

Full Length Research Paper

Impact of continuous improvement on new product development within SMEs in the Western Cape, South Africa

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Companies generally embrace Continuous Improvement (CI) in their quality improvement process over the last decades. The adoption of CI on New Product Development (NPD) has not been practically communized. In the current dynamic environment, many companies are focusing on innovation and NPD in order to be innovative and competitive. It has become an important issue on investigating the application of CI practice on NPD process. This paper reports on the findings from a research project that applied a survey approach to investigate the impact of CI on NPD process. Data were collected from 40 Small and Medium-sized Enterprises (SMEs) through questionnaire and interviews. The findings of the study indicate that CI plays a significant role in boosting NPD management within SMEs, although some areas still need to involve in depth learning to improve management competency and knowledge in order to implement CI effectively. Finally, a new NPD model that embedded CI into NPD management process in SMEs is proposed. This model will add value to the future research on CI and NPD management.

Key words: Continuous improvement (CI), New Product Development (NPD), management, Small and Medium-sized Enterprises (SMEs), South Africa.

INTRODUCTION

Continuous Improvement (CI) in Japanese term '*kaizen*', has been adopted by many companies worldwide. The concept of CI was originally brought to Japan from the US after the World War II to assist in the reconstruction of the Japanese industry (Schroeder and Robinson, 1991). CI can be defined as "a company wide process of focused and continuous incremental innovation" (Bessant et al., 1994). CI is one of the core values of quality management (QM), which is a people-focused system that aims at continual increase of performance by stressing learning and adaptation as keys to the success of an organization (Evans and Lindsay, 2001). Beside the key role of CI in quality management, CI has significant impact on productivity (Reid, 2006), and is considered vital in today's competitive environment (Dean and Robinson

Robinson, 1991; Singh et al., 2008). The CI concept indicates a continuous effort involving everyone in an organization.

Over the last decade, CI has been evaluated in the context of New Product Development (NPD) processes (Caffyn, 1997; Nilsson-Witell, 2005). However, there is little understanding of the practical issues surrounding adoption of CI in NPD processes, and in particular, of the contingent company-specific variables that affect the implementation of 'CI enablers' (Bessant and Caffyn, 1997). NPD is commonly defined as the transformation of a market opportunity into a product as a result of the integrative coupling of market assumptions with technological possibilities (Krishnan and Ulrich, 2001). The Product Development and Management Association NPD PDMA (2006) defined that NPD is an overall process of strategy, organization, concept generation, product and marketing plan creation and evaluation, and commercialization of a new product (Kahn et al; 2006).

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Small and Medium-sized Enterprises (SMEs) are being increasingly recognised as “the life blood of modern economies” (Ghobadian and Gallear, 1996). The strategy to create a NPD capability (Noke and Hughes, 2010) and the managerial skills for capacity building (Pansiri and Temtime, 2008) in SMEs is critical. These managerial skills can assist SMEs to build their capabilities in effective NPD management. SMEs play a significant role in South African economic development because approximately eighty percent of the members of the South African Chamber of Business (SACOB) are small businesses (SACOB, 1999). In recent years, NPD is regarded as one of the keys to a firm’s success and survival in today’s competitive environment. Cocca and Alberti (2010) developed a framework for SMEs to assess their performance measurement system (PMS) in order to identify the main weaknesses and take corrective measures. The framework supports SMEs in the process of CI of their PMS.

In comparing with large companies, SMEs have more problems in implementing NPD process (Owens, 2007) due to lack of resources and capabilities, this resulted in many SMEs struggling to compete in the market. Even worse, a number of SMEs closed their doors due to high competition. Fritz (1989) and Sweeney (1983) emphasised that innovation is one of the key factors that drives SMEs in playing the significant role in a country’s economic development. They further claimed that SMEs use product innovations as a means of becoming competitive to a higher extent than their large counterparts. Hence, it is vital for SMEs to have more focus on NPD in order to be competitive.

Key management components of NPD success

In order to be competitive and survive firmly, many SMEs have focused on various factors to achieve successful NPD. A number of studies addressed the key components as consistently correlating of new product success (Cooper, 2005; Bayo-Morines and Merino-Diaz de Cerio, 2004; Kahn et al., 2006; Cooper and Kleinschmidt, 1995; O’Dwyer and Ledwith, 2009; Moore and Pressmier, 1993; Bessant, 2003).

According to Cooper (2005), top management support is a necessary ingredient for successful product innovation, since its main role is to set the stage for product innovation. Thus decent management commitment can result in a great promotion to the environment of innovative culture. Employees as one of the main resources that contributes ideas to NPD, Bayo-Morines and Merino-Diaz de Cerio (2004) described that employees are one of the main assets of a firm and one of the decisive factors in determining performance as one that allows little room for argument. Ahmed (1998) has shown that the climate of the organisation is inferred by its members through the organisation’s practices, procedures

and rewards systems deployed and is indicative of the way the business runs itself on a daily and routine basis.

NPD strategy is commonly regarded as one of the key factors that have significant impact on NPD process. Kahn et al. (2006) present their view of a best practices framework for NPD management based on the PDMA’s six NPD management dimensions: Strategy, portfolio management, process, market research, people and performance evaluation. A new product strategy is needed to focus the product development effort and tie it to business unit or corporate strategy; and a new product strategy provides a way for management to influence this process (Moore and Pressmier, 1993: 96). Lynn et al. (1999) identified that one of the key determinants of NPD success is to have a structured NPD process.

Employee is one the main idea contributors in NPD processes. Kaizen is a well-known concept that is related to CI, which means continuous change for the better by involving all employees (Imai, 1986). CI is viewed as a particular set of routines that can help an organization to improve performance (Bessant et al., 2001). Caffyn and Grantham (2003) investigated ways of fostering continuous improvement within NPD processes to enhance company’s NPD management. Based on the discussion of above literature, the main success factors are identified. These key components are shown in Figure 1, which include management support, NPD strategy, NPD process, people involvement, company resources and continuous improvement.

Theoretical perspective of CI on NPD management

Companies routinely seek effective strategies to improve their NPD management in order to be competitive. However, being able to rapidly assimilate and implement strategies to increase the effectiveness of NPD may prove to be as important to a firm’s competitiveness, that is, in the innovative products themselves (Schilling and Hill, 1998). In a study by Barclay (1992), 87% of the surveyed organizations stated that the product development process needs ongoing improvements. Some perspectives are related to CI as a distinctive capability, knowledge transfer, and a dynamic process (Nilsson, 2002).

Caffyn and Grantham (2003) investigated theoretical perspectives on continuous improvement applied in product development. They found that research adopting a quality perspective (CI) is not common in NPD (Caffyn, 1997; Sterman et al., 1997). Gautam and Singh (2008) presented the concepts and a systematic methodology by involving CI in maximizing the benefits of the change in terms of the customer perceived value within the given set of constraints. Sun and Zhao (2010) reported a study that aims to investigate the influence of quality management tools such as CI on improving the speed of NPD. They suggested that companies, which have implemented TQM and other quality tools such as CI, will



Figure 1. Key management components of a successful new product.

have a better basis for implementing new NPD approaches.

Thus, up to date, there is a dearth of studies that investigates the impact of continuous improvement programs within the context of product development. It is an important decision to choose which quality principles and practices are to be considered and included when initiating a continuous improvement program in product development. Continuous improvement theories must be expanded to include approaches that improve product development performance. The overall purpose of this study is to investigate the impact of CI on NPD management within SMEs, and contribute a better understanding of CI in the context of NPD process.

A proposed NPD management model

Based on the key management components of successful NPD (Figure 1), a proposed NPD management model is introduced as shown in Figure 2. However, companies manage the NPD process in order to obtain a better understanding on how to achieve the successful product development through well performed tasks in the process. After carefully filtering the elements of NPD management from the key factors, the following components have been chosen as the critical components, especially, for SMEs' NPD management:

1. Management commitment
2. Employee involvement
3. Product strategy:
 - i. Resource availability
 - ii. NPD capability

- iii. Market research
- iv. Suppliers
- v. Continuous improvement

4. Quality assurance
5. Customer satisfaction
6. Feedback from new product launching

Competitive pressures mandate that firms identify customer requirements and develop strategies that allow them to meet or beat the service levels provided by competitors (Verwijmeren et al., 1996). It is widely recognized that collaborating with suppliers (Bessant 2003) and customers (von Hippel, 1986) makes a significant contribution to the innovation process. The speed to the market is often regarded as one of the key measurements of the quality of NPD management (Sun et al., 2009). Ordinarily, the speed with which new products are developed is likely to affect product quality. One view is that quality takes time; doing things quickly can compromise product quality (Crawford, 1992; Meyer, 1993). This perspective is supported by the notion that NPD speed is associated with time pressure (Sethi, 2000) and, when accelerated, might even encourage the development of shortcuts (Wind and Mahajan, 1997). Karau and Kelly (1992), and Sethi (2000) claimed that due to time pressure, NPD teams, for instance, may be forced to consider a narrow range of decision alternatives and may not have time to explore ways to build superiority into the product. Thus quality assurance is critical for the success of a new product's launch.

Gruner and Homburg (2000) assessed the performance impact of the intensity of customer interaction in different stages of the new product development process and the characteristics of the involved customers. They

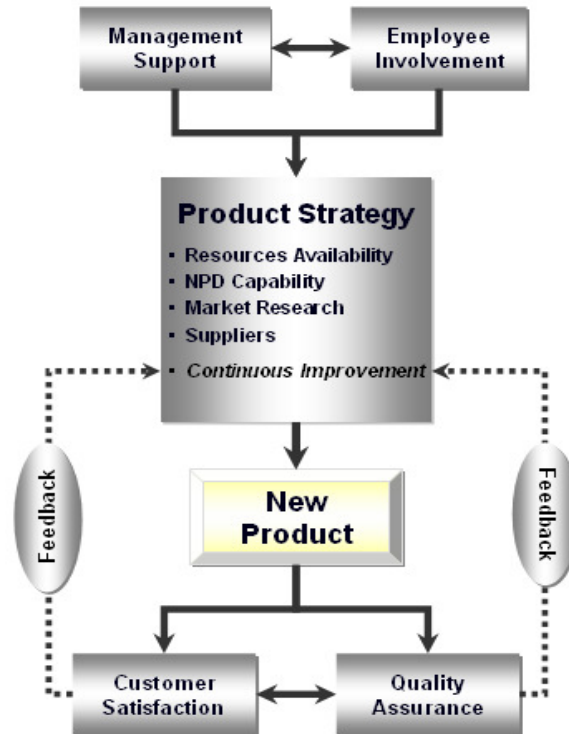


Figure 2. The proposed NPD Management Model.

was the relationship between customer satisfaction and new product quality.

According to Nambisan (2002), the customer plays a critical role in the NPD process, for example, as a resource in the ideation phase; as cocreator during design and development phase; and as user in product testing and support phase. Johnson and Fornell (1991) described that customer satisfaction involves keeping customers happy both in the day-to-day interactions. Hultink et al. (2003) identified both customer satisfaction and quality assurance as two of the four important factors for short-term and long-term NPD success. Beside these key elements, companies need to embrace Continuous Improvement (CI) culture into their NPD management process to ensure the success of their NPD. Due to the limited understanding of the practical issues surrounding adoption of CI in NPD processes, this study emphasizes on linking feedback from both customers and quality assurance process to identify the necessary areas for CI for SMEs.

In our proposed model, Feedback from both internal and external of a company is necessary for the NPD management. Internal feedback through quality check can identify the potential shortcomings of the product. External feedback from customers can greatly contribute valuable ideas for the new product. Thus, companies can enable CI of the product through both quality checking (internal) and customers (external) feedback.

RESEARCH METHODOLOGY

This case study covers 45 companies in the Western Cape, South Africa. These 45 companies are categorised as SMEs in accordance to its number of employees. According to the Department of Economic Development and Tourism (2004), small business employ less than 50 people and medium business employ from 50 to 249 people. In South Africa, the National Small Business Act provides a detailed definition of SMMEs (Small, Micro and Medium sized Enterprises) as shown in Table 1.

Table 2 showed that there are 55 management members, which include top, senior, and junior managers. 305 employees which include 48 administrative staff, 40 foremen/supervisors, and 217 production line workers from the 45 SMEs participated in this study. Figure 3 showed the numbers of SMEs in different sectors from the Western Cape. 62% of SMES embark on manufacturing activities, where 22% involves in repair and maintenance services, 4% are from construction, 2% is in communication. The others (9%) involve small retails, restaurant and logistics business.

Data were collected through a semi-structured questionnaire, a number of personal were interviews where it was considered necessary. Due to the working shifts in some SMEs, part of the questionnaires was completed through focus-group. The questionnaire consists of the key components from the NPD management model. These components were underpinned in the statements that are showed in Tables 3 and 4. In order to obtain accurate data, both management (coded as MAN) (Table 3) and partial employees (coded as EMP) (Table 4) were chosen.

The relevant information of both individuals and companies were collected, which include: Position held at the company, number of total employees, years of working experience, and turnover. In a few cases, some Managing Directors were also responsible for the production function. The data were analysed by using percentages,

Table 1. Definitions of SMMEs given in the National Small Business Act.

Enterprise size	No. of employees	Annual turnover	Gross assets, excluding fixed property
Medium	Fewer than 100 to 200, depending on industry	Less than R4 million to R50 million, depending upon industry	Less than R2 million to R18 million, depending on industry
Small	Fewer than 50	Less than R2 million to R25 million, depending on industry	Less than R2 million to R4.5 million, depending on industry
Very small	Fewer than 10 to 20, depending on industry	Less than R200 000 to R500 000, depending on industry	Less than R150 000 to R500 000, depending on industry
Micro	Fewer than 5	Less than R150 000	Less than R100 000

Table 2. Categories and number of respondents.

Category	Position	No. of respondent
Management (MAN)	Top management	38
	Senior manager	7
	Junior manager	10
	Sub-total	55
Employee (EMP)	Office staff	48
	Foremen/Supervisor	40
	Production line workers	217
	Sub-total	305

bar charts and scatter charts.

RESULTS AND DISCUSSION

Figure 4 showed that 33% of the total 360 participants (include both management and employees) have 2 to 5 years of working experience; 26% have less than 2 years of working experience; 22% are between 6 to 10 years; and 19% are between 11 to 15, and more than 15 years.

Responses from management

The responses from the 55 managers (including top, senior and junior managers) are shown in Table 5 and Figure 5. The results indicate that MAN1, MAN3, MAN4, MAN6, and MAN14~MAN19 have higher positive responses in comparing other items, all these items are more than 90 percent. This means that management is willing to provide actual support to CI and NPD process. For example, management delegates authority easily, accepts ideas, and all the 55 managers within the SMEs gave fully, their support in providing training opportunities to employees (MAN4). On the other hand, the results also show in MAN2 that 78% managers disagree with the statement, which means they do not take personal responsibility to specify the job/process requirements.

This indicates that management can easy delegate authorities within the companies.

In terms of product strategy, the result shows that management team has a clear vision of the final product during NPD process (MAN6). Companies generally have a good working relationship with suppliers (MAN17). Suppliers often contribute valuable ideas for continuous improvement in NPD (MAN18). All of these would contribute to an effective product strategy and maintain continuous improvement culture within these SMEs.

Quality assurance is the main theme of continuous improvement. The results showed that customers are generally satisfied with the quality of the product(s) that these SMEs delivered to them (MAN14), and the customer satisfaction stimulates companies to maintain the high quality of the product(s) (MAN15). Customer satisfaction motivates SMEs to preserve continuous improvement culture (MAN16). These SMEs also discusses with customers regarding what improvements need to be made (MAN19) to enable continuous improvement to take place.

Beside, the above high positive responses from management, some response were not strong and active, such as MAN5, MAN8~MAN12. 42% managers believe that communication channels between management and employees were not operating regularly within their companies (MAN5). 40% managers were not seeking

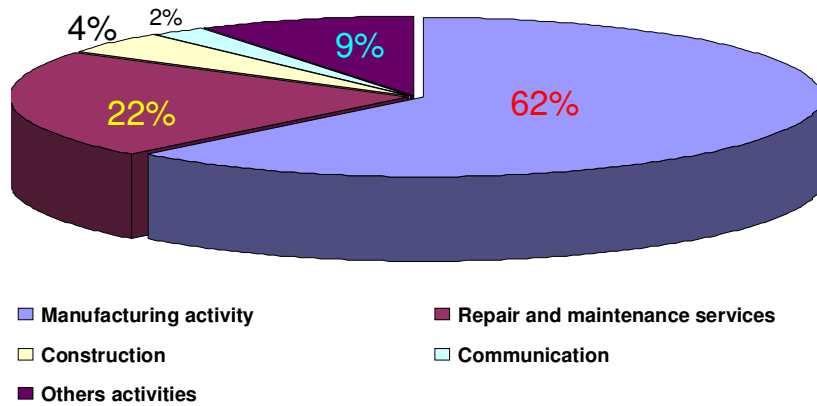


Figure 3. Number of SMEs in different sectors.

Table 3. Statements for data collection: Management (MAN).

No.	Statement
MAN1	Management delegates authority easily in the company.
MAN2	Management takes personal responsibility to specify the job / process requirements.
MAN3	Management often accepts employees' ideas and suggestions on processes / products.
MAN4	Your company provides training opportunities to develop individuals.
MAN5	Communication channels between management and employees operate regularly within your company.
MAN6	Management team has a clear vision of the final product during NPD process.
MAN7	Your company assesses the capability for a new product to be developed.
MAN8	Your company seeks any ideas from customers in order to have continuous improvement for NPD.
MAN9	Your company has a management team to support continuous improvement for NPD.
MAN10	Management concerns the cost of carrying a continuous improvement project(s).
MAN11	Your company seeks ideas for continuous improvement from relevant industry.
MAN12	Your company embarks on market research actively for continuous improvement.
MAN13	The results of market research contribute to decision making for continuous improvement.
MAN14	Customers are generally satisfied with the quality of the product(s) that you delivered to them.
MAN15	Customer satisfaction stimulates your company to maintain the high quality of the product(s).
MAN16	Customer satisfaction motivates your company to preserve continuous improvement culture.
MAN17	Your company has a good working relationship with suppliers.
MAN18	Suppliers often contribute valuable ideas for continuous improvement in NPD.
MAN19	Your company discusses with customers with what improvements need to be made.

ideas from customers actively (MAN8).

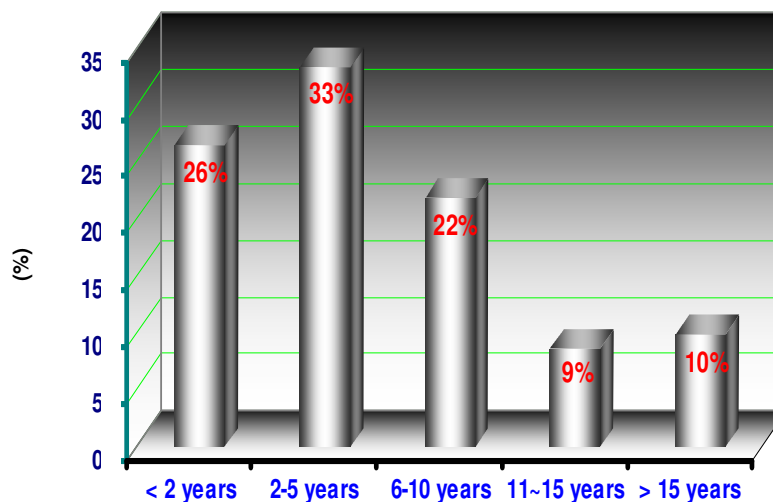
Nearly half of the SMEs did not have a management team to support continuous improvement for NPD (MAN9). More than half of the SMEs did not seek ideas for continuous improvement from relevant industry (MAN11). This was due to management concerned for cost of carrying a continuous improvement project(s) (MAN10). This was also confirmed by personal interviews during a number of visits at these SMEs. 62% of the managers believe that company embarks on market research actively for continuous improvement (MAN12), 72% managers agree that the results of market research contribute to decision making for continuous improvement.

Responses from employees

In order to verify some of the results that are generated from management, this study compared the responses from employees to management. The responses from employees are shown in Table 6 and Figure 6. In general, the responses from employees are positive (EMP1, EMP4, EMP6, EMP7, and EMP12) although some of the items are not strong (EMP2, EMP3, EMP5, EMP9, EMP10, and EMP11). EMP8 which has more than half of the employees has the negative response. 85% employees have the positive response on the delegation of duties from the management (EMP1), it has confirmed, through, the response from management (MAN1). 86% of

Table 4. Statements for data collection: Employees (EMP).

No.	Question
EMP1	Management delegates duties to you easily in the company.
EMP2	Management is competent and knowledgeable in continuous improvement.
EMP3	Management takes personal responsibility to specify the job.
EMP4	Management supports decisions for continuous improvement on the NPD process.
EMP5	You have contributed ideas for product continuous improvement.
EMP6	Management makes available specialized equipment and materials for continuous improvement.
EMP7	The company has offered you a training opportunity since you joined the company.
EMP8	You have feelings about the company equivalent to your own family.
EMP9	You can communicate with management easily.
EMP10	Management keeps you informed of the progress of continuous improvement project that you involved.
EMP11	Management employs outside experts for continuous improvement when necessary.
EMP12	Management insists in continuous improvement for the company's products.

**Figure 4.** Years of working experience.

employees agree that management supports the decisions for continuous improvement on the NPD process (EMP4). Management also makes available specialized equipment and materials for continuous improvement (EMP6). 75% employees agree that the company has offered them at least one training opportunity since they joined the company (EMP7). All of these items (EMP1, EMP4, EMP6, and EMP7) indicate that management support is truly exiting in the majority of SMEs.

However, management competency and knowledge in continuous improvement is not strongly recognized by employees (EMP2). Nearly half of the employees do not agree that management takes personal responsibility to specify the job, which is relevant to MAN2. 64% employees have contributed ideas for product continuous improvement (EMP5). 67% employees feel that they can communicate with management easily (EMP9). 66% employees agree that management keeps them informed

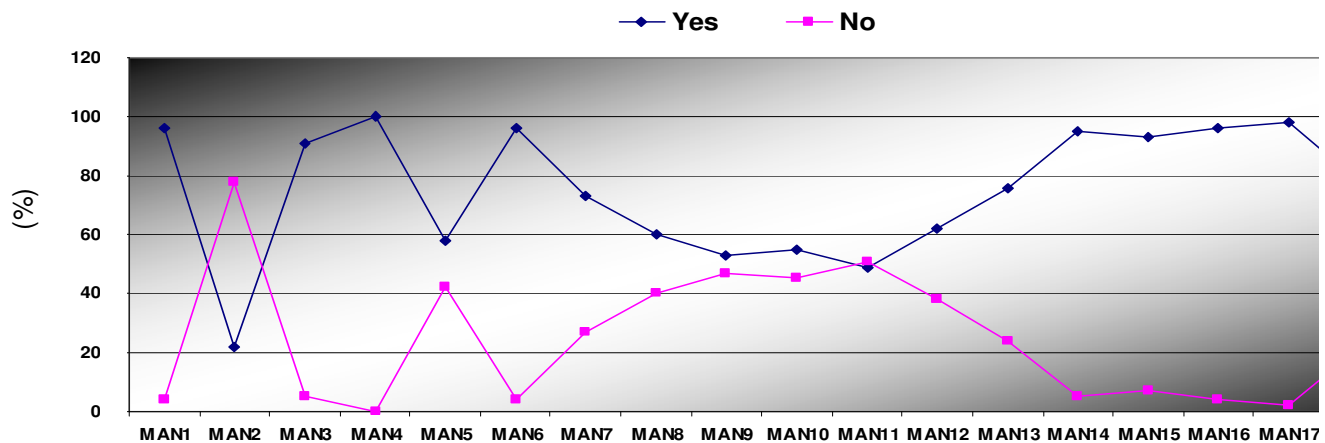
of the progress of continuous improvement project (EMP10). More than half of employees believe that management do not employ outside experts for continuous improvement when necessary (EMP11), which is a reflection on MAN11.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, CI plays a significant role in NPD management, such that management have strong awareness in offering training opportunities to employees and as a result employees could obtain necessary trainings; customer are satisfied due to the high quality of products; management motivates employees to involve in NPD process in order to contribute ideas; and management delegates authorities easily, which can boost CI process. Beside the positive responses

Table 5. Responses from management.

No.	Yes (%)		No (%)	
MAN1	53	96	2	4
MAN2	12	22	43	78
MAN3	50	91	3	5
MAN4	55	100	0	0
MAN5	32	58	23	42
MAN6	53	96	2	4
MAN7	40	73	15	27
MAN8	33	60	22	40
MAN9	29	53	26	47
MAN10	30	55	25	45
MAN11	27	49	28	51
MAN12	34	62	21	38
MAN13	42	76	13	24
MAN14	52	95	3	5
MAN15	51	93	4	7
MAN16	53	96	2	4
MAN17	54	98	1	2
MAN18	43	78	12	22
MAN19	48	87	7	13

**Figure 5.** Responses from management.

responses from both management and employees, however, there are some weak areas that need to be addressed. This includes:

1. Management does not have strong competency and knowledge in implementing CI;
2. Management is not actively sufficient in seeking expertise from industry for CI implementation and NPD management;
3. CI requires information flow effectively and efficiently within an organization, in order to maintain high quality of products and process.
4. However, many SMEs do not have an effective

communication channel between management and employees; this resulted in poor information flow and ultimately affects the NPD process.

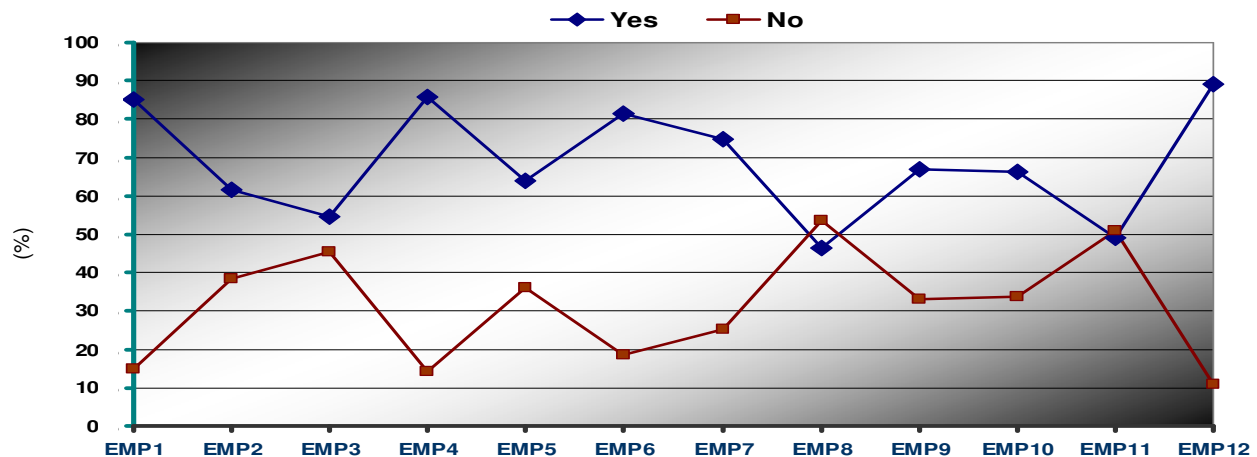
5. Employees were not well informed by the management of the progress of continuous improvement project.

The recommendations made by this study are as follows:

1. In respond to the management competency and knowledge regarding CI, in order to implement CI effectively and productively, the study suggests that managers must really understand what CI is all about, and identify the challenges faced by companies and try to

Table 6. Responses from employees.

No.	Yes (%)		No (%)	
EMP1	260	85	45	15
EMP2	188	62	117	38
EMP3	167	55	138	45
EMP4	262	86	43	14
EMP5	195	64	110	36
EMP6	248	81	57	19
EMP7	228	75	77	25
EMP8	141	46	164	54
EMP9	204	67	101	33
EMP10	202	66	103	34
EMP11	150	49	155	51
EMP12	272	89	33	11

**Figure 6.** Responses from employees.

extend CI into NPD management. Simultaneously, companies should create a continuous improvement culture, which begins from management level in terms of a set of key behaviours and daily working styles. Set as a role model, employees are gradually involved in the process and it is carried on further.

2. Management needs to have a regular communication with employees in order to identify the needs of employees. Once management has a good understanding of employees, then they will be able to provide effective support.

3. Management should continuously provide training opportunities to update employees skills and knowledge regarding CI programme.

4. Managers need to recognize the possible blocks and barriers, or disablers of CI before trying to implement it. This will enable them to avoid unnecessary waste for CI programme.

5. Management should invite experts in CI implementation when there is a need. This can boost and

put the company's CI programme on a right track.

REFERENCES

- Ahmed PK (1998). Culture and climate for innovation. *Eur. J. Innov. Manage.*, 1: 30-43.
- Barclay I (1992). The new product development process: Part 2. Improving the process of new product development. *R&D Manage.*, 22: 307-17.
- Bayo-Moriones A, Merino-Diaz de Cerio J (2004). Employee Involvement: its interaction with Advanced Manufacturing Technologies, Quality Management, and Inter-firm Collaboration. *Human Factor Ergon. Manuf.*, 14(2):117-134.
- Bessant J (2003). *High Involvement Innovation: Building and Sustaining Competitive Advantage through Continuous Change*. Chichester: John Wiley.
- Bessant J, Caffyn S, Gilbert J, Harding R, Webb S (1994). Rediscovering continuous improvement. *Technovation*, 14(1): 17-29.
- Bessant J, Caffyn S (1997). High involvement innovation through continuous improvement. *Int. J. Technol. Manage.*, 14(1): 7-28.
- Bessant J, Caffyn S, Gallagher M (2001). An evolutionary model of continuous improvement behavior. *Technovation*, 21: 67-77.
- Caffyn S (1997). Extending continuous improvement to the new

- product development process. *RD Manage.*, 27(3): 253-67.
- Caffyn S, Grantham A (2003). Fostering Continuous Improvement within new product development processes. *Int. J. Technol. Manage.*, 26(8): 843-856.
- Cocca P, Alberti M (2010). A framework to assess performance measurement systems in SMEs. *Int. J. Prod. Perform. Manage.*, 59(2): 186-200.
- Cooper RG (2005). *Product Leadership: Pathways to Profitable Innovation*. 2nd ed. New York, NY: Perseus Books.
- Crawford CM (1992). The hidden costs of accelerated product development. *J. Prod. Innov. Manage.*, 9: 188-199.
- Department of Economic Development and Tourism (2004). *Micro-Economic Development Strategy for the Western Cape: SMMES*. Resource file, 1. April.
- Dean M, Robinson A (1991). America's Most Successful Export to Japan: Continuous Improvement Programs. *Sloan Manage. Rev.*, 3: 67.
- Evans J, Lindsay WM (2001). *The Management and Control of Quality*, South-Western, Cincinnati, OH, 60-190.
- Fritz W (1989). Determinants of product innovation activities. *Eur. J. Mark.*, 23(10): 32-43.
- Gautam N, Singh N (2008). Lean product development: Maximizing the customer perceived value through design change (redesign). *Int. J. Prod. Econ.*, 114(1): 313-332.
- Ghobadian A, Gallea DN (1996). Total quality management in SMEs. *Omega*, 24(1): 83-106.
- Griffin A, Hauser JR (1992). Patterns of Communication among Marketing, Engineering, and Manufacturing-A Comparison between two New Product Teams. *Manage. Sci.*, 38: 360-373.
- Griffin A, Hauser JR (1996). Integrating Mechanisms for Marketing and R and D. *J. Prod. Innov. Manage.*, 13 (May), forthcoming.
- Gruner KE, Homburg C (2000). Does customer interaction enhance new product success? *J. Bus. Res.*, 49(1): 1-14.
- Hultink EJ, Griffin A, Hart S, Robben H, Henry SJ (1997). Industrial New Product Launch Strategies and Product Development Performance. *J. Prod. Innov. Manage.*, 14(4): 243-257, 15.
- Imai M (1986). *Kaizen: The Key to Japan's Competitive Success*, Random House Inc; New York, NY.
- Johnson MD, Fornell C (1991). A framework for comparing customer satisfaction across individuals and product categories. *J. Econ. Psychol.*, 12: 267-286.
- Kahn KB, Barczak G, Moss R (2006). Perspective: establishing and NPD best practice framework. *J. Prod. Innov. Manage.*, 23: 106-116.
- Karau SJ, Kelly JR (1992). The effects of time pressure and time abundance on group performance quality and interaction process. *J. Exp. Soc. Psychol.*, 28: 542-571.
- Krishnan V, Ulrich KT (2001). Product Development Decisions: A review of the literature. *Management Science*, 47: 1-21.
- Meyer C (1993). *Fast Cycle Time: How to Align Purpose, Strategy and Structure for Speed*, Free Press, New York, NY.
- Moore WL, Pessemier EA (1993). *Product Planning and Management: Designing and Delivering Value*. New York, NY: McGraw-Hill, Inc.
- Nilsson-Witell L, Antoni M, Dahlgaard JJ (2005). Continuous improvement in product development Improvement programs and quality principles. *Int. J. Qual. Reliability Manage.*, 22(8): 753-768.
- Noke H, Hughes M (2010). Climbing the value chain: Strategies to create a new product development capability in mature SMEs. *Int. J. Oper. Prod. Manage.*, 30(2).
- Nambisan S (2002). Designing Virtual Customer Environments for New Product Development: toward a theory. *Acad. Manage. Rev.*, 27(3): 392-413.
- O'Dwyer M, Ledwith A (2009). Determinants of new product performance in small firms. *Int. J. Entrepr. Behav. Res.*, 15(2): 124-136.
- Owens JD (2007). Why do some UK SMEs still find the implementation of a new product development process problematical? An exploratory investigation. *Manage. Dec.*, 45(2): 235- 251.
- Pansiri J, Temtime ZT (2008). Assessing managerial skills in SMEs for capacity building. *J. Manage. Dev.*, 27(2):251-260.
- Reid RA (2006). Productivity and Quality Improvement: An Implementation Framework. *Int. J. Prod. Qual. Manage.*, 1(1/2): 26-36.
- Schilling MA, Hill CWL (1998). Managing the new product development process: strategic imperatives. *Acad. Manage. Exec.*, 12(3): 67-81.
- Schroeder DM, Robinson AG (1991). America's most successful export to Japan: continuous improvement programs. *Sloan Manage. Rev.*, 32: 67-81.
- Singh RK, Garg SK, Deshmukh SG (2008). Strategy development by SMEs for competitiveness: a review. *Benchmarking: Int. J.*, 15(5):525-47.
- Sethi R (2000). New Product Quality and Product Development Teams. *J. Mark.* 64: 1-14.
- South African Chamber of Business (SACOB) (1999). *Developing the Small Business Sector in South Africa: A Review of Regulatory and Other Obstacles by the South African Chamber of Business*. RSA: SACOB.
- Sterman J, Reppenig NP, Kofman F (1997). Unanticipated side effects of successful quality programs: exploring a paradox of organizational improvement. *Manage. Sci.*, 43(4): 503-520.
- Sun H, Zhao Y (2010). The empirical relationship between quality management and the speed of new product development. *Total Qual. Manage. Bus. Excel.*, 21(4): 351-361.
- Sun H, Zhao Y, Yau HK (2009). The relationship between quality management and the speed of new product development, *The TQM Journal*, 21(6): 576-88.
- Sweeney GP (1983). *New Entrepreneurship and the Smaller Firm*. Campus, Frankfurt, New York.
- Verwijmeren M, van der Vlist P, van Donsellar K (1996). Networked inventory management information systems: materializing supply chain management. *Int. J. Phys. Distrib. Log. Manage.*, 6: 16-31.
- Von Hippel E (1986). Lead users: a source of novel product concepts". *Manage. Sci.*, 32: 791-805.
- Wind J, Mahajan V (1997). Issues and opportunities in new product development: an introduction to the Special Issue. *J. Mark. Res.*, 34: 1-12.