to embark on a major five year research programme called CIRCA - Continuous Improvement Research for Competitive Advantage. CIRCA is an 'action research' project which is working with a range of user firms to try and understand the dynamics of CI implementation. In particular the programme involves in-depth research with a small number of core case study companies and experience sharing and 'snapshot' case study work with a wider network of around 100 firms.

The main objectives of CIRCA are to deliver a basic methodology for implementing and maintaining CI and a toolbox of resources to support this [Bessant, Burnell, and Webb, 1992]. The original plan for the network was to offer access to these research results to a wider community via a series of dissemination workshops, but it has evolved into a much more extensive system. Membership has also grown from a planned group of 20 firms to over 70 organisations participating in some aspect of the Network's activities. Of these the majority are in manufacturing and although some large firms maintain an involvement, the network caters primarily for SME users; the main activities are described in table 2:

Table 2: Outline of the CIRCA programme

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshops - average</td>
<td>Regular (quarterly) 1-day meetings to explore a topic of concern in the area of CI. Typical format is:</td>
</tr>
<tr>
<td>attendance is 70 people</td>
<td>Introduction and scene-setting</td>
</tr>
<tr>
<td>representing around 40</td>
<td>Industrial presentations (from network members and other firms)</td>
</tr>
<tr>
<td>organisations, mostly at</td>
<td>Research perspectives</td>
</tr>
<tr>
<td>operating management</td>
<td>Discussion</td>
</tr>
<tr>
<td>level and often including</td>
<td>Group workshop activities exploring the main issue (often using / teaching CI tools)</td>
</tr>
<tr>
<td>those with formal</td>
<td>Summary</td>
</tr>
<tr>
<td>responsibility for CI</td>
<td></td>
</tr>
<tr>
<td>implementation. Themes</td>
<td></td>
</tr>
<tr>
<td>emerge from the network</td>
<td></td>
</tr>
<tr>
<td>membership and have so</td>
<td></td>
</tr>
<tr>
<td>far covered setting up</td>
<td></td>
</tr>
<tr>
<td>CI, measurement,</td>
<td></td>
</tr>
<tr>
<td>creating a CI culture,</td>
<td></td>
</tr>
<tr>
<td>developing infrastructure</td>
<td></td>
</tr>
<tr>
<td>for CI, CI in inter-firm</td>
<td></td>
</tr>
<tr>
<td>relations, and benchmarking for CI.</td>
<td></td>
</tr>
<tr>
<td>Conferences</td>
<td>Occasional large-scale meeting bringing all network members together with international experiences and key speakers</td>
</tr>
<tr>
<td>Special interest days</td>
<td>Limited numbers workshop meeting exploring a key issue identified by network members as significant. Format is typically a briefing paper, followed by presentation by each network member of their experiences in trying to deal with that issue.</td>
</tr>
<tr>
<td>– examples have included</td>
<td></td>
</tr>
<tr>
<td>CI and the learning</td>
<td></td>
</tr>
<tr>
<td>organisation, measurement in CI, mobilising CI at the individual level, and motivation systems for CI</td>
<td></td>
</tr>
</tbody>
</table>
Regular communication feature, containing items contributed by network members around useful tools and techniques, experiences in implementing CI, case studies, etc.

Makes available key books, journal articles and other resources to members of the network

Tailored support for network members in training, programme design and other key areas. Significantly an increasing amount of consultancy is member to member rather than involving the CIRCA team

Support package containing various resources to enable CI development. The toolbox is available via the CIRCA team and as a self-help system; contents include:

- case studies of user experiences
- route map of CI implementation
- information packs on key CI issues such as measurement, reward systems, etc.
- CI tools
- diagnostic framework

The toolbox is continuously evolving to take into account inputs of experiences and experiments within the network

Independent assessment of CI programme against a diagnostic framework developed within the CIRCA project. This diagnostic allows a degree of inter-firm comparison and enables contact between organisations with complementary strengths and weaknesses, thus promoting learning opportunities

Learning continuous improvement

It is something of a cliché to talk of CI as ‘a journey, not a destination’. But we believe this accurately reflects the nature of the learning experience in developing this capability within organisations. CI is not a single event, nor is it a single technique or tool; it is a long-term learning process. A useful analogy can be made with learning to drive a car; in the early stages the problem is one of unfamiliarity with the whole experience. Learning is concentrated on trying to understand and master the individual low level skills associated with things like steering, the clutch, the brakes, the accelerator and so on. Gradually facility with these is developed but then the challenge comes of linking the individual behaviours together in complex sequences - for example, changing gear or
making a hill start. Eventually, and after extensive trial and error and practice
the point is reached where you qualify for a driving licence - but all this indicates
is an expression of basic competence; the real challenges of becoming a good
driver, able to cope with different cars, weather conditions, road types, etc. still
lie ahead.

Reported experience from companies in the CIRCA project support this view. At
the outset there is enthusiasm but little skill, and the early days of CI
development are taken up with learning the basics of systematic problem-solving
and practising the use of simple tools and techniques. Putting a workable
programme together which integrates the generation of ideas with their
implementation, with recognising and rewarding the effort put in, with
measuring and recording the improvements and identifying the next targets is a
long-term undertaking. Not surprisingly, many programmes run aground
before this stage is reached, but some persist and begin to link their CI skills with
the needs of the overall business strategy. This requires learning new skills
around monitoring and measuring processes, but the results have more strategic
impact. Further down the road there is the possibility of self-directed CI in
which the organisation moves towards a devolved form of innovation, with high
levels of participation in experiment rather than just improvement.

There are parallels here to work which has been going on in the field of software
development. Like CI, software development is concerned with managing
innovation and work by the Software Engineering Institute at Carnegie Mellon
University has developed a model framework - the Capability/Maturity Model -
which maps the learning process involved. (Humphrey, 1988; Paulk, Curtis,
Chrissis & Bush, 1993)
Within our model it is possible to characterise at least five discrete 'stages' or levels of development in CI. These are summarised in table 3 below:

Table 3: Stages in the evolution of CI capability

<table>
<thead>
<tr>
<th>Stage of development</th>
<th>Typical characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 'Natural' / background CI</td>
<td>Problem-solving random</td>
</tr>
<tr>
<td></td>
<td>No formal efforts or structure</td>
</tr>
<tr>
<td></td>
<td>Occasional bursts punctuated by inactivity and non-participation</td>
</tr>
<tr>
<td></td>
<td>Dominant mode of problem-solving is by specialists</td>
</tr>
<tr>
<td></td>
<td>Short-term benefits</td>
</tr>
<tr>
<td></td>
<td>No strategic impact</td>
</tr>
<tr>
<td>(2) Structured CI</td>
<td>Formal attempts to create and sustain CI</td>
</tr>
<tr>
<td></td>
<td>Use of a formal problem-solving process</td>
</tr>
<tr>
<td></td>
<td>Use of participation</td>
</tr>
<tr>
<td></td>
<td>Training in basic CI tools</td>
</tr>
<tr>
<td></td>
<td>Structured idea management system</td>
</tr>
<tr>
<td></td>
<td>Recognition system</td>
</tr>
<tr>
<td></td>
<td>Often parallel system to operations</td>
</tr>
<tr>
<td>(3) Goal oriented CI</td>
<td>All of the above, plus formal deployment of strategic goals</td>
</tr>
<tr>
<td></td>
<td>Monitoring and measurement of CI against these goals</td>
</tr>
<tr>
<td></td>
<td>In-line system</td>
</tr>
<tr>
<td>(4) Proactive/empowered CI</td>
<td>All of the above, plus responsibility for mechanisms, timing, etc., devolved to problem-solving unit</td>
</tr>
<tr>
<td></td>
<td>High levels of experimentation</td>
</tr>
<tr>
<td>(5) Full CI capability - the Learning organisation</td>
<td>CI as the dominant way of life</td>
</tr>
<tr>
<td></td>
<td>Automatic capture and sharing of learning</td>
</tr>
<tr>
<td></td>
<td>Everyone actively involved in innovation process</td>
</tr>
<tr>
<td></td>
<td>Incremental and radical innovation</td>
</tr>
</tbody>
</table>

Developing capability in CI

Progress through these stages is based on absorbing an increasing number of behavioural routines - in other words, a learning process similar to that of learning to drive. These cluster around a series of themes, moving from acquiring the CI habit to developing a full-scale learning organisation.
Use Word 6.0c or later to view Macintosh picture.
The basic make-up of these routines is as follows:

**Ability**

‘Getting the CI habit’ - developing the ability to generate sustained involvement in CI

**Constituent behaviours**

- people make use of some formal problem-finding and solving cycle
- people use appropriate simple tools and techniques to support CI
- people begin to use simple measurement to shape the improvement process
- people (as individuals and/or groups) initiate and carry through CI activities - they participate in the process
- ideas are responded to in a clearly defined and timely fashion - either implemented or otherwise dealt with
- managers support the CI process through allocation of time, money, space and other resources
- managers recognise in formal (but not necessarily financial) ways the contribution of employees to CI
- managers lead by example, becoming actively involved in design and implementation of CI
- managers support experiment by not punishing mistakes but by encouraging learning from them

‘Focusing CI’ - generating and sustaining the ability to link CI activities to the strategic goals of the company

- individuals and groups use the organisation’s strategic goals and objectives to focus and prioritise improvements
- everyone understands (i.e. is able to explain) what the company’s or department’s strategy, goals and objectives are.
- individuals and groups (e.g. departments, CI teams) assess their proposed changes (before embarking on initial investigation and before implementing a solution) against departmental or company objectives to ensure they are consistent with them.
- individuals and groups monitor/measure the results of their improvement activity and the impact it has on strategic or departmental objectives.
- CI activities are an integral part of the individual or groups work, not a parallel activity
‘Spreading the word’ - generating the ability to move CI activity across organisational boundaries

• people co-operate across internal divisions (e.g. cross-functional groups) in CI as well as working in their own areas

• people understand and share an holistic view (process understanding and ownership)

• people are oriented towards internal and external customers in their CI activity

• specific CI projects with outside agencies - customers, suppliers, etc. - are taking place

• relevant CI activities involve representatives from different organisational levels

‘Continuous improvement of continuous improvement’ - generating the ability to strategically manage the development of CI

• the CI system is continually monitored and developed; a designated individual or group monitors the CI system and measures the incidence (i.e. frequency and location) of CI activity and the results of CI activity.

• there is a cyclical planning process whereby (a) the CI system is regularly reviewed and, if necessary, amended (single-loop learning)

• there is periodic review of the CI system in relation to the organisation as a whole which may lead to a major regeneration (double-loop learning).

• senior management make available sufficient resources (time, money, personnel) to support the ongoing development of the CI system.

• ongoing assessment ensures that the organisation’s structure and infrastructure and the CI system consistently support and reinforce each other

• the individual/group responsible for designing the CI system design it to fit within the current structure and infrastructure

• individuals with responsibility for particular company processes/systems hold ongoing reviews to assess whether these processes/systems and the CI system remain compatible

• people with responsibility for the CI system ensure that when a major organisational change is planned its potential impact on the CI system is assessed and adjustments are made as necessary.
‘Walking the talk’ - generating the ability to articulate and demonstrate CI values

- the "management style" reflects commitment to CI values
- when something goes wrong the natural reaction of people at all levels is to look for reasons why etc. rather than to blame individual(s).
- people at all levels demonstrate a shared belief in the value of small steps and that everyone can contribute, by themselves being actively involved in making and recognising incremental improvements.

‘The learning organisation’ - generating the ability to learn through CI activity

- everyone learns from their experiences, both positive and negative
- individuals seek out opportunities for learning / personal development (e.g. actively experiment, set their own learning objectives).
- individuals and groups at all levels share (make available) their learning from all work experiences
- the organisation articulates and consolidates (captures and shares) the learning of individuals and groups
- managers accept and, where necessary, act on all the learning that takes place
- people and teams ensure that their learning is captured by making use of the mechanisms provided for doing so
- designated individual(s) use organisational mechanisms to deploy the learning that is captured across the organisation
Enabling learning in CI

Putting these behavioural routines in place and reinforcing them is the critical management task in developing CI. This development can be enabled by the use of a variety of structural and procedural devices - ‘enablers’ - which can be deployed strategically. Some examples are given in table 4.

Table 4: Enablers for continuous improvement

<table>
<thead>
<tr>
<th>Behaviour/routines</th>
<th>Blockage</th>
<th>Enablers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting the CI habit</td>
<td>No formal process for finding and solving problems</td>
<td>PDCA or similar structural model plus training</td>
</tr>
<tr>
<td></td>
<td>Ideas are not responded to</td>
<td>Simple idea management system, based on rapid response</td>
</tr>
<tr>
<td></td>
<td>Lack of skills in problem-solving</td>
<td>Training in simple CI tools - brainstorming, fishbone techniques, etc.</td>
</tr>
<tr>
<td></td>
<td>Lack of motivation</td>
<td>Recognition system</td>
</tr>
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<td></td>
<td>No structure for CI</td>
<td>Simple vehicles, based on groups</td>
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<tr>
<td></td>
<td>Lack of group process skills</td>
<td>Facilitator training</td>
</tr>
<tr>
<td>Focusing CI</td>
<td>No strategic impact of CI</td>
<td>Focus problem-solving on strategic targets/ policy deployment</td>
</tr>
<tr>
<td>Spreading the word</td>
<td>Lack of co-operation across divisions</td>
<td>Cross-functional CI teams</td>
</tr>
<tr>
<td></td>
<td>Lack of process orientation</td>
<td>Process modelling tools and training</td>
</tr>
<tr>
<td>Walking the talk</td>
<td>Conflict between espoused and practised values</td>
<td>Articulation and review</td>
</tr>
<tr>
<td>The learning organisation</td>
<td>No capture of learning</td>
<td>Post-project reviews</td>
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<td></td>
<td></td>
<td>Story-board techniques</td>
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<tr>
<td></td>
<td></td>
<td>Encapsulation in procedures</td>
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<tr>
<td>Continuous improvement of CI</td>
<td>Lack of direction</td>
<td>Formal CI steering group and strategic framework</td>
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<td></td>
<td>Running out of steam</td>
<td>Regular CI review and relaunch</td>
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Benchmarking continuous improvement

Our research suggests that it is possible to use measurement of the presence or
absence of these as a simple form of ‘benchmark’ which differentiates levels of CI ability. By asking about CI activities and experiences in terms of these core behavioural routines we can derive a relative position for the organisation in terms of what it has achieved and where it could usefully direct its efforts in the future.

The following example illustrates how the diagnostic process works in practice. Data collected during the early phase of the research has been re-examined against the developmental framework described above.

Company A is located in the south of England employs around 80 people in the design, production and marketing of pipeline products for use world-wide. The business was founded in 1904 and run by the founder until his death in 1942. In 1964 the company was purchased by a conglomerate, which in turn was acquired by a privatised water company in 1989.

In the late 1980s the company realised it needed to improve quality. It gained accreditation to BS5750 Part 2 in 1987, and Part 1 in 1990. Company A then embarked down the path of MRPII (Manufacturing Resource Planning) and JIT (Just In Time). They were driven by the desire to improve what they did as a business, not because there were problems but because they felt their leading position in the marketplace was under attack and they wanted to keep ahead. A comparison of the company as it then was (Company I) with the sort of organisation they were aspiring to become (Company II) was followed by a major investment in planning and implementing the change, training and education.

By the end of 1991 the company recognised that a more people-oriented approach was required, alongside the software development, and a "TQ philosophy" was adopted. In July of the following year BEAT (Business Excellence At The company) was launched at a half-day session attended by everyone. BEAT comprises MRPII/JIT and TQM. After that, Business Improvement Teams (BITs) began to be set up to tackle particular issues. In August the MRPII system was purchased and during the following eight months software familiarisation, four pilots, conceptual education, and training took place. In September 1992 an attitudinal survey (the Pulse Check) was conducted by external consultants, a key finding of which was the lack of communication mechanisms in the company. On 4 May 1993 the company cut over to the new system with the aim of achieving Class A status by early 1994. During the period from July 1992 to May 1993, although there were a few BITs, so much energy was focused on MRPII that little attention was paid to developing CI.

From data collected during a CI diagnostic exercise in November 1993 the company is placed within the Level 2 (formal CI) band on the CI Maturity Model. The profile generated by an analysis of the data is shown in Figure 1.

Figure 1: Profile of Company A showing the extent to which the core abilities/key behaviours are present, November 1993.
There was no evidence of individuals and groups using strategic objectives to focus and prioritise their improvement activities, but management direction of the BITs ensured that these teams worked on issues that were important to the company. In general, understanding (by non management employees) of the company’s strategy and its plans for CI was hazy. Many of the managers, though not openly hostile to CI were not active in their encouragement of it. However, there were two or three champions, one at Director level, and some managers did give some time (though a relatively small amount) to CI.

Monitoring of the CI system was somewhat ad hoc, with the Suggestion Scheme Committee and the BEAT Steering Committee keeping a watch over some components. Although considerable resources had been made available for BEAT, much of the budget had been spent in connection with the MRPII implementation rather than on preparing people for TQ/CI (for example, there had been very little training in problem solving). There was no evidence of ongoing assessment to ensure congruency between the company’s structures and the CI system, but the company was trying to change systems and attitudes to fit in with Company II.

Although there were some enablers in place to encourage participation, the level of CI activity was very low. There was no problem-solving methodology in use (apart from the Corrective Action procedure) and little application of CI tools. However, two departments (Development and Finance) appeared to be more advanced, with staff improving their processes proactively as part of their "normal" work. Working across boundaries was not as effective as it could have been, and in general knowledge and understanding of other departments was low. Most of the cross-boundary working appeared to be directive (by management processes or the requirements of MRPII) and reactive rather than happening naturally when a need arose.
The extent to which people learned from their own experiences and those of others appeared to vary considerably. For example, while there were people who would not even admit they had made a mistake let alone learn from it, in two departments mistakes were genuinely considered opportunities for improvement. There were some enablers in place that could be used to support the development of learning behaviours, including the company’s strong commitment to training, and the setting by office staff of their own personal objectives. There was no evidence that the learning of individuals and groups was being captured and shared, and there were no mechanisms in place to encourage this, the exception being when the work of a BIT resulted in a new or amended company procedure. The company had started to articulate and communicate CI values, for example in the mission statement and in the Company II document, but the management style, with one or two exceptions, did not appear to reflect these values.

A generic model for CI implementation

Our view is that all organisations should be engaged in developing higher levels of participation in the innovation process through continuous improvement. The above model describes a generic set of behavioural routines which our research shows as being important in implementing and sustaining CI; however the particular routes to reach this destination will vary widely. Each organisation needs to develop its own particular strategy and to make use of firm-specific enablers to implement it. So there is a value in a ‘toolbox’ approach to CI development which offers a combination of a diagnostic audit and then a suite of enablers which can be adapted and configured to suit particular needs and circumstances.
Figure 2 indicates a generic strategic framework for developing CI capability.

This is essentially a cyclic learning and development process, moving from establishing the basic operating structure through to developing a sophisticated, flexible and organisation-wide programme. Table 5 indicates the basic cycles involved, linking these to the key abilities identified earlier in the paper. It should be stressed that this need not be a linear sequence, although the early stages associated with developing the basic skills of CI within the organisation are likely to involve a sequential process.

Table 5: Development cycles in CI implementation

<table>
<thead>
<tr>
<th>Development cycle</th>
<th>Examples of enablers to be deployed</th>
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<tbody>
<tr>
<td>Cycle 1: Preparing the ground</td>
<td>Awareness-raising</td>
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<td>Facilitator training</td>
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<td>Set up steering group</td>
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<td>Identify pilot sites</td>
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<td>Decide on pilot vehicle</td>
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<td>Design idea management framework</td>
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<td>Design recognition system</td>
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<td>Cycle 2: Launch</td>
<td>Training in basic problem-solving cycle</td>
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<td></td>
<td>Training in basic toolkit for finding and solving problems and basic measurement</td>
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<td></td>
<td>Supported teamwork on problem finding and solving</td>
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<td>Review and publicise results</td>
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<td>Recognise achievements</td>
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<td>Cycle 3: Consolidate</td>
<td>Further inputs of training</td>
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<td></td>
<td>Extend range of tools and techniques</td>
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<td></td>
<td>Groups become autonomous/ self-managing</td>
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<td></td>
<td>Extend participation to other groups</td>
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</tbody>
</table>
Cycle 4: Focusing CI
- Develop and communicate business strategy
- Policy deployment to set CI targets
- Training in monitoring and measurement

Cycle 5: Spreading the word
- Introduce cross-functional teams/projects
- Training in process modelling
- Customer orientation training and techniques

Cycle 6: Devolution of control
- Groups become self-steering and set their own targets based on policy deployment
- Training in design of experiments

Cycle 7: Development of learning
- Post-project reviews
- Story boarding and other learning capture techniques
- Procedure and standard setting

CONCLUSIONS

The late twentieth century environment poses many challenges to all kinds of organisations, and this turbulence and uncertainly is unlikely to diminish. Organisations therefore need to respond with reconfiguration and re-invention of their structure and processes - and to continue to do so over time. Making this happen requires active participation in the process and content of change, and maintenance of this level of participation in innovation. This is the nature of the continuous improvement challenge.

The paper has introduced a model framework which helps explain the apparently diverse set of experiences of CI implementation reported in the literature. It suggests that CI can be characterised as an evolutionary learning process associated with acquiring and routinising key behaviour patterns, and diffusing them across the whole organisation. In our view CI is fundamentally about behavioural change, and involves both learning and unlearning. A major reason why it is often so hard to get beyond the honeymoon experience towards strategically effective CI is the difficulty in learning new behaviours to the point where they become routines, the way we do things round here – in other words, culture change.

References


