

Green Management Improves Organizational Productivity: Cases of Total Quality Management and Lean Initiatives.

Chark Tingsabhat^{1*} and Sombat Teekasap.²

1) DBA Program, Faculty of Business Administration, Ramkhamhaeng University 10240

2) Faculty of Engineering, Eastern Asia University, Pathumthani 12110

*Corresponding Author: ctingsabhat@gmail.com

Abstract

The organizational environments have been dynamically changed. Chief executive officer must turn an ailing organization around by rethinking a new mission. With global competition and trend of environmental performance improvement, the green management then becomes substantially strategic orientation. The new management techniques such as Total Quality Management and Lean Management are introduced to the organization for achieving its new mission. The researchers use case studies method to describe the causal relationship between productivity derived from continuous improvement initiatives and green management by presenting four empirical cases. The results of all cases were measured by differentiation and integration criterion and then quantified by the concept of Time-Driven Activity-Based Costing. The findings of this paper are the causal inference and continuous improvement initiative procedure.

Key words: Green Management, Organizational Productivity, Total Quality Management, Lean Management, Time-Driven Activity-Based Costing.



1. Introduction

It comes to the recognition that today's world of dynamically rapid change and increasing global competition requires more responsive forms of organizing. Organization is bundles of processes and its success depends on agility - the capacity to respond quickly to changes comprising of its general and specific or task environments. It shall focus on both internal and external environments as well as continue realignment on customer needs for expanding their markets in the global arena, thus generating more bottom-line profits. The world-class companies engage in many technological environmental initiatives to make their organizations more responsive.[1],[2] They develop new management techniques that can respond effectively to the rapid changes. Since environment suffering the consequences of selfish and wasteful human behavior, the need for environmental awareness and green management is emerged.[3] Environmental issues have been on the agendas of industry in the late of 1990's. The growing trend of all term of "green" appears to reflect changes in the external environment of market systems, attracting firms to pay more attention to the environmental impact of their products, processes and services.[4]

As an organization shifts it's thinking to more innovative and flexible establishment of direction, trend of environmental performance improvement, especially in green management then becomes substantially strategic orientation. Firm must integrate this issue into its corporate strategy. It requires rules and procedures to guide employees' actions under changing circumstances. To complete this, mission must continuously be presented to achieve a common strategic

mind-set. New practices have emerged which focus on internal processes. All processes continually co-evolve and assumed to be connected to all others. With operating challenges of more complex, resource-scarce and dynamic environments, the executives should balance creatively all processes and functions into diverse forces of differentiation and integration, while attending to the practices that committed by them.[5]

To turn an ailing organization around, it requires a conscientious and capable Chief executive officer (CEO) who works hard and takes a decisive action to seriously rethink the new theory of its business.[6] The new management techniques in form of continuous improvement (CI) initiatives like total quality management and lean management are positioned within the framework of productivity improvement, cost savings and eliminating defects, all of which are environment and quality improvement parameters.[7]

Attempts to prove whether and how the CI initiatives of 4 cases improve organizational productivity and affect their green management mission have resulted in the findings of this paper; the causal inference and the CI initiative procedure.

2. Materials and Methods

2.1 Materials

The researchers designed the theoretical framework of this paper from the substantial materials as follows

Green management measure – Waste disposal measures

Green management measures play a key role in the discussion of non-mandatory approach to foster organizational environmental performance. From the study of Ziegler and Rennings in 2004, they found that green

management measures like waste disposal measures have a positive effect on future environmental products or process innovations. That study avoids possible bias and inconsistent parameter estimates due to the using of lagged explanatory variables.

Technological environmental innovation is defined by Organization for Economic Cooperation and Development (OECD), considering 3 aspects of technology innovations which are; based on new technology knowledge, it must have been already implemented, and new products must be introduced on the market.

According to the Oslo-Manual of OECD, organizational innovations in general refer to the implementation of new management techniques such as total quality management, and the implementation of new or substantially changed organizational strategic orientations. Green management measures such as waste disposal measures fulfill the definition of new management techniques such that they are organizational innovations.[8]

Project management

The project management is used to accomplish unique outcomes with limited resources under critical time constraints. It continues to grow in the organizations. Firms use the projects as the preferred way of accomplishing almost everything they undertake. Three phases of project management embraced in management perspective are; project initiation which concerns the project context being crucial for project managers and their teams, project planning guides for budgeting, scheduling and resource allocation among the activities; and project execution that gets into action with monitoring and

controlling system to assure the results would meet expectation. This framework can serve demand on the development of new methods of management, using team to solve problems instead of individuals. Regardless the size and value, all projects involve outcomes or deliverables. With the complexity, multidiscipline, they all have same general objectives – performance or scope, time and cost, which referred to direct project goals.[9] Performance, time (or resources) and cost are entailed in achieving the project outcomes.

Project success has 4 dimensions; project efficiency, impact on the customers (either internal or external), business impact on organization, and opening new opportunities for the future. The project manager has to manage project's trade-offs occurring from the complexity and differentiation, whereas is expected to integrate all aspects of the project ensuring that the proper knowledge and resources are available when and where needed as well as the expected results are produced in a timely, cost-effective manner.

Waste, productivity and continuous improvement

Quality is free implies that high quality eliminates the costs associated with lost customers, rework, excess time, indirect engineering, modified specification, data collection and analysis, field service, re-inspection and waste.[10] The nonconformance costs go down simultaneously with reductions in conformance costs, thus enhancing productivity. Lean production techniques associated with TQM lead to the quality processes, higher productivity and translate into high company value. With 7 steps of implementing, the quality circles can guide to productivity gain, cost-effectiveness and employee morale. Managing quality then becomes a new working and thinking styles.

Total quality management (TQM) stresses a commitment from all employees including the management to drive toward the companywide excellence valued by the customers. TQM requires a never-ending process of continuous improvement in all aspects of an operation.

Lean Operations supplies the customers, without waste through continuous improvement, with what they want and when exactly they want it. Both TQM and Lean set their sights on perfection, only value-added activities. Waste is referred to a non value-added activity in the process. Taiichi Ohno from Toyota identified seven categories of waste, which become popular in lean organizations covering the ways organizations squander their money. The seven wastes are; overproduction, queues or waiting, transportation, inventory, motion, over-processing, and defective product.[11]

Organizational balance in environment

A systems perspective of an organization is characterized by 2 diverse forces; differentiation and integration. Organizations have divisions, departments and units separated out to perform specialized activities or functions, which are differentiated. Horizontal differentiation implied the task segmentation. Managers in various departments can be expected to hold different attitudes and behave differently in terms of goal perspectives, time frame and interpersonal orientation. The degree of differentiation becomes a measure of complexity and indicates greater complications and more rapid changes. To cope with the differentiated reality, it requires the attitudes and mindset underlie such thinking.

Integration means the quality of collaboration that exists among inter-

dependent units or departments that are required to achieve unity of effort. Organizations deal with parts of environment and have their subsets.[12] Organizational integration is typically achieved through devices such as coordinated levels of hierarchy, direct supervision, rules and policy. Every system requires differentiation to identify its subparts and integration to ensure that the system does not break down into separate elements.

To maintain a balance with the changing environments, it requires the executives to incorporate differentiation and integration into organizational strategy, which can then create a synergy between them.

Organizations have to appropriately balance these two opposing forces by creating differentiation between departments to deal with specific problems and tasks and getting people to integrate and work as a cohesive team toward the organization's goals.

Costing Method

Time-driven activity-based costing assigns resource costs directly to the cost objects by requiring 2 sets of estimates; first is the cost of supplying resources capacity or called capacity cost rate; and secondly, it requires an estimate of the time required to process a particular activity or called time equation. The model allows the time estimate to vary on the basis of the specific demands. TDABC uses time equations that directly and automatically assign resource costs to the activities performed and transaction processed.[13]

Cases Profile

The cases of 4 firms that found their new ways of organizing themselves so that they could solve another contradiction; doing things better, cheaper and faster to achieve competitive advantage. The logic underlying case studies is the detailed examination of processes in a context can reveal processes

that can be proposed as general to the organization.

The researchers summarized the cases profile as exhibited in table 1 due to confidentiality of clients' trade secrets.

Table 1 Summary of case profile

CI Initiatives	Manufacturing	Process Materials	Environmental Impact	Improvement Areas
TQM	Case 1 Air-conditioned Insulator	Polyethylene	Non-biodegradable waste disposal	Production 1
	Case 2 Dyeing & Finishing	Cloth & Chemical	Chemical solutoin discharged	Dyeing & Finishing
Lean	Case 3 Printing	Paper	Wood pulp & waste disposal	Plate, Print & Fold
	Case 4 Kitchenware	Woods	Wood & waste disposal	CNC & Sanding

To investigate these four cases, the researchers formed the constructs of interest with each own multi-item scales based on 3 objectives of project. The first three constructs consists of project orientation, schedule, team involvement which necessitate for achieving the fourth construct; i.e. productivity gain. Each construct has its own multi-item scales as exhibited in table 2.

Table 2 Case investigating instrument

Project Objectives	Constructs	Multi-item scales	Measured by
Performance	Project orientation		% improvement
		Training score	of pre/post tests
		Coaching score	
Time/Resources	Schedule		% compliance
		Timeliness	plan vs actual
		Milestone	
Cost	Team involvement		% compliance
		No. of participants	plan vs actual
		No. of meetings	
Target	Productivity gain		% reduction
		Waiting	baseline vs actual
		Defects	

2.2 Methods

Case study is an appropriate method for management research into unique situations. The researchers used this approach to explain the firstly implementation of new management technique such as quality management and the complex and dynamic processes, benefiting from in-depth investigation. Four cases studies of 2 TQM and 2 Lean initiative implementations were carried out in order to understand their processes of changes - how and why activities occur and find the best method to examination of why and how contemporary actual implement under condition where researchers have minimal control. The purpose is to examine if such best method can reduce waste and increase productivity.

The researchers used document analysis for data collection as preliminary data. The project implementing teams collected the secondary data from historical data of operating unit. A time-series design was utilized to temporally track area of development phenomena, predict patterns of operating unit constructs of interest or variables, collect data (prospectively or retrospectively), and compare between predicted and empirical patterns. Case constructs measured by multi-item scales were assessed over time to establish baselines or plans. After the intervention, the baselines/plans and changes of constructs can be compared.

All data of case constructs measured by multi-item scales were presented in the forms of raw data and value standardized into Z-Score, except the productivity gain as exhibited in table 3. The researchers used the time-driven activity-based costing concept to convert the productivity gain derived from waste reduction into monetary value.

To increase reliability in case study approach, the researchers used cross-check

information, applying multiple sources and verification, utilizing different ways of measuring the same construct where as utilized data triangulation through multiple sources and methods to avoid the threat to internal validity. By undertaking multiple case studies of CI initiative implementations, then the external validity shall be generalisable. [14]

improvement shown in Productivity Gain. When comparison on these findings, the optimum balance of differentiation and integration criterion based on the effective project management for CI Initiatives illustrates the causal inference of productivity improvement and green management, consider plausible explanation. Z-Scores of multi-item scales of all cases are presented in form of radar graph in figure 1.

Table 3 Raw scores and Z-scores of 4 cases

CI Initiatives		Project orientation		Schedule		Team involvement		Productivity gain	
		Raw	Z score	Raw	Z score	Raw	Z score	%	actual
		score %		score %		score %		improved	savings (K)
TQM	Case 1	80	0.64	90	1.05	97	0.69	60	11,194
	Case 2	75	0.33	86	-0.63	92	0.37	35	1,119
Lean	Case 3	45	-1.49	85	-1.05	63	-1.49	41	850
	Case 4	78	0.52	89	0.63	93	0.43	40	2,576

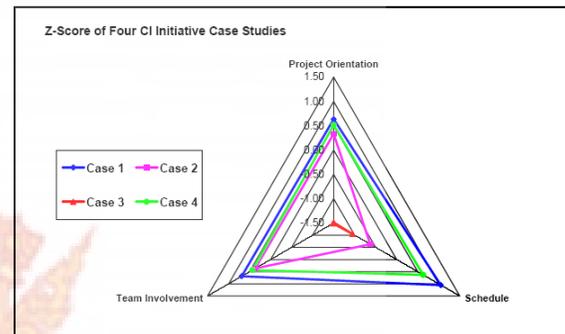


Fig. 1 The radar graph illustrates the performance of 4 cases

3. Results and discussion

Waste Reduction and Savings

The result interpretation from multi-item scales Z-Score of Case 1's all constructs are the highest in all aspects, especially 1.05 in Schedule following with 0.69 in Team Involvement, and 0.64 in Project Orientation. Thus effects Case 1's Productivity Gain raised to 60% improved over the baselines with substantial savings of ₱ 11,194 K. Case 4 and Case 2 follow in order, and the last ranking is Case 3 with the lowest in all constructs; both Project Orientation and Team Involvement have score at -1.49 and -1.05 in Schedule. Even though, with the lowest rank, Case 3 still earned a savings of ₱ 850 K. with 41%

4. Conclusions

The researchers concluded that if all three leading constructs; project orientation, schedule, and team involvement are effective, well-balanced managed between differentiation and integration, the project will gain the productivity which is the lagging construct of the research's investigating instrument and affect to the waste disposal measure that reflects green management mission.

5. References

- [1] Huber, Joseph. 2005. *Technological environmental innovation*. Available Sources: www.sozio-logie.uni-halle.de/publikationen/pdf/0501.pdf, February 14, 2010.
- [2] Nagareda, Jazmin Seijas and Ziegler, Andreas. 2006. *Green management and green technology: exploring the causal relationship*. Available Sources: <http://econstor.cu/bitstream/10419/24495/1/dp06040.pdf>, February 14, 2010.
- [3] Pane Hade, Stephanie S., Oyler, Jennifer D. and Humphreys, John H. 2009. Historical, practical and theoretical perspectives on green management: an exploratory analysis. *Management Decision*. 47:1041-1055.
- [4] Banerjee, Subhabrata Bobby. 2002. Organisational strategies for sustainable development: developing a research agenda for the new millennium. *Australian Journal of Management*. 27:105-117.
- [5] Quinn, Robert E., O'Neill, Regina M. and St.Clair, Lynda.(eds.) 2000. *Pressing problems in modern organizations*. AMA Publications. New York.
- [6] Drucker, Peter F. 2006. *Classic Drucker*. Harvard Business School Publishing Corp. Boston.
- [7] Banerjee, Subhabrata Bobby. Ibid.,112.
- [8] Nagareda, Jazmin Seijas and Ziegler, Andreas. Ibid.,9.
- [9] Meredith, Jack R. and Mantel, Samuel J. 2010. *Project management: a managerial approach*. John Wiley & Sons, (Asia) Pte Ltd.
- [10] Quinn, Robert E., O'Neill, Regina M. and St.Clair, Lynda.(eds.) Ibid.,229.
- [11] Heizer, Jay and Render, Barry. 2009. *Operations Management*. Pearson Prentice Hall. Singapore.
- [12] Quinn, Robert E., O'Neill, Regina M. and St.Clair, Lynda.(eds.) Ibid.,216.
- [13] Kaplan, Robert S. and Anderson, Steven R. 2007. *Time-driven activity-based costing*. Harvard Business School Publishing Corp. Boston.
- [14] Tharenou, Phyllis, Donohue, Ross and Cooper, Brain. 2007. *Management Research Method*. Cambridge University Press. Port Melbourne.