Introduction

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1 Introduction

Based on papers presented at the *5th International CINet Conference on Continuous Innovation: Strategic Priorities for the Global Knowledge Economy*, in Sydney, Australia, on 22–25 September 2004, this special issue contains a range of exciting articles addressing continuous improvement, one of the cornerstones of continuous innovation capability.

The Continuous Innovation Network (CINet), a cooperative research network of academics established in 1994 to investigate and share good practices in the area of continuous innovation, has defined continuous innovation as "… the ongoing process aimed at creating Product – Market – Technology – Organisation – Combinations (PMTO) that are new to an individual, a group of people, an organisation, a market sector

or even society as a whole".[1] Business success, however, not only depends on innovation but also on the exploitation of innovation outcomes. Boer and Gertsen (2003) therefore proposed a wider definition by conceptualising continuous innovation as "… the ongoing process of operating and improving existing, and developing and putting into use new configurations of products, market approaches, processes, technologies and competencies, organisation and management systems. In other words, continuous innovation is the ongoing interaction among operations, incremental improvement, learning and radical innovation, aimed at effectively combining operational effectiveness and strategic flexibility, or 'exploitation and exploration'". This definition suggests that successful continuous innovation is based on operational, innovation and strategic excellence.

There are various 'weaknesses' in this definition of continuous innovation. We want to pick out three here. First, the definition sketches a kind of ideal end-state. However, it is questionable *whether* that ideal is attainable, even if we limit the discussion to continuous improvement. Sub-questions are: what are the drivers, enablers/disablers and (performance) effects of (1) continuous improvement activities, and (2) the development of continuous improvement capabilities over time? The following articles by Dabhilkar and Bengtsson, Middel *et al*., Corso *et al.* and also Albors and Hervás, address one or both of these questions.

Second, the definition is somewhat 'introvert' – especially, the interaction between continuous innovation and company strategy requires more attention. The articles by Hyland *et al.* and Albors and Hervás explicitly discuss the relationships between continuous improvement and strategy.

Third, the definition suggests continuous innovation and, for that matter, continuous improvement, is an intra-firm capability. However, in a global, networked economy, in which companies increasingly work together not only to produce and market their products, but also to develop new technology and applications, and, in the context of this special issue, to improve the functioning and performance of the chains and networks they are involved in, this conceptualisation no longer holds. Kaltoft *et al*., Middel *et al*. and Hanna report results of research on collaborative improvement in their articles.

Boer and Gertsen (2003, p.821) "… are no way convinced … that [the field of continuous improvement] is fully understood. On the contrary, [they] think that this topic still deserves a lot of attention, particularly in terms of the development and validation of theory and management concepts, and tools based on that. This development is not necessary merely for the sake of further clarifying the topic: a workforce with high CI and learning capabilities is one of the cornerstones of the continuous innovation capabilities organisations need to survive in the future". The results reported in this issue show this concern is still very much justified. All articles, and especially the one from Readman and Bessant, identify some of the challenges lying ahead.

2 The articles

2.1 Inter-firm continuous improvement – collaborative improvement

Kaltoft *et al*. from Aalborg University, Denmark; Caniato from Politecnico di Milano, Italy; and Middel, University of Twente, The Netherlands report their experiences with three different approaches towards the implementation of collaborative improvement. Labelled the bottom-up learning-by-doing; the top-down directed; and the laissez-faire

approach, respectively, each of these approaches has its advantages and disadvantages. The strength of the bottom-up approach is that it produces immediate improvement results. Its potential weakness is that it may run out of momentum after a while. The strengths of the top-down approach are that it provides the fundamentals of theoretical knowledge, goal alignment and an assessment of the partners' and the Extended Manufacturing Enterprise's (EMEs) strengths. Its potential weakness lies in the difficulty to translate knowledge and vision into action. The laissez-faire approach may help create a shared vision and goals, genuine collaboration and learning. However, if there is not enough commitment (will, time, resources) and/or trust, this approach does not even begin to work. The authors tentatively propose that the combination of the three approaches may actually present the best way to implement collaborative improvement. A successful implementation process requires understanding and direction (provided by the top-down approach), activity and learning (supported by the bottom-up approach), and a willingness to collaborate based on trust and commitment (key values underpinning the laissez faire approach).

In their article, 'Managing and organising collaborative improvement: a system integrator perspective', Middel *et al*. of Twente University, The Netherlands, also report a study on CI in an inter-organisational setting. In order to gain insight and develop knowledge on the process of collaborative improvement from a system integrator perspective, they use the actor network theory to discuss the role of scope, scale, skills and values, and social networking in collaborative improvement. They conclude that all four mechanisms (scope, scale, skills and values, and social networking) have to be in place in order for the network to last and avoid a biased attention on one of the mechanisms.

Hanna from the University of Melbourne, Australia has explored the exploitation of complementary competencies via inter-firm cooperation. She found that the companies involved in the five cases she studied used collaboration as a way of improving their competitive position. Indirectly, there were new opportunities for the firms to exploit, but these benefits accrued once the network/alliance had operated successfully for some time. The link to new competency development was more tenuous, new skills were developed, but these were related to the successful negotiation and operation of networks and alliances rather than core technical skills.

The remaining seven articles in this collection are the initial reports of a stream of international research based on analysis of the 2003 CINet survey, the second of a series of international surveys implemented by CINet to measure continuous organisational improvement practices. The first of these surveys was conducted in 1995–1996 and measured continuous improvement practices in over one thousand manufacturing business units in Australia, Denmark, Finland, Norway, Sweden, The Netherlands and the UK. Each national team was responsible for the collection of its own country's data using an agreed research methodology and a standard survey instrument, translated from English into the home country language where necessary. The major findings of this initial survey may be found in Boer *et al.* (2000) and Bessant (2003).

This methodology was repeated in the 2003 survey, which aimed to more closely examine the ways organisations promote, support and sustain CI activities, along with a replication of much of the 1995 survey to enable insights to be gained into the evolution of CI through time. Along with an expansion of the survey's content, the participating

countries expanded through the addition of Hong Kong, Italy, Ireland and Spain. The next round of this survey is planned for late 2006 with a further expansion of participants through the addition of further Asian countries and representatives of the Americas.

The results of the 2003 survey reported here may be divided into three main streams: intra-firm CI and strategy; CI maturity; and the challenges ahead.

2.2 Intra-firm continuous improvement and strategy

Hyland from Central Queensland University, Australia, and Mellor and Sloan from the University of Western Sydney, Australia examine the link between performance measurement and continuous improvement, and wonder whether these practices are linked to manufacturing strategy. One of the conclusions they draw is that managers do not relate gains in business performance achieved through continuous improvement to how they think about the importance of indicators affecting customer and market demand. The authors recommend that managers integrate the lessons they have learnt from implementing continuous improvement programmes, when looking at the performance of the firm, and based on that, devise an appropriate manufacturing strategy for the firm.

Albors and Hervás, both from Universidad Politécnica de Valencia, Spain, report the state-of-the-art of CI in Spain and, like Hyland *et al*., they focus on the role of CI as a strategic tool for the firm. The authors present a modified model of CI evolution, that is, modified relative to models previously presented in the literature. Furthermore, the article outlines the relevance of CI practices as a strategic tool. A factor analysis identified various critical variables. Firm size, management support for CI, the CI culture, the organisational structure, the use of CI tools and the experience with CI, as well as the time dedicated to CI practice, explain the sample variance.

2.3 Continuous improvement maturity

Dabhilkar and Bengtsson from the University of Gävle, Sweden, report on their study of the continuous improvement capability in the Swedish engineering industry. Again, this study uses data from the 2003 CINet survey. The authors take their starting point in the Brighton CI Capability Maturity Model (see *e.g.*, Bessant and Caffyn, 1997). They conclude that Swedish plants in general are carrying out their improvement work at a level that corresponds to no higher than the second level of maturity model, that is, the structured CI capability level, where there is a formal commitment to building a system that will develop CI across the organisation. According to the authors, the main reason for this situation is that the plants have not developed the requisite *systematic and strategic CI ability* to qualify for higher capability levels. The question is how to move forward. The authors propose that it is important to develop all three categories: systematic and strategic CI, leading the way and customer and supplier integration, and mention two reasons for this. First, these three abilities correspond to the lower levels of maturity model and refraining from them prevents plants from establishing higher CI capability levels. Second, the behaviours underpinning these abilities have a positive impact on performance in three important dimensions, namely, plant operating efficiency, customer satisfaction and working conditions.

Middel *et al*. from the University of Twente report on the current adoption and application of continuous improvement practices in The Netherlands. Their study is based in the 2003 CINet survey, and shows that customer satisfaction, productivity, quality conformance and delivery reliability are important motivators to start working with CI. The authors confirm Bessant and Caffyn's (1997) conclusion that continuous improvement is a relatively simple concept, which, however, appears to be quite difficult to design, implement and develop successfully. Lack of time, lack of knowledge/capabilities/experiences, ambiguity, and insufficient performance measures were the most frequent difficulties identified by the authors. Furthermore, organisational learning, the key process underpinning continuous improvement and the development of that capability over time, is a 'bridge too far', especially in terms of sharing, diffusing and institutionalising improvement and learning experiences.

Corso and Giacobbe from Politecnico di Milano, Italy and Martini and Pellegrini, from the University of Pisa, also in Italy, investigate the impact of CI tools and enablers on performance (improvement). The authors find that CI has a positive influence on productivity, quality conformance, customer satisfaction, customer relations, and safety and working conditions. Furthermore, the improvement of business performances does not depend on the use of CI tools/enablers, but rather on the development of CI abilities.

The results reported by Al-Khawaldeh from The Hashemite University, Jordan and Terry Sloan from the University of Western Sydney, Australia, sketch a similar picture. Customer satisfaction, cost reduction, quality control and improvement, and productivity improvement are the main motives for continuous improvement in Jordanian companies. Implementation problems are related to performance measures, culture, time, funding and organisational commitment. In spite of these problems, continuous improvement appears to have positive effects on productivity, quality, customer satisfaction, safety and working conditions, employee commitment/attitude towards change, cooperation and communication, and supplier and customer relations.

2.4 Continuous innovation – the challenges ahead

Readman from Brighton University and Bessant from Imperial College, both in the UK, consider the challenges lying ahead for improvement programmes in the UK. Based on an analysis of the 2003 CINet Continuous Improvement Survey data, they identify a number of challenges, including developing CI to such a level that it can deliver positive results over a sustained period, taking CI to non-production activities, including product development and administrative processes, and to inter-organisational settings, that is, towards supplier and customer relations. This, in turn requires a different set of objectives, performance measures and enabling techniques than what organisations use in their manufacturing improvement activities. Finally, the familiar CI tool kit has to be adapted to help companies face the challenges coming from globalisation.

3 Conclusion

The ten articles collected in this special issue provide a richer picture of continuous improvement that is hitherto available.

As to the development of intra-firm CI, the availability of longitudinal data has made it possible to investigate the development of that capability over time in Italy, Jordan, The Netherlands and Sweden. All four articles report industry to be making progress, and that the Brighton CI Capability Maturity Model explains the process relatively accurately. However, the maturity process appears to be fraught with difficulties – in particular lack of time and funding, insufficient knowledge, capabilities and/or experience, ambiguity in terms of vision, goals and ambitions, poor performance measures and management, a non-supportive culture, low commitment, and poor organisational learning. The experiences in these countries in terms of drivers, enablers and effects of CI are surprisingly similar.

The link between CI and strategy is weak, both in practice and in theoretical understanding, and definitely an area for further research and concern in industry.

The area of collaborative improvement, a 'white spot' in the continuous improvement literature, is being opened up by showing the influence of a wide range of factors affecting the development of continuous improvement in inter-firm settings.

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Note

1 http://www.continuous-innovation.net/Who_are_we/Research_Vision.html.