

CONTINUOUS IMPROVEMENT IN THE NETHERLANDS: A SURVEY-BASED STUDY INTO THE CURRENT PRACTICES OF CONTINUOUS IMPROVEMENT

Rick Middel, Saskia op de Weegh, José Gieskes

School of Business, Public Administration and Technology, University of Twente, Enschede,
The Netherlands

ABSTRACT

Continuous Improvement is a well-known and consolidated concept in literature and practice and is considered vital in today's business environment. In 2003 a survey, as part of the international CINet survey, has been performed in the Netherlands in order to gain insight into the current practices and the evolution of continuous improvement over the past 5 years. From a sample of 51 companies, this paper describes the results of the Dutch survey. The main motives for continuous improvement are customer satisfaction, productivity, quality and delivery reliability. Continuous improvement contributed to several performance areas, but the implementation is fraught with a lot of difficulties. It appears to be difficult for companies to design and implement an approach towards continuous improvement that is in line with their own perception.

1. INTRODUCTION

More than ever, companies are challenged to improve their performance and respond quickly and accurately to changes within the market. Some do this by major (radical) changes and some do this by small (incremental) changes. Incremental improvement is a well-known concept and widely discussed by the literature on Continuous Improvement (CI). CI is a consolidated concept in managerial theory and practice (Imai, 1986; Bessant and Caffyn, 1997; Boer et al., 2000) Although CI is not sufficient on its own, is recognised as an essential driver of long-term competitive advantage (Boer et al., 2000).

The earliest accounts of continuous improvement-related concepts go back at least as far as the 18th century. Although the attempts are not based on scientific methods of identifying and analysing improvement possibilities, they have some key ingredients in place to continuous improvement (Van der Bij et al., 1999). A key factor in the 'professionalisation' of CI has been Scientific Management, where CI was already defined and described as a key issue (Taylor, 1912). The concept of Continuous Improvement (CI) was further developed as a new field in Operations and Innovation Management in relation to the Japanese practice of *Kaizen*. While continuous improvement may not have been invented in Japan (Kerrin, 1999), a rich stream of literature bloomed, describing successful applications of *Kaizen* in manufacturing processes of Japanese companies (see Imai (1986, 1997)). During the 90s a new stream of literature on CI emerged, characterised by a much higher emphasis on the role of management, setting the strategic, organisational and cultural conditions for the diffusion of CI to the overall workforce. An important contribution in this direction was the one by John Bessant (1994) and the CINet research network (Caffyn, 1998). Bessant et al. (1994) summarise the organisational factors which are needed to support continuous improvement. Tools and techniques are only one of organisational factors that support CI. Bessant et al. (1994) indicate

that organisational learning and knowledge management become key issues in CI. An important strand of research has also developed to assess the evidence of adoption of continuous improvement practices (for example, Coughlan et al., 1997; Gieskes et al., 1997; Chapman et al., 1997; Terziovski and Sohal, 2000; Delbridge and Barton, 2002).

There are various definitions and conceptualisations of continuous improvement. But for the purpose of this paper CI is best understood with the following definition: *“the planned, organised and systematic process of ongoing, incremental and company-wide change of existing practices aimed at improving company performance”* (Boer et al. 2000: 1). Adding to this definition, Boer et al. (2000) give insight into some key aspects and terminology in the current understanding of CI are:

- Suggestion, recognition and reward, and training systems;
- Methods, tools and techniques;
- Individual and team-based contributions;
- CI as a normal day-to-day activity;
- Company-wide involvement and commitment;
- Strategy-driven and strategy-forming;
- Empowerment;
- Facilitating individual and organisational learning;
- Multiple projects (taking place simultaneously);
- Applied in all sorts of organisations.

Within the concept of CI, models, methods and techniques have been developed and more or less successfully implemented in organisations (Boer et al., 2000). The problem with CI is that such a, at first sight, very simple and attractive concept appears to be difficult to design, implement and develop successfully (Bessant, 1998; Boer et al., 2000). *“Despite its attraction, evidence suggests that CI often fails, or fails to take root in organisations which try to implement it”* (Bessant, 1998).

In a recent literature review on CI, Boer and Gertsen (2003) indicate that the development and validation of theory and management concepts and tools based on that still deserves a lot of attention within the field of CI. This paper will present and give an insight into the current practices of CI in the Netherlands based on the findings of the CINet survey 2003. As such, the paper is descriptive in its nature; presenting and describing different practices of CI (see also De Lange-Ros, 1999), which can ultimately contribute and be used in the development and validation of CI.

This paper is structured as follows. First, the paper provides some general information on the background and general characteristics of the organisations that have participated in the CINet survey in the Netherlands. Second, we will discuss the results of the survey in terms of the organisation and operation of CI, support for and tools used in improvement activities, the effects of improvement activities. In this section we will present and discuss the most striking results of the survey. Throughout the paper the findings will be analysed in order to gain insight into the applicability of some of the theories and models of CI. Finally, the last section will draw some conclusions based on the Dutch results of the CINet survey.

2. CINET SURVEY

In 1995 an international co-ordinated study of CI practices and performance in Australia, Denmark, Finland, the Netherlands, Norway, Sweden, and the UK was performed. The study, comprising more than a thousand manufacturing business units, was undertaken by the CINet and the Innovation & Continuous Improvement Technologies Research Centre (InCITe) at the University of Western Sydney, Macarthur, Australia (Boer et al, 2000).

The survey of 1995 has shown us that for the Dutch industry, CI was a relatively new phenomenon that had a rapidly growing number of companies looking at this concept with more than average interest. That implementation of CI was partly driven by market demands, and especially costs, delivery reliability were important motivators. Secondly, the survey showed us that the tools and techniques, which were perceived as valuable, often actually received limited use, and those that are used are fairly simple process-related and problem identification tools (Gieskes et al., 2000; Gieskes et al. 1996).

The School of Business, Public Administration and Technology of the University of Twente conducted the CINet survey 2003 in the Netherlands. The questionnaire was translated from English into Dutch. In total, 499 questionnaires were sent out in the Netherlands of which 51 questionnaires have been returned in a workable form. This is a response rate of 10%. The reason for this low response (compared to the response rate of 40% in 1995) is (partly) explained by the kind of research, the time-consuming questionnaire, and the fact that companies in the Netherlands complain about the amount of surveys they receive. There has been no evidence that organisations in the Netherlands are less interested in CI.

3. BACKGROUND AND GENERAL CHARACTERISTICS OF THE ORGANISATIONS

The companies in the survey represented different branches and there is a broad coverage of industries in the Netherlands (See Figure 1).

The majority of the sample are independent companies (72%); the average turnover is 26.5 million USD, the average number of employees is 143. The main function of the companies is production. Functions that also have been identified by the companies as important are Logistics/Distribution and R&D/Product design/Product development.

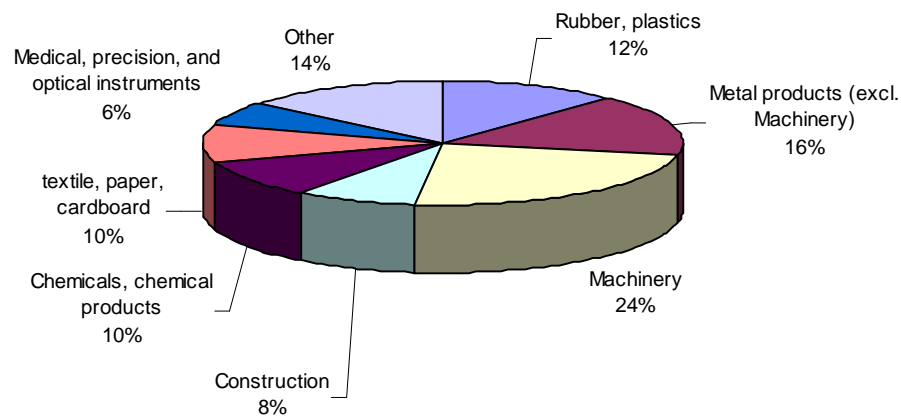


Figure 1: Sample breakdown according to the type of industry

As Figure 2 shows, the most important product lines are high volume/high mix (34%) and low volume/high mix (33%). High volume/low mix and low volume/low mix score respectively 25% and 8%. This distinction is relevant, because volume and mix make high demands upon the product and production flexibility, and consequently the design and content of CI.

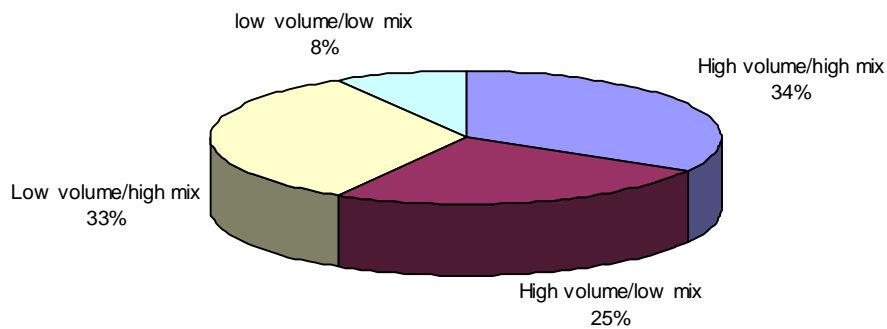


Figure 2: Product line

The companies described the production system for their most important production line as line production (30%), batch production (24%), project (24%), continuous (16%), and job shop (6%).

If the companies should describe their order-fulfilment practice, they indicate produce to customer order (40%) and deliver from stock (27%) as the best description for their most important product line.

As Figure 3 shows, the companies indicated that the indicators price, product design, time-to-market and delivery reliability had increased in importance over the previous three years. The results of product design and time-to-market are notable. Although a large group of companies indicated these indicators had become more important, several companies stated that these indicators had become less important. This is notable, because competitive pressure causes companies to innovate in the global knowledge economy and stay competitive. Indicators that had become less important are order size flexibility, product customisation and environmentally-sound products.

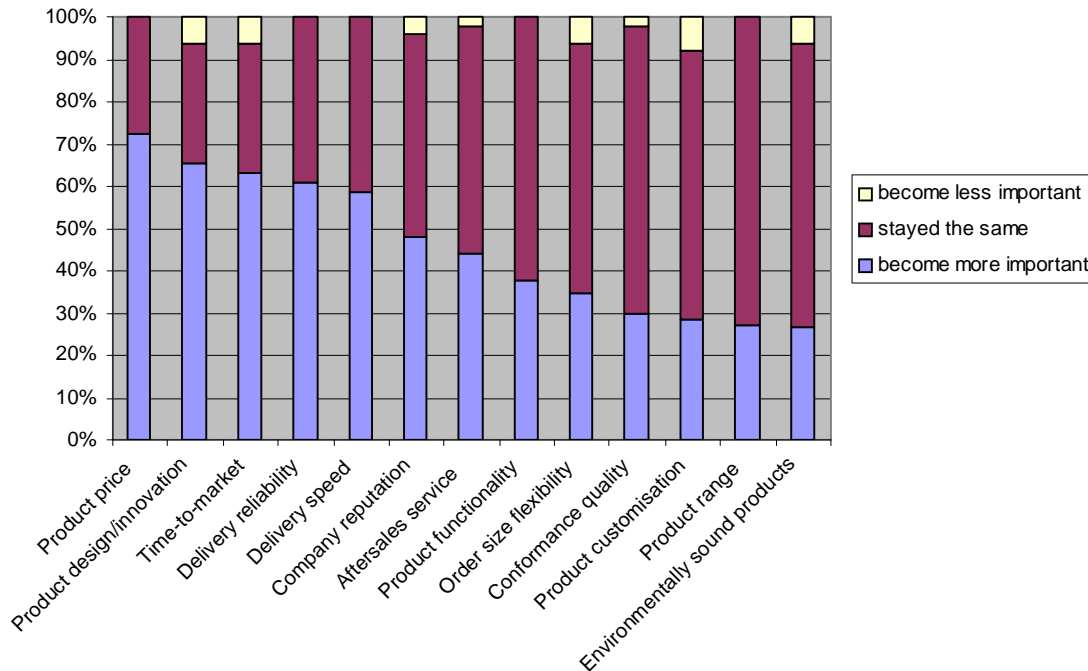


Figure 3: Change in importance of indicators over the last three years

4. THE ORGANISATION AND OPERATION OF CI

Companies in the Netherlands have already, for a long period of time, been actively engaged with improvement activities. The results of the survey showed two peaks which indicated a lot of companies became actively engaged in CI. The first peak, in the early '90s, can be explained from a historical perspective due to increased interest in the Netherlands in the ideas of Imai (1986) and the founding of the Institute of Dutch Quality in 1991 on the initiative of the Ministry of Economic Affairs. The second peak, around the year 2000, can be explained by increased attention of companies in the INK-management model (source: www.ink.nl) and ISO9001.

Improvement activities within companies in the Netherlands are widely spread throughout the whole organisation. As stated before in this paper, CI is, by many companies, seen as vital in today's business. The high score of the managing director/management team with regard to

how widely spread improvement activities are represents the strategic importance of CI in today's business environment.

Improvement activities are carried out during regular working time (98%) and during unpaid overtime (2%). These activities are carried out in ordinary meetings of cross-functional CI teams (27%) and in meetings of regular work teams (26%). To a lesser extent these activities are carried out in spontaneous meetings (17%), by individuals (17%), and in special meetings (13%). Apparently, CI is regarded as a regular activity.

As Figure 4 shows, the most important motives for working with CI were higher customer satisfaction (85%), increased productivity (82%), improved quality conformance (81%), and improved delivery reliability (79%).

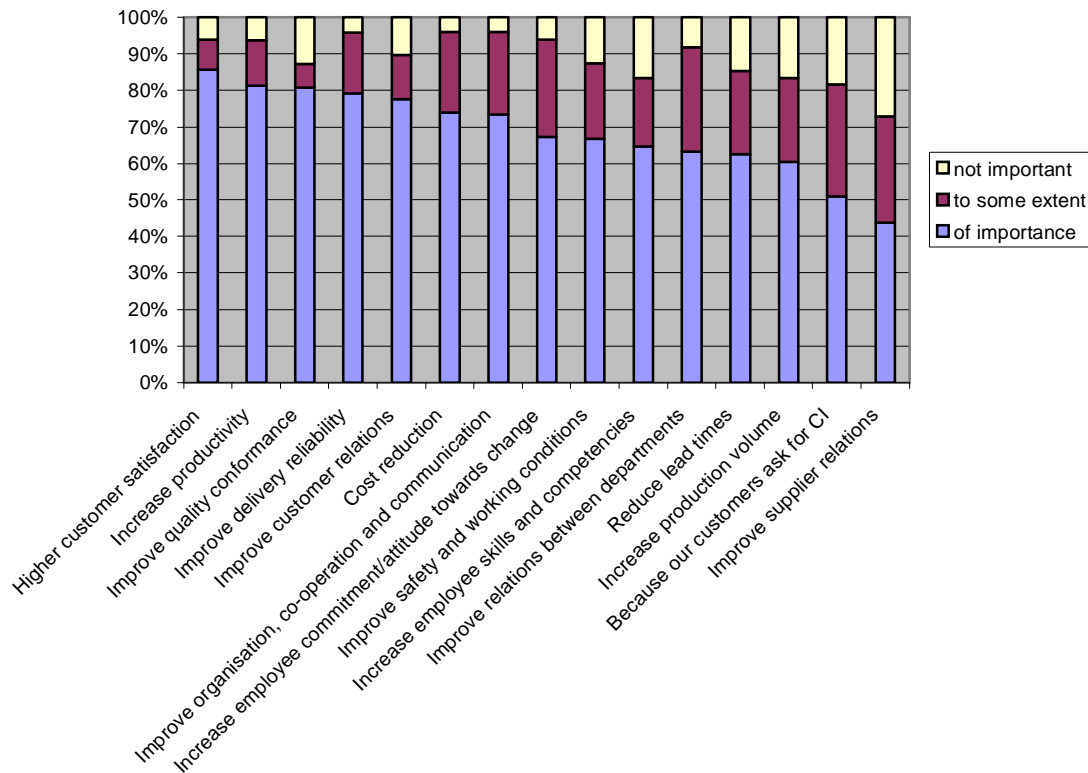


Figure 4: Main motives for CI

Figure 4 corresponds, in general, to the main indicators as depicted in Figure 3. Notably, cost reduction is not seen as one of the main motives for CI, whereas product price is one of the most important indicators.

Although CI seems to be a very simple and attractive concept, it appears to be difficult to implement. The general experiences with improvement activities indicate that spreading change efforts to other departments/units (52%) and raising sufficient resources for CI activities (48%) ranged from difficult to very difficult for the companies. Initiating concrete changes (31%) and aligning CI activities and overall business strategies are, relatively speaking, easier.

The most frequently encountered problems in implementing improvement activities were not enough time, not enough knowledge/capabilities/experiences, insufficient performance measures, and lack of goal clarity or ambiguity. Companies experienced that aligning CI activities with the overall strategy was relatively easy and the results of the survey showed that there was an increased attention of management in CI. Nevertheless it appeared that there were frequent problems in the implementation of improvement activities.

In relation to CI activities, there appears to be a great distinction between individual learning and organisational learning. In the survey a number of statements with regard to learning were listed. The results showed that individual learning, as part of the improvement activity, were sufficiently present in the organisations, although it did had to be stimulated and facilitated by the organisation. Stimulation and facilitation was particular important in terms of spreading change efforts through the organisation and learning from each other. Organisational learning appeared to be “bridge too far” in terms of the sharing of improvement experiences by individuals and groups. Especially, the institutionalisation of improvement and learning experiences in the organisation and improvement system was lacking behind.

5. SUPPORT FOR AND TOOLS USED IN IMPROVEMENT ACTIVITIES

The most important means, according to the companies in the survey, for establishing incremental improvement are supportive leadership (96%), support from managerial staff (92%), regular shop floor visits by management (90%), monitoring the improvement activities (88%), face-to-face communication (86%), training of personnel in problem solving tools (82%), a general problem solving format (82%), and work in teams/work groups (78%). Means that are not regarded as important are promotion through competitions and awards (6%), quality awards (16%), and incentive systems (19%). If we compare the values of the importance of a certain mean with the usage of the same mean in the companies, some interesting results are shown (see Figure 5).

Group 1 in Figure 5 indicated a group of means (i.e. promotion through competitions and awards) that were perceived as less important and usage is rarely. Group 2 were the most important means that were frequently used. In general, it appeared that the usage of the means in establishing incremental improvement were lacking behind the perceived importance of the same by the companies. However, there were two exceptions. The mean “use of ISO9000/2000, or any other quality standard” (see point 3) was very frequently used in establishing CI compared to the importance of the mean. The mean “training of personnel in problem solving tools” was perceived as important in establishing CI, but the actual usage was rare compared to the other means with the same score on importance.

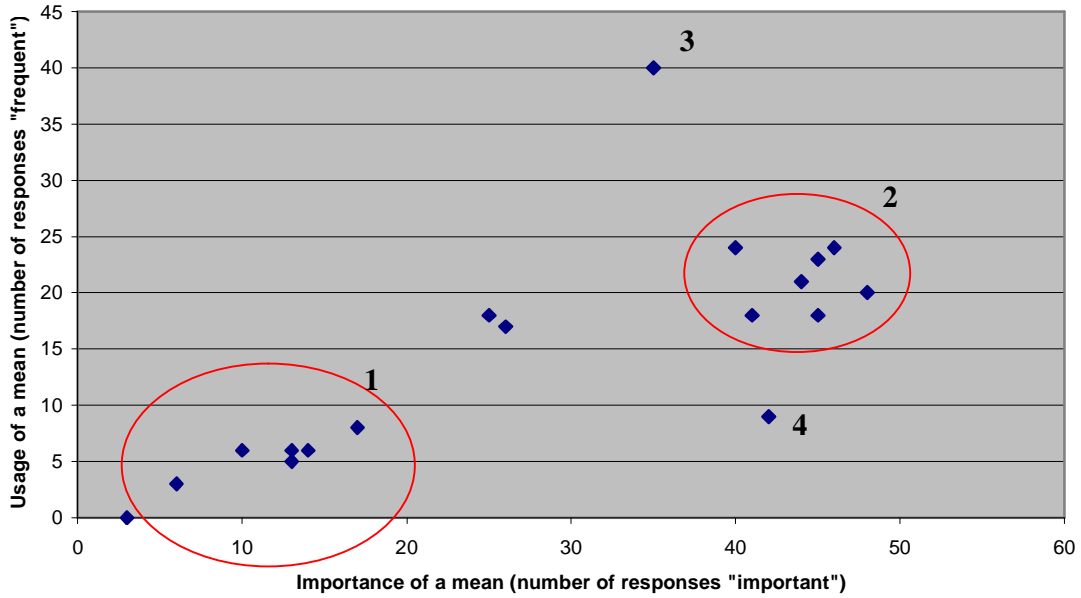


Figure 5: Scatter diagram importance/usage of means for establishing incremental improvement

As Table 1 shows, the incentives that were perceived as less important in companies were used rarely. Despite the notion of the importance of incentives in establishing CI, both in practice and theory, incentives were not a structural part of the design and implementation of CI in the Netherlands.

| | Importance (Percentage response "important") | Usage (Percentage response "rarely") |
|--|--|--|
| Suggestions are evaluated and rewarded | 43% | 70% |
| Improvement results are rewarded directly through one off bonuses | 24% | 86% |
| Improvement results are rewarded indirectly through individual salaries | 20% | 71% |
| Improvement results are not rewarded monetarily, but through development of individual job, careers etc. | 47% | 49% |
| Improvement results are rewarded to entire teams | 59% | 61% |

Table 1: Importance/usage of incentives in establishing CI

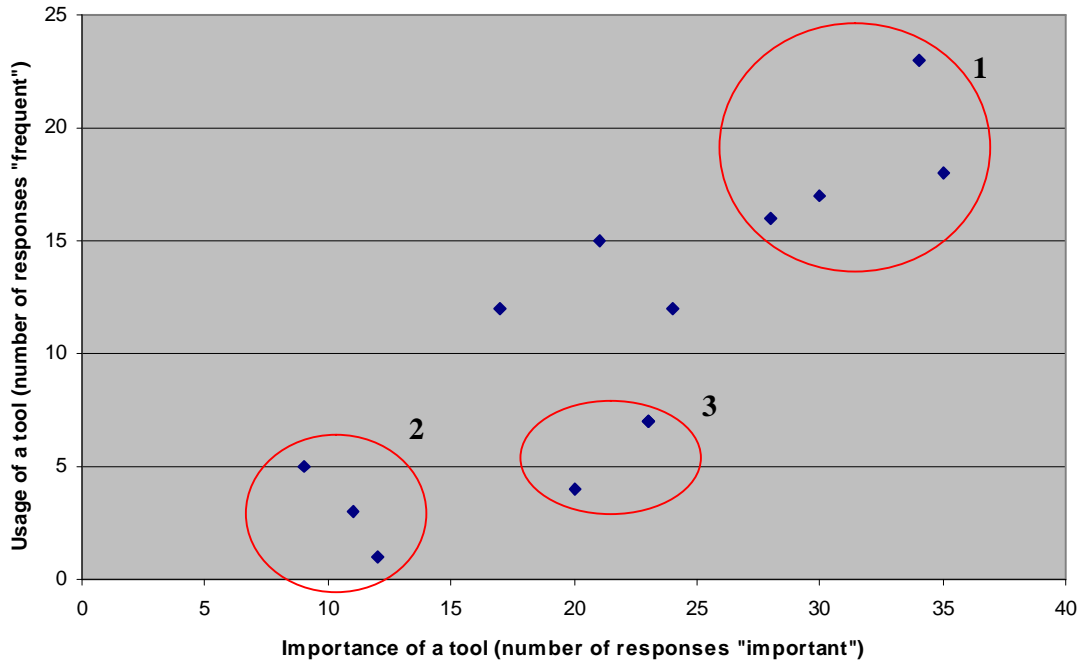


Figure 6: Scatter diagram importance/usage of tools for establishing incremental improvement

The most important problem finding and solving tools (see also Figure 6) were problem identification tools/checklists (70%), process mapping tools (68%), display/visualisation tools (60%), and 7 basic quality tools (56%). Less important tools were simulation (19%), Six Sigma (23%), and QFD (26%). The four most important tools were used most frequently (see Group 1 in Figure 6). The tools that were used rarely are also perceived as less important tools in establishing CI (Group 2). The exceptions in this Figure were the tools creativity tools/idea generation tools, FMEA, and 7 “new” quality tools (Group 3), which were perceived as important but the usage of the tools by the companies compared to the other tools was lower in the Netherlands.

6. THE EFFECTS OF IMPROVEMENT ACTIVITIES

Companies in the Netherlands rated the overall importance of continuous improvement as vital for their business (26%). 47% of the companies rated the overall importance of CI as of strategically important and 27% as of operational importance.

As Figure 7 indicates, over the last three years CI contributed to the highest extent to areas of improved quality conformance, improved customer relations and improved delivery reliability. A Comparison between Figure 4 and Figure 6 shows some similarities. Higher customer satisfaction, improved delivery reliability and improved quality conformance were important motives for working with CI, and, apparently, CI contributed to these performance areas.

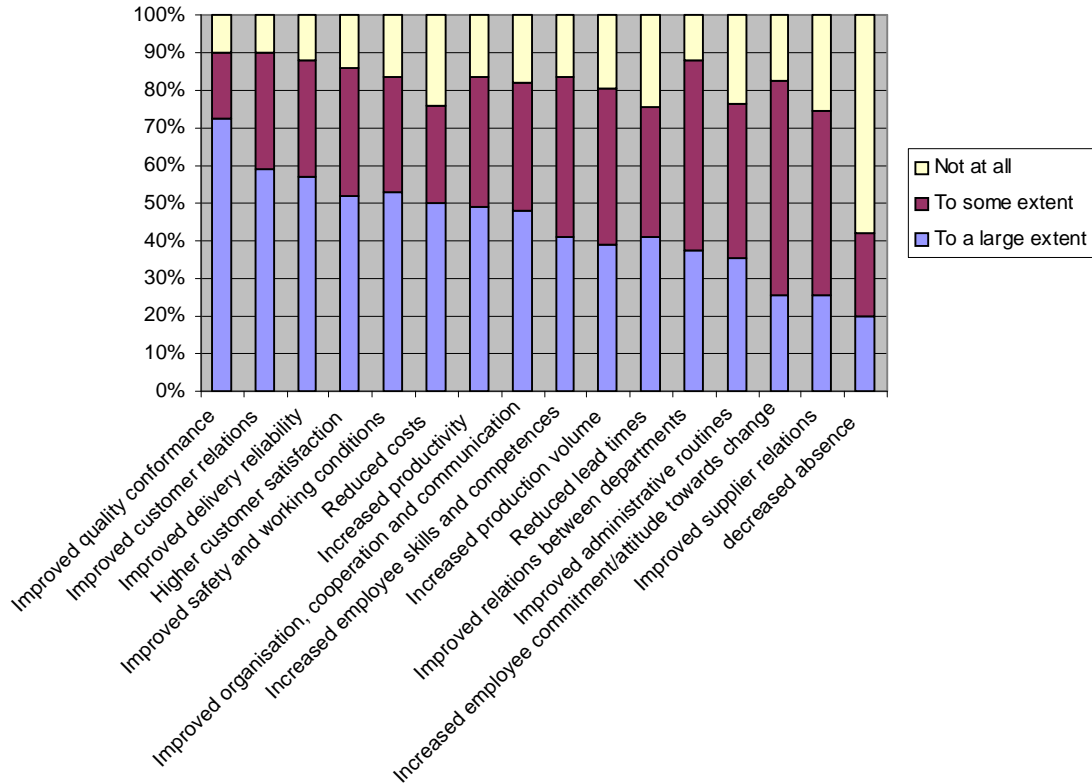


Figure 7: Contribution of CI to performance areas

Performance areas to which CI hardly contributed over the last three years were decreased absence and improved supplier relations. These areas were not depicted in Figure 4 as main motives for working with CI.

7. CONCLUSIONS AND FUTURE RESEARCH

The survey presents a picture of current practices with CI in the Netherlands. From the survey it can be concluded that implementation of CI seems to be relatively simple, it appears to be difficult to design, implement and develop successfully. Customer satisfaction, productivity, quality conformance and delivery reliability are important motivators to start working with CI. However, implementing CI can be fraught with difficulties. Lack of time, lack of knowledge/capabilities/experiences, ambiguity, and insufficient performance measures were the most frequent one. These four problem areas correspond with the disablers of learning in product innovation, as identified by Gieskes (2001). Apparently, the four problem areas can be characterised as being necessary conditions for a successful implementation of CI.

The key to CI is development and learning (Boer et al., 2000). The survey indicated that individual learning was sufficiently part of improvement activities, although it had to be stimulated and facilitated, but organisational learning is a “bridge too far”, especially in terms of sharing, diffusing and institutionalising improvement and learning experiences. Facilitation and stimulation by companies of individual and, especially, organisational learning was necessary and even required to ensure successful CI.

It appeared to be difficult for companies to design and implement an approach towards CI that is in line with their own perception of what is important and what not. Often the means and tools for establishing CI that were perceived as important have limited use. The same conclusion can be drawn with regard to incentives for CI. Although literature on CI indicates that a supporting reward and incentive system is a key aspect of CI (Boer et al., 2000), there is still a limited use of incentives in practice.

The survey indicated that CI had become more important on a strategic level. However, ambiguity and the lack of performance measures are frequent problems which are encountered in the implementation of CI. As a consequence, companies should develop a clearer and more consistent top-down approach towards CI.

Definitions with regard to continuous improvement often implicated that CI is an integral part of the daily work practices. In general we can conclude that the companies in the Netherlands perceive CI as a more integral of their business. However, this survey showed that this perception might be a bit too optimistic, due to lack of resources, organisation learning as a bridge too far, goal ambiguity and insufficient performance measures, and discrepancy between importance and usage in terms of incentives, means and tools. There is great potential for CI in several areas to which CI can and has significantly contributed.

In literature several key aspects of CI are mentioned (Boer et al. 2000; Rijnders, 2002). Although these aspects have been indicated as key in literature on CI, the findings of this survey show that these aspects also cause most of the difficulties in the design, implementation and development of successful CI.

Although this paper has presented and described practice of CI in the Netherlands, there are still three pointers of future research, which need to be addressed:

- The CINet 2003 survey has been to some extent a replication of the original survey. Further analysis of the findings and comparison between both surveys is required to gain insight into and develop and understanding of the evolution of CI-practices in the Netherlands over the past years.
- A central idea to the activities of the CINet community is learning from previous and collaborative work. As such, it is required to share and analyse the findings of all the CINet surveys of the participating countries in order to develop and test theory and models on CI.
- A continual assessment of CI-practices and trends within practice and theory in order to contribute to the concept of CI. Based on the continual assessment in the field of CI, existing theory will be challenged, tested and add upon, and, implications and recommendation for managerial practice can be further formulated.

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