

BALANCED SCORECARDS FOR A STRATEGIC AND SUSTAINABLE CONTINUOUS IMPROVEMENT CAPABILITY

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ABSTRACT

In this article we illustrate how strategic continuous improvement (CI) capabilities were developed in three Swedish manufacturing companies that have implemented Balanced Scorecard (BSC). A multiple case study was conducted; each company followed a unique team-based CI strategy. We show how the use of BSC was adapted to the specific characteristics that each of the CI strategies entail. Furthermore, we show that it could be difficult to sustain the capability that was developed. However, we also found that certain mechanisms in the management control system, as well as the presence of an advanced work organisation, may help in sustaining the strategic CI capability.

INTRODUCTION

The importance of developing a strategic continuous improvement (CI) capability in manufacturing companies has clearly been articulated in contemporary resource-based strategy theory research. An example is the five-level evolutionary model of CI behaviour developed by Bessant and others, which describes particular patterns that confer competitive advantage (Bessant et al., 2001). Table 1 presents the model in brief.

Stage of development	Characteristic behaviour patterns
Level 1: Trying out the ideas	Problems are solved randomly; no formal structure for improving the organisation; no strategic impact on human resources, finance or other measurable targets; staff and management unaware of CI as a process; focus on short-term benefits.
Level 2: Systematic CI capability	There is a formal commitment to building a system which will develop CI across the organisation; staff use structured problem-solving processes; training in CI tools.
Level 3: Strategic CI capability	All of the above, plus: Policy deployment links local- and project-level CI activity to broader strategic goals; monitoring and measurement of CI against these goals; CI activities are an integral, rather than parallel, part of individual and group work.
Level 4: Proactive CI capability	All of the above, plus: There is an attempt to devolve develop autonomy and to empower individuals and groups to manage and direct their own processes.
Level 5: The learning organisation	All of the above, plus: Extensive and widely distributed learning behaviour; systematic finding and solving of problems as well as gaining and sharing of knowledge

Table 1. Stages in the evolution of CI (Bessant et al., 2001). Progression from level two to level three is emphasised in this article.

Progression towards a true learning organisation involves adding new routines to the core set of behavioural patterns. However, it seems that the key transition that many companies find difficult in their CI journeys is the one between Level 2 and Level 3; that is, moving from a systematic approach to CI to one that brings a strategic focus to bear (Bessant and Francis, 1999; Kerrin, 1999). This issue has also been reported from Sweden. Researchers at the Swedish National Institute for Working Life state that in order to develop good working conditions and

simultaneously improve the competitiveness of the Swedish engineering industry, companies must develop strategic CI capabilities by aligning CI in production teams to the overall strategic planning of the company (Nilsson, 1999). Unfortunately, this is not the case in general, which results in a lack of support and resources for the teams. Another aspect of the problem is that top management does not exploit the local and operational knowledge base in order to further improve the company's competitiveness.

Balanced scorecard (BSC) is a new approach for strategy development and deployment that has entered the management scene during the last decade. It is well described in several publications by its originators (e.g., Kaplan and Norton, 1996; 2001). In brief, BSC is a multidimensional approach to performance measurement and management control that is linked specifically to organisational strategy. One of the major strengths is the emphasis it places on linking performance measures and action plans at all levels with business unit strategy. Since the diffusion of this management innovation in Sweden is rather high (Ernst & Young Management Consulting, 1998; Kald and Nilsson, 2000; Olve et al., 1999), we decided to investigate its potential. Our specific research interest was the above-stated problem of companies that fail to exploit their operational knowledge base to improve competitiveness by linking CI efforts in production teams to the overall strategic planning of the company.

The overall purpose of this article is to illustrate how a strategic CI capability have been developed in three manufacturing companies that have implemented BSC. Besides the fact that BSC may support the development of a strategic CI capability, there are three reasons for exploring the use of BSC in manufacturing. First, the high rate of diffusion. Research estimates the use of BSC or similar approaches within the Swedish engineering industry in general at 28% in 1999 (Bengtsson et al., 2000). Secondly, there are very few empirical studies that explore and illustrate in detail how BSC is implemented and used. In particular, cases where the concept is implemented at top management level as well as at the operational level in manufacturing are hard to find (Lundahl and Ewing, 1997). Thirdly, there is a significant request for further research on the concept in use. As examples, Witcher and Butterworth (2001), as well as Malmi (2001), point to the interface between total quality management (TQM) and BSC as a prioritised future research area. There has also been a request for further research on BSC applications in different contextual situations (Hoque and James, 2000; Ittner and Larcker, 1998; Otley, 1999).

CONCEPTUAL FRAMEWORK AND RESEARCH QUESTIONS

This study is based on five conceptual premises. First, the categorisation of team-based strategies in the Swedish engineering industry. Lindberg and Berger (1997) have recognised a distinction between three different team-based strategies for designing, organising and managing systems for CI in the Swedish engineering industry. These are the expert task force, organic and wide focus CI strategies. They differ according to the degree of managerial emphasis on controlling content, process or goals. In companies that have adopted the expert task force strategy, CI tasks are carried out in projects that are mainly staffed by professionals from engineering, etc. Production team members participate, but only to a limited extent. Management defines by whom and when (process) and what (content) activities should take place. In the organic strategy, it is the production teams that carry out the CI work, while management controls the CI work by setting business-related goals. The wide focus strategy is a combination of the previous two. Both experts and production teams carry out the CI work; process, content and goals are predefined.

However, the work of Lindberg and Berger (1997) only describes how a structured and systematic approach to CI can be established. Their research does not consider the problematic issue of progression to the third level identified by Bessant and others, i.e., establishing a

strategic CI capability. The key behavioural patterns of this third level are our second conceptual premise of this article and may be found in Table 1.

Our third conceptual premise concerns management control systems for implementing the above-mentioned behavioural characteristics of the third CI level. As mentioned in the introductory section of the article, we have chosen to limit our work to BSC. Previous research points towards two significantly different approaches to implementing and using BSC (Lundahl and Ewing, 1997). On the one hand, there is the centralised approach, which is closely related to Kaplan and Norton's original idea, where BSC is mainly a tool for top management to communicate centrally formulated strategies down through the organisational hierarchy. On the other hand, there is the decentralised approach, where the intention is to implement a development tool that permits front-line production teams to formulate their own strategies and objectives, which are formalised in a team scorecard. These scorecards are not strictly tied (aggregated) to other scorecards, but related to the overall company scorecard and strategic planning. The design supports front-line teams in their daily work, as their role changes when companies become more process-oriented and thereby emphasise horizontal dimensions of control to a greater extent.

A great deal of the deeper understanding of the decentralised BSC implementation approach comes from Lundahl and Ewing's (1997) case study at ABB Control in Sweden. This plant was also studied in the project reported in this article. However, local work on CI in relation to the implementation and use of BSC has not been explored before. Based on these first three theoretical premises, our first research question was:

- How can the interface between the various team-based CI strategies and the implementation and use of BSC be described in companies that have developed strategic CI capabilities?

Our fourth conceptual premise concerns the need to design management control systems according to a different logic at the management level as compared to at the operational level, in order to sustain the developed strategic CI capability over the years. Work tasks, information needs and learning processes at the two levels are different, and disregarding these differences in the implementation and use of BSC might create a lack of commitment to strategy among organisational members in the long run (de Haas and Kleingeld, 1999; Jönsson and Grönlund, 1988; Meyer, 1994; Nilsson and Rapp, 1999; Norreklit, 2000). Our literature review suggests that this implies that the management control system should be highly adaptable, which is a question of using a frame of reference that is only partially common to the two organisational levels, in order to create a meaningful dialog between them. This brought us to our second research question:

- What particular mechanisms feature the use of BSC, with regards to differences in needs between the management and operational levels, at companies that have sustained their strategic CI capability?

Our fifth conceptual premise claims a relationship between the work organisation at the operational level and CI. We have chosen to elaborate this issue further with regards to developing and sustaining strategic CI capability because of two main reasons: motivation to improve work processes and opportunities for learning. First, it is not enough to have systems and structures that align the local work on CI to the overall strategic plans of the company, there is also a need for employees at the operational level that are motivated to drive the CI work forward. Work redesign theory specifies that motivation to continuously improve processes at the operational level is strengthened when the work itself is meaningful, when front-line workers have considerable autonomy in determining the means by which the work is accomplished and when they receive feedback on their work outcomes (Hackman and Oldham, 1980).

The second main reason why we adopted the fifth conceptual premise is related to learning: in addition to motivated employees, we maintain that the work itself must provide for learning opportunities. One important feature of the BSC formulating process according to Kaplan and Norton (1996) is the provision of opportunities for double-loop learning to the participants, due to the continuous questioning of business fundamentals when developing new strategies, objectives, actions and measures. Previous research shows that semi-autonomous, target-oriented teams with extensive work content are more capable of double-loop learning than teams in a less advanced work organisation (Kock, 2002). The above-mentioned two reasons related to motivation and learning both sharpen the relationship between the work organisation and CI and bring us to our third and final research question:

- What role have the features of the work organisation at the operational level played in developing and sustaining strategic CI capability?

METHODOLOGY

A multiple case study was conducted at three engineering industry companies in Sweden that manufacture heat transfers (Sapa Heat Transfer), bearings (SKF) and low-voltage apparatus (ABB Control), respectively. We used two criteria in selecting the companies, based on our conceptual framework and research questions. First, all three of Lindberg and Berger's (1997) team-based CI strategies should be represented. Second, both of Lundahl and Ewing's (1997) BSC implementation approaches should be represented. It is important to note that we visited several more companies (including manufacturer/assemblers of car body components, buses, gas turbines and radio base stations) that met our two criteria prior to finally selecting the above-mentioned three companies. However, we only found three CI-BSC combinations among the visited companies (Table 2). The chosen three case companies are regarded as "best cases" in terms of contributing to our knowledge, as well as illustrating each identified combination.

	Expert task force CI strategy	Wide focus CI strategy	Organic CI strategy
Centralised BSC approach	Sapa Heat Transfer	SKF	
Decentralised BSC approach			ABB Control

Table 2. Case study design. Lindberg and Berger's (1997) typology of team-based CI strategies in interaction with Lundahl and Ewing's (1997) approaches to implementing BSC.

The main source of data was a set of recorded interviews with open-ended questions that reflected the conceptual framework used. As an example, the work of Bessant and Caffyn (1997) as well as Bessant and others (2001) was used to assess if the companies had developed strategic CI capabilities. Each company was visited on several occasions prior to the spring of 2002, since we wanted to study how such a strategic CI capability was to be sustained over the years, not only how it could be developed. In addition to production managers, white collar workers close to production, operators and union representatives were interviewed. This way we got a clearer and more balanced picture and also captured differences in needs between the management and operational levels at the companies.

AN EXPERT TASK FORCE CI STRATEGY IN SYMBIOSIS WITH A CENTRALISED BSC IMPLEMENTATION APPROACH – THE CASE OF SAPA HEAT TRANSFER

Sapa Heat Transfer is a division of an international industrial group that produces aluminium strips and sheets for heat transfer applications. It has 480 employees, of which 360 are blue collar workers, and the most typical machine operations are rolling mills and slits.

The company has organised the systematic CI work in line with the expert task force strategy by carrying out this work in temporary projects that are either cross-functional or functional. The

cross-functional ones are usually quite extensive and have a greater impact on productivity and efficiency. The majority of the project members are white collar workers, but operators participate too. The participating operators are appointed by the project leader in order to ensure shop floor experience.

The company followed a centralised approach to implementing BSC in 1998. Three levels were chosen: the company level, functional level (e.g., manufacturing) and the operational level. The scorecard at the company level is revised every year by the management team and comprises strategic objectives, measures and actions from the financial, customer, process and employee perspectives. The manufacturing scorecard is revised by the manufacturing manager in co-operation with the front-line supervisors. This scorecard is intimately related to the overall company scorecard. The measurements are almost identical, and the amount that a target met on the lower level would contribute to the target set on the company level is explicitly formulated. The scorecards on the operational level are developed by the front-line supervisors. These scorecards are linked to the manufacturing scorecard in the same fashion. Workers do not participate in formulating the targets but are informed of target levels, etc.

The CI-BSC link is made through the actions in the scorecards, namely by making each action a CI project. The cross-functional CI projects are explicitly linked to the company's overall scorecard and the intra-functional projects are explicitly linked to the manufacturing scorecard. The emphasis when controlling CI is on content and process. This is accomplished by the management personnel specifying what should be done and also by selecting participants for the projects, as well as specifying the time constraints. This way, management uses BSC to focus and prioritise among actions, and CI activities at the company are being strategically aligned.

Towards a common strategic frame of reference

Since the company depends on management's ability to identify potential areas of improvement as well as to drive the CI work forward via detailed control of content and process, front-line commitment has so far not been an issue. On the contrary, this one-way approach of implementing BSC (i.e., satisfying the needs of management only) seems to be consistent with the chosen CI strategy. However, the chosen CI-BSC approach is not totally flawless, according to the interviewed manufacturing manager. While he maintains that the company's approach to continuously improving the processes at this plant is rather adequate, he also states that in order to further improve their competitiveness in the future by increasing the pace of innovation, they have to make the most of the situation by engaging far more people in both the CI work and the strategy formulating process. The manager's ambition for the future is that operators on the shop floor will initiate and push the CI work forward to a greater extent. A prerequisite for the latter would be, according to him, "*...that we define the strategic frame together and that the production teams paint the picture themselves...*".

Less advanced work organisation consistent with expert task force CI strategy

A light version of team-based work features the work organisation at present in terms of co-operation and administrative work. The work is usually carried out independently by a single operator without much interaction with others. Moreover, tasks such as detail planning, maintenance and quality are not delegated to the teams. The operators meet regularly and have common goals, yet as indicated above, they are not systematically involved in formulating these. Our interpretation is that the chosen type of work organisation is consistent with the expert task force strategy, since front-line operators are not expected to contribute yet to the strategic CI capability on their own initiative.

A WIDE FOCUS CI STRATEGY IN SYMBIOSIS WITH A CENTRALISED BSC IMPLEMENTATION APPROACH – THE CASE OF SKF

The studied SKF plant is part of a global corporation and manufactures standardised bearings for the world market. There are about 150 employees, of which 120 are blue collar workers. The manufacturing is organised in product-oriented production lines. Each production line is run by a target-oriented production team of about six persons, supported by two technicians.

A wide focus CI strategy is adopted. There are continuous improvement teams (CI teams) that meet once every second week for two hours between two shifts. All operators participate and those operators that carry out the same kind of operations form a CI team. A white collar worker coaches the meetings and takes the role of catalyst. However, it is the CI teams themselves that are responsible for problem identification, prioritisation, action plans, measurements and follow-up of CI activities. The activities are handled as projects, which could last from one month up to one year. Besides the CI teams there are expert teams as well, operating at the plant level. However, these are omitted here since they are rather similar to the ones described in the preceding Sapa Heat Transfer case.

Since 1998, the plant has used BSC to formulate and communicate strategic targets. The concept was implemented on three hierarchical levels: the plant, the production line and the CI team level. The scorecards are revised every year. The scorecard at the plant level is revised by the management team every year and comprises strategic objectives and measures from financial, customer and process perspectives. The production line scorecards are developed and revised by the production line managers and are intimately related to the company scorecard. A majority of the measurements are identical and the amount that a target met on the lower level will contribute to the target set on the company level is explicitly formulated. The scorecards on the third level concern the CI teams' proposed CI actions and measures.

The explicit link of activities in the CI teams to the production line scorecard is done in a target-oriented fashion. As mentioned above, the activities that the CI teams carry out are identified by the operators themselves. These must, however, be approved by the production line manager. As long as the team can link the specific CI activity as well as approximate its contribution to the production line scorecard, the work can continue. The reasons, according to the production line manager, are twofold. Firstly, when the CI teams have their meetings, production is stopped, which affects productivity. Secondly, the solutions often entail investments; in order to invest financial resources in an activity, the solution must contribute to the overall strategic planning of the company. In this case, the BSC is mainly a tool to prioritise among, allocate resources to and co-ordinate local CI efforts.

Balance between management orientation and operational orientation, through dialog and different measures

Right from the beginning of implementing BSC at this plant, the overall management control system has had an ability to balance the needs of management as well as the CI teams respectively in developing and sustaining the plant's strategic CI capability. On the one hand, there is a vertical top-down dimension of control where the CI teams do not have a say, which is difficult to avoid when following the centralised implementation approach. On the other hand, there is a horizontal operative dimension of control, where the teams play a key role by identifying the particular areas to improve. The enabling mechanism that aligns the vertical and horizontal dimensions of control is the dialog that takes place when the CI teams have to specify the contribution of their proposed activity to the production line scorecard. For example, the production line scorecard parameter "efficiency" does not mean much to a front-line worker. But the CI team scorecard parameter "number of bearings with spiral marks on the surface" is one

that the teams understand, since they have identified the improvement activity as well as the parameter to monitor. Thus, different measures are in use at the management level as compared to the operational level, creating meaning for both parties.

An advanced work organisation facilitates the development of adequate CI team actions and measures

Ten years ago, first-line supervisors at the studied plant were discarded in favour of an advanced team-based work organisation. The supervisors' work tasks were split between the production line managers and the teams. Each team now has four appointed specialists, responsible for logistics, quality, human resources and engineering, respectively. The persons that occupy these roles co-operate with staff at the corresponding department at the plant. Furthermore, the teams are responsible for their internal work scheduling, ordering of material and quality assurance, and all team members are capable of carrying out the constituent operations of the line.

The overview of the entire line, as well as the responsibility and powers to act that the work organisation permits, creates a deeper understanding of the business operations among the workers. This understanding forms the basis from which to develop the actions and measures to monitor. It also provides a basis for arguments used during negotiations with the production line manager, when the CI teams have to match their suggested activities to the production line scorecard. Thus, one key facilitator for the ability to link local CI work to the overall strategic planning at this plant is the advanced local work organisation.

AN ORGANIC CI STRATEGY IN SYMBIOSIS WITH A DECENTRALISED BSC APPROACH - THE CASE OF ABB CONTROL

ABB Control is a unit within a multinational corporation in the electrical engineering industry that manufactures various kinds of low-voltage apparatus. Between 1990 and 1993, when the corporation launched a customer focus program that aimed at reducing all lead times by 50%, operations at this plant were thoroughly process-oriented and organised in target-oriented teams.

Since the target-oriented teams are responsible for almost all operations from order to invoice, an organic approach to CI was chosen. The teams initiate the plan-do-check-act cycle themselves every time an improvement area is identified. There are specialist roles in the teams to handle team co-ordination, capacity planning, purchasing, quality, production engineering, human resources and budgeting. Often it is these specialists who identify areas to improve. Best practices are shared at the plant during regular meetings when all specialists within an area see each other. The specialists are supported by functions such as production engineering. However, these are contacted only if needed from the team's point of view, since the CI work mostly does not require decision-making by authorities outside the group.

In 1994, a new project was launched to integrate the customer focus program with the management control system. The aim was to provide the target-oriented teams with a system that supported them, since their role in continuously improving the production processes was clearly recognised. A BSC model inspired by Kaplan and Norton (1992; 1993) was developed. The resemblance to the model was in many respects strong, but there were also striking differences. Target-oriented production teams on the shop floor developed their own scorecards with the vision and strategies of the company as a point of departure. It is important to note that these team scorecards were derived from the vision and the strategies of the company, but not from the measures as was the case in Kaplan & Norton's original model.

Most important though, with regard to the purpose of this article, a new level of questions was added, namely that of "What actions should we take to realise the critical success factors?" One

of the action researchers who participated in the BSC project at this company claims the following in a working paper from 1996 (Ewing, 1996): *...this addition was the result of different tests in target-oriented teams. It became evident that the step from “critical success factors” to “measures” was too big for ordinary employees of the teams. They needed something very hands-on to link the often to them “fluffy” strategies and success factors to their daily operations. When the outcomes of the measures were discussed in periodical meetings with the whole team, these were related to the action plans agreed on for the period. This discussion also formed the starting point for the discussions and agreement for the next period’s action plans and targets...*

The above quotation illustrates the essentials of the CI-BSC interface when an organic CI strategy is used in combination with a decentralised approach to implementing BSC, since the action plans in the teams’ scorecards were CI activities. Thus, BSC was used as a tool for strategy implementation at the team level, linking overall strategies to actions at the front-line of the organisation. During interviews in the early phase of developing this strategic CI capability, respondents claimed that implementing BSC brought a common focus within the team to prioritised areas, as well as a continual matching of resources to the areas where they were most needed.

The other face of commitment - sustainability through management orientation!

When we returned in January 2002 during our last round of interviews, BSC was only in use in one target-oriented production team at this company. Since previous observations had indicated that the implementation and use of BSC could be developed into one mechanism that facilitated a strategic dialog between the management and the operational level, we were surprised. Interviews pointed towards the following explanation. In the end, most of the team scorecards made no sense to management, so they let the system die out by itself. In more exact words, management’s point of view was that since the team scorecards were derived from an overall vision and the company strategies rather than from concrete measures, the distance between what management and the teams perceived as important became too wide.

However, efforts are now being made to get a similar system back on track. This time, though, the system will be based on the features of the only team-related scorecard currently in use at the company. Thus, scorecards with accompanying measures at the team level will have to be related to the very measures that set the agenda during the management team’s weekly meetings. These scorecards will still be developed by the teams themselves, but the correlation to management’s needs will definitely be stronger than before.

The importance of a consistent, wide and parallel approach to organisational change

One of the most noticeable prerequisites for developing a strategic CI capability at this company was their work organisation. It was characterised by skilled and multifunctional semi-autonomous teams with deep knowledge in their specialist areas. They had the ability to initiate the plan-do-check-act cycle themselves every time an improvement area was identified and they could relate their CI work to the team scorecard. These abilities were enabled by a consistent, wide and parallel approach to organisational change. As examples, not only was BSC implemented in a suitable way for the teams, other related areas such as competence development and information technology (IT) were changed simultaneously. With regards to competence development, the overall company goal was 150 hours per year and person. Furthermore, the leading idea with the BSC IT support tool was user-friendliness and sufficient flexibility in order to be useful in the teams by enabling local variation and adaptations.

DISCUSSION AND CONCLUSION

In this article we have illustrated how strategic CI capabilities were developed in three manufacturing companies that have implemented BSC. Table 3 summarises our findings in relation to our research questions. Further, we discuss how these findings contribute to current theory.

With regards to our first research question, which concerned the CI-BSC interface in developing a strategic CI capability, we found the following. At Sapa Heat Transfer, which combined an expert task force CI strategy with a centralised approach to implementing BSC, management specified the CI activities in detail in centrally formulated scorecards. At SKF, which combined a wide focus CI strategy and a centralised BSC approach, front-line workers in CI teams suggested improvement activities themselves. These would then be matched with centrally formulated scorecard measures via negotiation with the production line manager. At ABB Control, which combined an organic CI strategy with a decentralised BSC approach, each production team developed its own scorecards, where their actions were strategically aligned CI activities.

Unlike Lindberg and Berger (1997), who confined themselves to describing how a systematic approach to CI may be established, we also examined the problematic issue of progression to the third level in Bessant and Caffyn's evolutionary model of CI behaviour, i.e., establishing a strategic CI capability. We found that BSC may serve as an enabler for policy deployment in developing the strategic CI capability and that the use of BSC (i.e., Lundahl and Ewing's implementation approaches) was adapted to the specific characteristics that each of Lindberg and Berger's CI strategies entail.

Our second research question concerned mechanisms that featured the use of BSC in companies that have sustained their strategic CI capabilities. First we would like to suggest, though, that sustaining such a capability through BSC should not be considered unproblematic. Only SKF managed to do this without major difficulties, by balancing top-down and bottom-up dimensions of management control. In contrast, the BSC implementation only satisfied the needs of management in the case of Sapa Heat Transfer, and only the production teams in the case of ABB Control. This imbalance in the management control system created a lack of commitment among production team members at the former and among the managers at the latter. Thus, both front-line workers and managers have to be committed to BSC, which requires addressing both parties' needs in the implementation and use of the concept. This finding supports previous research claiming a need to design management control systems according to different logic at the management and operational level (e.g., Jönsson and Grönlund, 1988).

With regards to mechanisms that have sustained the strategic CI capability, it is too early to say in the Sapa Heat Transfer case. At SKF, the crucial mechanism is the strategic dialog that takes place when the CI teams have to match the contribution of their proposed CI activity to the production line scorecard. At ABB Control, we have been able to observe a shift in emphasis when using BSC, which is related to the above-mentioned commitment issues. The company has followed the same path as SKF has, and this shift in emphasis has been directed towards a point of balance between the management and operational level at the company. The two levels are now developing separate measures that are different from each other but, at the same time, point in one direction. To our understanding the described mechanisms at SKF and ABB Control corroborate current theory that claims a need of using a frame of reference that is partially common to the two organisational levels, in order to create a meaningful dialog between them (Nilsson and Rapp, 1999).

	Sapa Heat Transfer	SKF	ABB Control
How can the interface between the various team-based CI strategies and the implementation and use of BSC be described and understood in companies that have developed a strategic CI capability?			
Continuous Improvement (CI) strategy	Expert task force	Wide focus	Organic
Balanced Scorecard (BSC) implementation approach	Centralised	Centralised	Decentralised
CI-BSC interface	CI carried out in projects specified as actions in centrally formulated scorecards; front-line workers participate when asked to.	Locally initiated CI activities matched to centrally formulated scorecard measures in negotiation with the production line manager.	CI as actions in locally formulated scorecards related to the overall vision and strategies.
What particular mechanisms feature the use of BSC, with regard to differences in needs between the management and operational levels, at companies that have sustained their strategic CI capability?			
The importance of developing management control systems according to different logic at the management and operational levels	An approach that is adequate for the time being but not stable in the long run; lack of front-line participation in CI and the strategy formulating process.	The company has developed a sustainable strategic CI capability.	The approach was not stable in the long run, due to lack of management commitment; measures and action plans at the operational level not meaningful to management.
	Management intends to shift the management control emphasis further down and have front-line workers participating in the strategy formulating process in the future to a greater extent.	Top-down and bottom-up dimensions of management control are in balance.	There has been a shift in management control emphasis towards a centre-point of balance between the management and operational level; so far implemented in a few teams only.
Mechanisms that have sustained the strategic CI capability	Too early to say and therefore not possible to report yet.	The dialog that takes place when the team has to match the contribution of their proposed CI activity to the production line scorecard.	Measures are now being developed by the management and the operational level that are distinct from each other but at the same time point in one direction.
What role have the features of the work organisation at the operational level played in developing and the sustaining strategic CI capability?			
	A less advanced work organisation considered consistent with the expert task force CI strategy, since the teams were not expected to contribute to the strategic CI capability on their own initiative.	An advanced work organisation prerequisite for the teams to identify areas to improve, approximate the contribution and develop measures to monitor.	An advanced work organisation prerequisite for the teams to initiate the plan-do-check-act cycle themselves; a decentralised BSC approach, facilitated by parallel changes in competence development, IT and work organisation.

Table 3. Summary of case study.

Our third research question concerned the role of the local work organisation. Our findings suggest that in developing a strategic CI capability, companies do not seem to be dependent on particular features of the work organisation, as long as the features are consistent with the CI strategy and BSC implementation approach. However, in order to sustain this strategic CI capability over the years and thus obtain commitment, there seems to be a need for an advanced work organisation. The reason is that measures for front-line operators have to be developed by the shop floor and not the top floor. The case analysis shows that a prerequisite for the ability to develop adequate measures seems to be production teams characterised by enriched work content. This finding is in line with the evolutionary model of CI behaviour developed by Bessant and others (Bessant et al., 2001). Our finding indicates that in order to sustain the developed strategic CI capability, companies have to move on to the fourth level of the model; that is, to devolve autonomy and empower individuals to manage their own processes.

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