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Strategy and continuous improvement in small-to-medium Australian manufacturers

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Abstract

While Australian firms have generally recognised the value of continuous improvement (CI) in improving performance, many have yet to develop systems to ensure that the efforts of the CI program are focussed on issues of strategic importance to the company. In fact, as recognised in operations management generally, CI activities can have a significant impact on the development of strategy as well as its implementation. The research reported here uses a CI mapping methodology to chart the relationship between CI and strategy in small- to medium-sized manufacturers. Analysis of the link between the firms' strategies and CI programs indicates that most firms involved in the study made little attempt to link the two and some appear to be unaware of any need to do so. However, such findings seem to be dependent on company size, the maturity of the CI program and the competitive position of the firm. The paper also includes an examination of the role of operations and shopfloor CI in company strategy, particularly as related to SMEs.

Introduction

Continuous Improvement (CI) can be defined as "a company wide process of focused and continuous incremental innovation" (Bessant *et al.*, 1994). CI has many attractions, one of the most important being a potential low-cost approach. However, Bessant and Caffyn (1997) note that despite its attractions, the concept can often fail. In a response to this they report that the success of a CI program is influenced by a number of organisational factors. These factors include: a clear strategic framework incorporating CI, an underlying supportive culture, an enabling infrastructure, a supporting toolkit and the necessity to strategically manage CI as an ongoing process. Successful CI requires long-term organisational commitment to a course of action and the development of a consistent set of shared values or beliefs.

While there is a clear need to implement CI processes at the operational level, the common view is that the program as a whole must be driven from the top, that is, the CI program needs to be managed strategically in the deliberate strategy mode as proposed by Mintzberg (1987). In this approach the issues and the overall CI support structure will be shaped by top management. If the program is to satisfy these preconditions for success then the program should have a visible focus that is consistent with a strategic vision of the whole organisation, and for the various functions which comprise the organisation. This view, that the process *must* be driven from the top, reflects a valid, but limited perspective on the process. Just as strategy can be regarded as emergent or deliberate, it is also possible to see that the CI process should have complementary drivers, some originating from the senior management group, but others emerging at points lower down in the organisation at places where day-to-day problems are being solved. This duality has been compared to the need for an organisation to be able to develop systems which can achieve control, while still fostering learning (Sitkin *et al.*, 1994) and is clearly consistent with the view of a strategy formulation process proposed by Hamel and Prahalad (1989).

Other authors have commented on the essential contribution of operations to the overall strategy of a firm (e.g. Johnston, 1994) particularly for small-to-medium enterprises (SME) (Hayes and Upton, 1998). These authors provide convincing arguments for “small-step” development of operational capabilities as being able to provide defensible strategic advantages for firms, especially in markets dominated by complacent, market-dominant competitors. The ability of operations workforces to provide a continual source of process-based innovation is an excellent source of competitive advantage. The essential nature of global scale, operational efficiencies and learning capabilities to the internationalisation of small firms has been recognised for some time (Bartlett and Ghosal, 1987).

Effective and sustainable CI of the manufacturing function requires strategic approaches within the organisation, which enable managers to be able to think “globally” about the organisational needs but to act locally in response to those needs. The global issues for the organisation reflect the competitive priorities of the market. All members of the organisation must be able to see these values and understand how local tactics influence the capability of the organisation to compete on these factors. Local tactics may be developed which flow from local conditions but they should complement capabilities that are consistent with global needs. Managers then need to foster the development of local complementary tactics and ensure that they are integrated with the strategy of a company.

Within the concept of strategy, critical elements include the process of decision making and the need to encourage and capture learning in the organisation. An important foundation for the effectiveness of a CI program within an organisation is the level of integration between the CI process and the strategy that exists for the organisation. SMEs, however, often have no strategies or poorly-developed strategies. Even those that do have a strategic plan may not have any mechanisms for measurement, review or feedback regarding their strategic goals. This paper will examine some of the approaches to developing manufacturing strategy and then analyse how SMEs have linked their improvement processes to their strategies.

The development of manufacturing strategy

Approaches to manufacturing strategy over the last 15 years appear to be strongly influenced by a concept of strategy, which Hamel and Prahalad (1989) described as “premised on a strategy hierarchy in which corporate goals guide business unit strategies and business unit strategies guide functional tactics”. Mintzberg (1987, 1994) addressed this topic when he placed the process of developing strategy into two broad categories. The first category he described as deliberate. A deliberate strategy is often attributed to a single person and the strategy will be used within a context of control and top-down direction. The second category has been labelled emergent strategies and in a sense this category follows from Mintzberg’s view of strategy as a pattern in the flow of decisions made in the organisation.

Mintzberg (1987) argues that the conventional view of strategy as a deliberate process, often attributable to one person, such as the chief executive of the organisation, does not account for observations made in his work. His view, based on studies of a number of large organisations, is one where “... strategies can form as well as be formulated”. A realised strategy can emerge in response to an evolving situation, or it can be brought about deliberately, through a process of formulation followed by implementation. “There is no such thing as a purely deliberate or purely emergent strategy. For just as purely deliberate strategy making precludes learning, so purely emergent strategy precludes control. Pushed to the limit, neither approach makes much sense. Learning must be coupled with control”

(Mintzberg, 1987). An emergent strategy can appear in an organisation without clear intentions, or even in spite of them.

The importance of the strategic plan, an expression of the deliberate strategy that is possibly conceived and built from the top down, is evident. However, this plan is best framed in the terms proposed by Hamel and Prahalad (1989) as “a strategic context” rather than a set of highly-defined top-down plans. The challenge for managers is to “enfranchise employees to invent the means to accomplish ambitious ends”. The outcome of this will be a pattern of decisions that will result in an emergent strategy, which may in fact challenge the deliberate strategy of the organisation, but at the same time will be reinforcing the capacity of the organisation to maintain or improve performance based on experience. Managers must create an environment that fosters the development of this capability within the organisation even though it seems to foster a culture that allows the existence of potentially contradictory strategies.

Several models of strategy (and particularly manufacturing strategy) development have been proposed. Some of these models focus on an evolutionary or cumulative development of capabilities and strategic focus. The cumulative model has been so named owing to its proposition that a comprehensive manufacturing capability is a progressive development of skills in quality and dependability before flexibility, fast response times and low-cost manufacturing can be achieved. Figure 1 (adapted from Slack *et al.*, 1995) describes the main elements of this model.

The cumulative model proposes that the foundation of cost-competitive operations is first developed on an operation that can deliver quality and dependability in its outcomes, such as product performance, and supply and schedule dependability. Only after this foundation is laid can an operation set flexibility and speed as objectives. Price competitiveness, with attractive margins, follows from mastery of the other four areas of performance.

Wacker and Sheu (1994) have also proposed a cumulative or evolutionary approach to strategy and organisational development in their examination of quality and organisational development. During this evolutionary process, a firm’s products and services become increasingly competitive in the global market. Wacker and Sheu (1994) proposed that this process involves a sequence of four identifiable stages. In the first stage, the firm’s products do not have high quality, as there is little competition. During the second stage the firm has acceptable quality but competes on low cost as it develops its manufacturing systems. In the third stage, firms have well-developed manufacturing systems and are able to compete on superior durability and reliability. In the fourth stage, firms differentiate their products by constantly adding new features. In this stage the firm’s competitive advantage can only be sustained if its competitors’ manufacturing system cannot readily duplicate or improve on the product.

In a similar vein, De Filippis (1994) maintains that there are three increasingly complex stages that a company must go through to be successful in sustaining gains from improvement activities. The initial stage involves building confidence and a commitment to change, while stage two requires that personnel are aligned with the right job. The third stage involves breaking down existing departmental frameworks so that improvement is across the whole organisation.

The problem with both these models is that they are based on life-cycle theory and an evolutionary approach to change that insists that an organisation is organic in nature and that it must undergo a sequence of pre-defined, necessary changes to reach its ultimate stage.

Van de Ven and Poole (1995) maintain that teleological theory can be used to explain changes based on goals as the final cause for guiding change. They claim that this approach underlies many organisational theories, including those on adaptive learning (March and Olsen, 1976) and strategic planning and goal setting (Chakravarthy and Lorange, 1991). Proponents of this theory, view change or development as “a repetitive sequence of goal formulation, implementation, evaluation and modification of goals, based on what was learned or intended” (Van de Ven and Poole, 1995). As this is very similar to the plan-do-check-act or PDCA cycle widely used as a general basis for CI activities, CI can be viewed as part of teleological theory.

Unlike life-cycle and evolutionary theory, teleological theory operates in a constructive mode. A constructive mode of change produces innovative and often unpredictable solutions and is more creative than prescribed modes of change. Also, teleological models are not based on the idea that there are clearly-defined stages that an organisation must progress through in order to achieve success. Hence, a firm embarking on CI does not have to follow a prescribed path and can move from one tool to the next without having to successfully master previous tools and techniques.

Thus, the concepts of emergent strategy and organisational learning, teleological theories of organisational development and what might be called “organic CI” approaches have much in common. The term “organic CI” is used here to describe the opposite of highly-structured, perhaps traditional, CI where individual or group improvement activities are undertaken within a tight framework of strategy deployment or hierarchical goal development. Thus, the term describes a more spontaneous or self-directed CI approach where individuals or groups undertake improvement activities unbounded by a tight control structure, but perhaps within a consistent set of broad organisational values. The ability of an organisation to allow independent CI activities (albeit within a broad umbrella of organisational values) which can then shape and modify company strategy, is a valuable asset, particularly for SMEs competing in rapidly changing global markets.

Survey work on CI and strategy

Results from earlier benchmarking survey work by Chapman *et al.* (1997), in Australia, indicate that quality is clearly the most important competitive measure (order-winning criterion) of manufacturing firms. This competitive priority has been effectively communicated through the organisations and across the global manufacturing sector. Price is second only to quality, but cost reduction saturates the approach of manufacturing regardless of the importance of quality or price. The factors of quality and price dominate the tactics and motivation of the surveyed companies. CI activities, which should be related to the broad priorities of the business, appear to be focused more on manufacturing issues of cost reduction and product quality. The range of tactics employed at the operational level is not integrated through the use of the competitive priorities of the business. These tactics are presumably driven by local needs. While this may lead to the occasional lucky outcome, it is more likely that it will produce local benefits, which do not gain the synergy of supporting a major strategy. If the organisation, for example, is developing a position as a responsive

supplier, then it may be inappropriate to introduce a large long run automated press which will reduce costs but lengthen supply lead times.

It is difficult to avoid concluding that the companies studied in the survey research have either failed to create a clear strategic focus for the CI program, or have a manufacturing strategy which exists in isolation from the CI programs implemented at the operational level. The low level of correlation between competitive measures and motivation for CI or content of the CI program indicates that there is no clear strategy providing direction to the program, and that the CI activities have little or no impact on the development of organisational strategy. To some extent the only measure that seems to have elicited a consistent set of responses in the CI program is the need to compete on price. Ferdows and De Meyer (1990) propose that lasting improvements in manufacturing need to be grounded on a hierarchy of performance in quality, reliability, flexibility and technological leadership. The survey research undertaken in Australia (Chapman *et al.*, 1997) clearly indicates that manufacturers are generally focussed on cost reduction and as a result they may never develop the foundations required to achieve sustainable performance improvement across the full manufacturing function.

Qualitative research methodology

Research reported in this paper has used a qualitative methodology that enables researchers to make a detailed assessment of a company's status in the development of an effective CI process. This methodology has been termed CI mapping and involves identifying specific abilities within the organisation and aligning these with a CI maturity index to produce an assessment of the organisation's CI development. The research reported here places emphasis on the strategic aspects of the CI process within a strategy framework for the manufacturing function. This also includes reference to the process of decision making and to the need to encourage and capture learning in the organisations.

CI maturity index

It is argued that the effectiveness of the CI program can be evaluated by the maturity of the overall process in which it operates. This level of maturity can be measured using a CI maturity index. This index (shown in Table I) has been developed by Bessant and Caffyn (1997) and is similar in concept to the capability maturity model for software development produced by the Software Engineering Institute (Humphrey, 1988; Paulk *et al.*, 1993). As companies develop more advanced levels of maturity in the CI process, differing characteristics will be evident. These maturity levels, termed "natural"/background, structured, goal-oriented, pro-active/empowered CI, and full CI capability – the learning organisation, are shown in Table I, along with some of the typical characteristics of each level.

In recognising the importance of CI in the process of improving a company's competitive position, six core abilities have been identified as having an impact on the effectiveness of improvement programs. These core abilities are measured during CI mapping studies through the presence or absence of selected behaviours that are observed during the company site visits. Observing the way in which people work and behave within the organisation and the manner in which they talk about the organisation can test the level of maturity of the abilities. These abilities and behaviours are drawn from a set developed by Bessant and Caffyn (1997).

The six core abilities are termed; strategic, systematic, sustainable, extensive, learning and values.

Each of the core abilities and related behaviours were then mapped onto the CI maturity index to produce a measure of the firm's CI maturity along each of six axes. For example, considering the strategic CI ability, the relevant generic behaviour is "Individuals and groups use the organisation's strategic goals and objectives to focus and prioritise their improvement activities". A range of specific behaviours and characteristics were developed to enable the researchers to determine the respective CI maturity level of the firm within that particular core ability.

Results

Brief descriptions of the companies studied

The five companies involved in the study were all small-to-medium manufacturing/distributing organisations based in Sydney, Australia. Profiles of the firms are shown in Table II, along with their assessed strategic CI ability level. Firm A has been operating as a registered co-operative since 1992, and Firm D is an Australian subsidiary of a multinational. Firms B, C and E are private proprietary companies with three or fewer shareholders. All of the firms export part of their production, primarily to markets in New Zealand, Asia, North America and the Pacific Islands.

Overview of the CI mapping case studies

The overall (combined) maturity levels of the five firms were determined from an examination of the total results of the interviews and general company analysis. When considering behaviours across all six CI abilities, Firms A, B, and E, all demonstrated behaviour consistent with a structured maturity level (level 2) as described in Table I. Firm D was goal-oriented (level 3) and Firm C was at empowerment maturity level (level 4). The complete CI maturity radar plots of the five companies are shown in Figures 2 and 3. These plots provide an overview of the total CI picture within the five SMEs.

CI and strategy within the companies

It is commonly considered necessary for a company to be able to link CI activities to all levels of the company strategy. This assumes that the company has a greater degree of developed strategy rather than a predominantly emergent strategy, and that the strategy can be disseminated throughout the organisation. Further, in using the CI maturity index it is assumed that the company's strategy and strategic abilities are developing along a continuum from "natural"/background to systemic learning.

Strategic ability ensures that the widespread activities that are part of the CI process, help move the organisation in the direction it wishes to go. It reflects the position of the company on a strategy continuum. This continuum is bounded at one extreme by an anarchic model, a situation where decisions are taken across the organisation without reference to any overarching set of values or strategy. The other extreme consists of a model company with a highly-integrated set of values internalised by all members of the organisation. Note that this extreme does not rule out emergent strategy development within a broad framework of organisational values.

The following brief summary of the outcomes of the case study analyses represents a very condensed version of the company studies and focuses on the strategy aspects of the investigations. More than 60 hours of interview transcripts were analysed using the qualitative analysis software application NUD.IST (Non-numerical Unstructured Data Indexing Searching and Theorising). Detailed reports were prepared for each company and researchers presented seminars to key company personnel to outline results and improvement strategies.

Considering only the strategic CI ability, the results of the studies indicated two of the firms at the structured maturity level (Firms A and B), two firms at the goal-oriented maturity level (Firms D and E), and only Firm C at the empowered maturity level. While Firms A and B did demonstrate some evidence of the key strategic behaviour, that “individuals and groups used the organisations strategic goals to focus and prioritise their improvement activities”, this behaviour was not uniform throughout the organisation. Clear differences exist within different sections of the three organisations and there are distinct “boundaries” between operational employees and management. Similar findings have been reported by O’Mara *et al.* (1996) in studying the interactions between strategy and performance measurement in SMEs. In Firms A and B, employees at operational level were unable or perhaps unwilling to respond with a clear view of the company strategy. However, in Firms D and E, employees throughout the organisation displayed a uniform view of the company’s strategy, when asked to describe strategies relating to aspects such as order-winning criteria.

In contrast to the operational employees, managers in Firms A and B were willing and able to cite what they believed were the issues of strategic importance to the company. In Firm A, managers believed cost, quality, on-time delivery and customers’ needs were important. At senior management level, delivery performance and quality were perceived to be of greatest importance. However, as with the vast majority of manufacturers, cost was always important. Managers in Firm B had similar views with regard to product price and delivery time but viewed stock and inventory control as a cause for concern. At senior management level in Firm B, price was seen to be of greatest importance. As with Firm A, delivery time was an underlying problem.

In firms D and E operational staff were able to articulate components of the company strategy. While they tended to focus on sub-goals of the company and functional issues, they had a clear view of the importance of quality, inventory control and production lead times. Managers in Firm E cited product quality, service quality and delivery lead times as issues of strategic importance. The general manager at Firm E, believed that everyone in the company focussed on quality and this was their competitive edge. Similarly, in Firm C operations staff believed that the company was successful because it had pursued a strategy based on ensuring product quality. One operational employee in Firm C maintained the company was successful because it competed on quality first, service second and then cost. However, many operators articulated a belief that their main objective was also to get the job done as quickly as possible.

Middle managers in Firm C believe that quality was the strategic focus of the company. Some middle managers from different areas viewed quality improvement primarily from their own particular functional perspective. So the warehouse manager saw strategic alliances with suppliers and trading partners as important. Cost was still important as was on-time delivery. However, the need to maintain a competitive position by ensuring that product and service quality were continuously improved, embodied the views of most managers. At Firm D,

senior management pointed to programs aimed at cost reduction, improved marketing/sales and product support development, and maintained that these were consistent with an overall strategy. Firm C was classified as empowered, as it appeared that the company had committed to teams and the CI process was pro-active.

Firm D was rated as having achieved a goal-oriented maturity level as managers and employees were able to prioritise objectives using criteria related to the company's strategy. Although firms A, B and E were rated at the same *overall* maturity level, there are clear differences between the firms. For Firms A and B, CI will not be able to complement the company strategy as the strategy is still diffused and perceived differently by different groups such as managers and operational staff within the company. At Firm E, CI complements the company strategy. At all levels of the organisation employees respond to changes in direction and product mix, and remain focused on the needs of the customers.

Company C was rated highest on the strategic CI ability component of the maturity index, because of its greater involvement of staff in the strategy deployment (and development) process. This was evident through the consistent responses to questions about the company's main goals and the effective team and communications structures in place. The integration between the company goals and the content of CI activities was also higher than at the other companies studied. While all firms were strongly oriented towards "developed" strategy, Firm C showed the greatest evidence of the "emergent" strategy concept. Among other things, this was observable in the widespread view that employees felt that they had contributed to the company's strategic directions and goals and had opportunities to provide input to the development of these goals.

Table II shows the relationship between the age and size of the firms and their assessed strategic CI ability. While, obviously, no conclusion can be drawn from such a small sample, it would appear (as might be expected) that older, larger firms exhibit greater maturity on the strategic CI capability scale.

Discussion and conclusion

An important foundation for the effectiveness of a CI program in an organisation is the level of integration between the CI process and the strategy that exists for the organisation. While Australian industry has recognised the value of CI and its usefulness in improving performance, it has still not developed systems to ensure that the efforts of the CI program are focused. Also, companies have not clearly linked CI to the strategic thinking of the company.

CI requires a long-term commitment to a course of action and the development of a set of beliefs. If CI is developed in a vacuum, isolated from the main strategy of the company, then, while it is likely to flourish for some time, it is unlikely to achieve general acceptance across the different functions of the organisation. So, sooner or later, if a champion moves on to other issues it will become one more management program that failed to achieve its potential. As reported elsewhere (Bessant *et al.*, 1994; Chapman *et al.*, 1997), it was also observed that the context of the CI program within the company is of critical importance. If the CI program is treated as an isolated set of actions carried out to improve, for example, set-up times then it is unlikely to lead to sustained improvements across the full range of competitive factors of the company.

In our studies of Australian SMEs, we have identified three distinct organisational approaches to strategy. The characteristics of these approaches are briefly described as follows:

A. “Laissez-faire” strategy development

- Few overarching goals.
- Focus on short-term priorities.
- Reducing costs and improving quality are commonly of greatest strategic importance.
- Very limited measurement systems.
- CI activities only evident in response to particular problems.

B. Relatively “tight” control and structure

- Top-down, deliberate strategy is dominant.
- Strategic “planning” is emphasised, but commonly only CEO and (maybe) senior managers are involved.
- Strategic focus often shifts to quality and reliability.
- Measurement systems exist but feedback often does not occur.
- CI is directed mainly at production, but often appears in strategic agendas, etc.

C. “Loose” control structure with overarching values

- Greater involvement of employees in strategy development within a set of guiding organisational values or priorities (appearance of emergent strategy).
- Decision making is more decentralised.
- Measurement systems and feedback loops exist.
- Speed and flexibility are common strategic priorities.
- CI is an accepted function of the business and features in organisational performance measures and strategies.

In the SMEs studied, where measurement systems were found, they often did not include a closed feedback loop, and any learning that did take place was usually localised owing to the absence of any effective information collection and storage mechanisms. The five companies examined for this study, demonstrated either approach A or approach B as described above in their development of CI and strategy. Some evidence of approach C was found in Firm D; however, this was not widespread.

There is some evidence from our studies that the approaches to strategy development described, create a time-dependent developmental sequence for SMEs; however, it is by no means clear that SMEs *must* sequentially pass through these stages as they grow.

Further research is required across a wider range of SMEs to fully understand this phenomenon. It is clear though that a strong CI program, well integrated into a company’s strategic agenda, can provide an effective platform for both implementation and review of strategies as well as the development of new strategies in response to changing market and industry environment.

The concepts described by the term “continuous improvement” are one way of creating an environment where emergent strategies can be fostered and ultimately enable a business to

meet the changing needs of the market. In the five SMEs studied here, it was apparent that the development of CI was at differing stages in different companies, although all firms could integrate their CI activities more effectively into their strategy development activities. Continued efforts to develop the environment for successful CI should allow the firms to improve their feedback loops for organisational learning and create the possibility for more emergent strategic approaches within their structures.

Table I

CI maturity level

Level	Description	Typical characteristics
1	“Natural”/background CI	CI practices take place in response to the beliefs of individuals in the organisation or in response to special problems. The use of CI techniques may stop once the problem has been solved or the individual moves on
2	Structured CI	Some of the techniques or vehicles of CI have been introduced, but they are not (yet) integrated with the strategic process of the company
3	Goal-oriented CI	Top-down structures start to link aspects of the CI process to the strategic processes of the business. Some feedback loops using measures of performance and formal deployment of strategic goals are incorporated in the CI process
4	Pro-active/empowered CI	The top-down focus is now extended to permit emergent strategic aspects, or “bottom-up” actions, to create part of the strategy
5	Full CI capability – the learning organisation	CI is seen as a part of “how we do business around here” – in all aspects of the business

Table I CI maturity level

Table II

Profiles of the companies involved in the case studies

Firm	Number of employees	Annual turnover in AUD\$ million	Years of operation	Strategic CI ability level	Main products
A	35	2.7	24	2	Solid custom made abrasives
B	48	10.0	14	2	Gas barbecues and combustion heaters
C	130	30.0	75	4	Office products and computer software
D	215	35.0	6	3	Pollution control valves
E	30	3.0	14	3	Poultry incubators and granulated discharge systems

Table II Profiles of the companies involved in the case studies

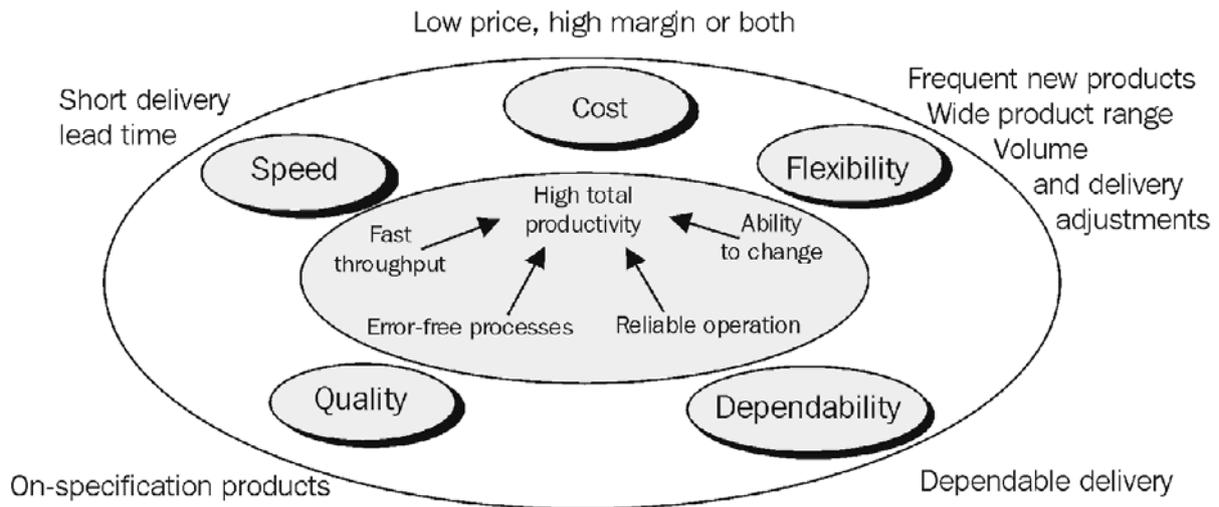


Figure 1 Cumulative model of operations strategy (adapted from Slack et al., 1995)

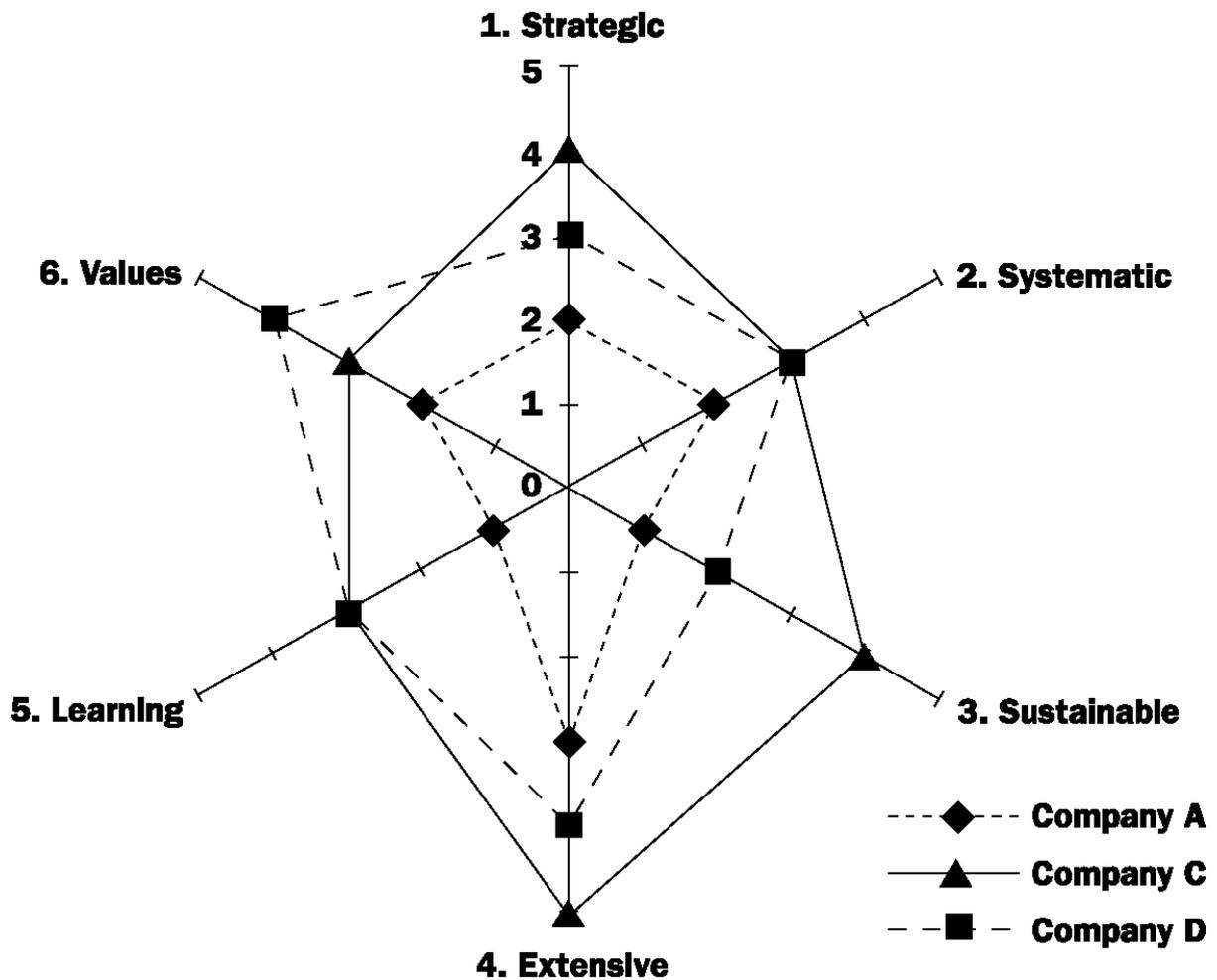


Figure 2 Radar plots for CI maturity levels – companies A, C and D

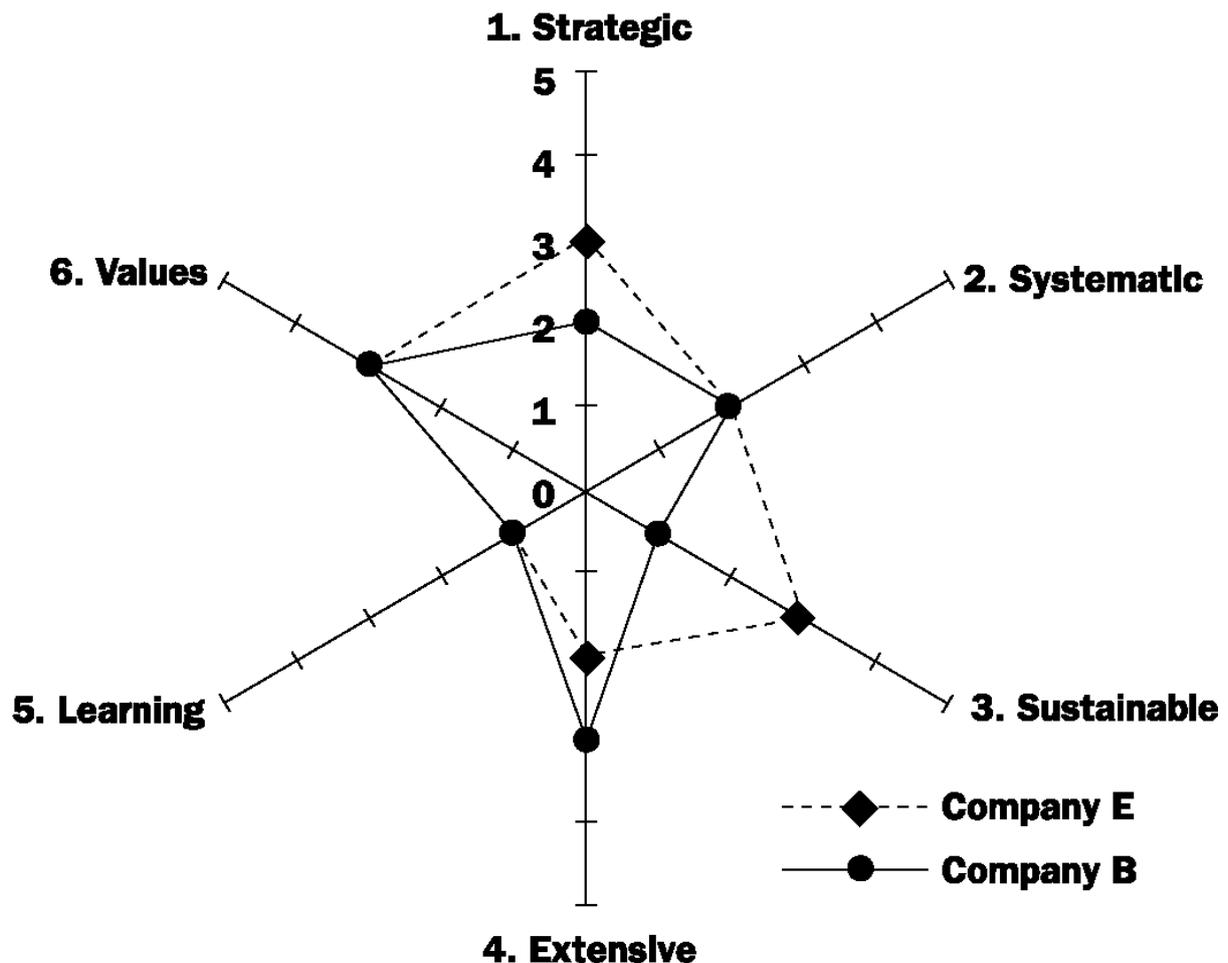


Figure 3 Radar plots for CI maturity levels – companies B and E

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