Identification of green management system's factors: A conceptualized model

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Abstract. This paper discusses the basic factors and a conceptual model in the adoption and maintenance of green management system. It is anticipated that if organizations ensure these factors, they will experience less resistance from their Stakeholders and consequently, and they will have a successful GM (green management) and GP (green productivity) implementation. The models and factors presented in this paper are based on the findings of a research project that is done in transportation ministry of Iran. The theoretical framework in this study is related to two aspects. The aspects discussed in the paper consist of environmental systems and management systems; the first one is related to organizational affects on environment and second is related to improvement. Both of them emphasize sustainable development. So, in literature review and designing models, sustainable development, environment systems and green analysis are discussed. Based on the literature review, effective factors are recognized and finally the conceptual model is provided.

Keywords: sustainable development, green management transportation systems, green conceptual model

1 Introduction

This paper discusses the basic factors and a conceptual model in the adoption and maintenance green management system. It is anticipated that if organizations ensure these factors, they will experience less resistance from their Stakeholders and consequently, and they will have a successful GM (green management) and GP (green productivity) implementation. The models and factors presented are based on the findings of a research project that is done in road and ministry of Iran. The theoretical framework in this study is related to two aspects. These aspects are environmental systems and management systems; the first one is related to organizational affects on environment and second is related to improvement. Both of them emphasize sustainable development. So, in literature review and designing models, sustainable development, environment systems and green analysis are discussed.

2 Literature review

In environmental analysis, the 1990s have been labeled the “decade of the environment” as social and environmental concerns have assumed a greater level of importance in consumers’ product choice and supplier selection decisions^[9]. For many of today’s increasingly sophisticated and knowledgeable consumers, the ecological environment is likely to be at or near the top of their list of social concerns individuals easily take on the roles of “citizens-as-consumers”, benefiting from modern amenities, and “citizens-as-conservers”, doing their part to lead an ecologically friendly life^[24]. Several studies have considered the concept of ecological sustainability as a framework for studying management practices in both operational and strategic contexts. In all these analysis, the environment management system (EMS) is considered. An EMS is a tool for managing

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the impacts of an organization's activities on the environment. An EMS integrates environmental management into a company's daily operations, long-term planning and other quality management systems^[7]. To develop an EMS, and as a result, complete green system an organization has to assess its environmental impacts, set targets to reduce these impacts, and plan how to achieve the targets. Following are more components that should be considered when developing an EMS: Environmental policy, environmental impact identification, Objectives and targets, Consultation, environmental management plan, responsibilities and reporting structure, Review audits and monitoring compliance, Continual improvement. The analysis are discussed in green and EMS subjects are grouped into eight broad categories: clean/green operations; effective operations; profitability; competitive product/service; market expansion; improvement in company image; improvement in management and others. Berry and Rondinelli (1998)^[18] illustrated six critical elements in order to create an effective proactive environmental management system. They suggest that a champion within the company is to assume responsibility for environmental issues. Proactive companies should also have environmental policies and strategies that reflect sound environmental goals. Furthermore, environmental goals and targets should be both clear and measurable^[3]. Some discussion in green subjects are consists of green supply chain management (GSCM)^[10, 22, 27]; green production^[21]; green procurement or green purchasing^[14, 20, 25]; green designing, green architect, green culture, green productivity^[16, 18] and so on. There is consensus within the literature that internal environmental management is a key to improving enterprises' performance^[5]. It is well-known that senior managers' support is necessary and, often, a key driver for successful adoption and implementation of most innovations, technology, programs and activities^[11]. To ensure complete environmental excellence, top management must be totally committed^[27]. Communication between business managers and environmental professionals is also important in the successful business and environment relationship^[2]. Based on the analysis of green subjects, in an endeavor to find practical and attractive approaches to researcher and presidents deal with both productivity and environmental protection for sustainable development the APO (Asian productivity organization) introduced the concept of green productivity (GP). By definition as coined by the APO, GP is a strategy for enhancing productivity and environmental performance for overall socio-economic development. Its applications are about of appropriate productivity and environment management policies, tools, techniques and technologies in order to reduce the environmental impact of an organization's activities.

Some researches do comparative studies and have considered the concept of ecological sustainability as a framework for studying management practices in both operational and strategic contexts. As a part of this effort in GM analysis, other studies have examined the greening of supply chains within various contexts including in product design, process design, manufacturing practices^[26], purchasing and a broad mixture of these elements. Cairncross (1995)^[4] draws parallels between striving for total quality and environmental management^[4]. In developing the green system, researchers introduced ISO 14000 as a methodology for implementing green subjects. For example, Makower (1994) simplified the essence of being "green" into two basic goals: (1) Reducing waste and (2) Maximizing resource efficiency. Under process, Makower (1994) introduced four key concepts: (1) Empowerment (2) Education (3) Efficiency (4) Excellence.

In other green analysis, policy making are considered. These policies represent a serious commitment on behalf of the company in which every word and phrase will be carefully through and its implications fully understood^[8]. In analyzing green subjects and policies using environmental standards are considered. The establishment and implementation of ISO 14000 based EMS is a long-term programmed involving the participation of employees from all levels and all functions within organizations. an effective EMS. They should commit and support not only for an effective system, but also for continual improvement of Success factors for ISO 14000 implementation Strategic issues Attributes: (1) Management attitude Top management commitment and support, (2) Organizational change Structure and responsibility, (3) External and social aspects Environmental legislation, and (4) Technical aspects Environmental specialist assistance.

In order to maintain continual improvement in environmental performance, suitability and effectiveness of the environmental management system, and thereby its performance, the top management should review and evaluate the environmental management system at regular intervals. The management reviews must be based on the EMS audit results and must address all possible needs for changes needed in the policy, objectives and other elements of the environmental management system, changing circumstances and the commitment to continual improvement^[8].

When looking at new management systems standards for the environment, embracing ISO 14000, Zuckerman^[28] claims that European officials have voiced widespread concern over the commercialization and the growth of a global registration/certification industry, as witnessed by ISO 9000^[8]. Moreover, there is a worry at the proliferation of additional schemes. In fact, there is general talk of encouraging the International Standards Organization (ISO) to cease creation of additional management systems altogether. The effective development and implementation of ISO 14001-based EMS is inevitably influenced to a great extent by external and social aspects^[17, 23]. These include environmental legislation, market pressure, and employee relations. The increasing trend of environmental legislation is found not only in developed countries but also in developing countries, for instance, the South Eastern Asia (SEA) countries like Thailand, Malaysia, etc. Hong Kong has a history of non regulation. The Hong Kong government used to leave the environmental legislation to industry to self-regulate and, as a result, little was done to minimize environmental damage. The situation has been changing rapidly in recent years, as community expectations are increasing and with increased pressures for environmental sustainability, it is expected that enterprises will need to implement strategies to reduce the environmental impacts of their products and services^[16]. To establish their environmental image, enterprises have to re-examine the purpose of their business. Success in addressing environmental items may provide new opportunities for competition, and new ways to add value to core business programs^[12]. In the green-oriented companies these companies set up teams for supplier programs who review the materials and supplies that serve as inputs to the production process and also work with suppliers to resolve any quality or environmental issues. They even hold workshops with them and evaluate their performance on service, technical ability, quality, costs, flexibility and overall environmental performance. In the same manner, perhaps sometimes even more critically, the companies are realizing the role the workers play in implementing environment friendly procedure to bring about greening of production. The greenest critical role in ensuring that:

- The products/services produced by the companies are environment friendly in nature;
 - Prevention of pollution at the source is achieved for the production process;
 - Cleaner production practices are followed in the sense that environment friendly technology is used;
 - Closed loop manufacturing is incorporated to the greatest extent possible, so that the waste generated is processed and recycled back into the production;
 - Reuse and recycling of materials is carried out;
 - Material usage is reduced;
 - Recyclable content in the product is increased;
 - The processes are optimized so that generation of waste, both hazardous or otherwise, is minimized;
- and
- The products are redesigned (design for environment) so that the adverse environmental impacts of the product are minimized.

A number of forces as far as James and Bennett (1994) are concerned, are now driving organizations to measure their environmental performance. These include demonstrating progress towards targets, ensuring better data for decision making as well as supplying information to regulators and all major stakeholders. Their detailed model is in the form of a continuous loop, consisting of eight sequential steps for effective environmental performance appraisal: (1) Select appropriate measures; (2) Set targets; (3) Identify potential measures; (4) Implement measures; (5) Define the environmental context and objectives; (6) Monitor and communicate results; (7) Act on results; (8) Review ^[13]. Similarly, Mosley (1996) suggests that the idea of such a performance cycle can be perceived as a dialogue and a focal point across the organizational divide, between the specialist measurers and the functional managers^[19]. A survey of the literatures revealed that the benefits most often mentioned might be grouped into eight broad categories: clean/green operations; effective operations; profitability; competitive product/service; market expansion; improvement in company image; improvement in management and others.

The others often mentioned benefit is that adoption of the EMS standards will lead to effective operations. Under this category, "improved operational safety" was reported in papers by Weissman and Sekutowski; and Sayre^[23, 26]. "Improve material utilization efficiency" Weissman and Sekutowski were mentioned too. One benefit reported to have been mainly gained by Asian companies, particularly those in Hong Kong was that

of “Market expansion” as reported in [15, 17, 23] and Hong Kong Industry department^[1]. Apart from this, “improvement in company service” and “improvement in management” were mentioned too, for both Asian and US companies. Benefits related to profitability^[6] and “competitive product/service” were only mentioned in cases concerning developed countries.

3 Research purpose and methodology

This paper is based on the findings of a large research project that involved three Dimension of fieldwork. Three dimensions consist of Green training, green researches and cultural affairs. The project was aimed to achieve two main objectives:

- (1) To study of the role of organizational stakeholders during the EMS adoption process and designing conceptual model.
- (2) To develop a set of guidelines and a framework for EMS implementation within the road and transportation ministry

The phases of fieldwork included a combination of a questionnaire and interview. For More familiar of cooperator in research, three big conferences and 6 workshops held during the research. Based on the literature review, a tentative list of critical factors of environmental management was developed. To validate the framework presented in the preceding section and the basic factors binomial test and Friedman test is used. Thus, using a significance level of 0.05 the basic variables are validated. In this research the 5 basic dimensions are analyzed: 1-sustainable development, considering energy consumption in green analysis, considering transportation system as the infrastructure in sustainable development; 2-citizens and customer expectation (voice of customer); 3-reducing cost in transportation system with considering productivity approach. Some of sub factors analyzed consist the following items:

- ★ the study of transportation methods with less pollution
- ★ the characteristics of suitable services to citizens energy consumptions patterns

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- ★ the effects of road and transportation section on quality life, employment, hygiene and safety in society
- ★ air and noise ,soil , water pollution with
- ★ developing road and transportation system
- ★ analysis of airport, terminal, rail station in the country with defining right standards
- ★ green procurement and green designing in lines, machinery and equipment with considering

Resources saving

- ★ green culture and green thinking in road and Transportation systems
 - ★ the analytically studying of energy usage in line and staff departments of road and transportation section and with using new technology
 - ★ the use of disposal by recycling and recovery systems
 - ★ determining the right green criteria in developing and maintaining infrastructures and utilities road and transportation system
 - ★ determining green criteria for transportation institution
 - ★ the safety and quality criteria in road and transportation system
 - ★ the ergonomic criteria in road and transportation system
 - ★ the aesthetic of the road and rail
 - ★ relation between wear out and depreciation and energy consumptions
 - ★ information systems to personnel and employees in line and staff departments
 - ★ the decision making about injured and occupational disease as in road and transportation system
- Interview and data gathering do the analyses of above factors with a questioner. The results in 95 percentage confidants confirm the above factors, as the basic factor must be considered in green analysis.

4 Finding and the conceptual model

The green conceptual design is considering two models. The first model is process model (Fig. 1) and the second model is goal-oriented model (Fig. 2). For designing these models the mentioned factors by considering variables are introduced in the Fig. 1 this figure has 4 level and the focus area is optimum and productive management in road and transportation systems. Models designed can be used for transportation system in macro perspective. The first model is a process model consists of these elements:

Fig. 1.

1-inputs: these inputs are consisting of:

- raw material: improper usage and consumption patterns, large material stocks, poorly scheduled deliveries, unplanned handling and stacking;
- energy consumption: over –utilization of equipment and machinery (facilities), fuel wastage;
- information, data and knowledge;
- manpower: use of non excessive manpower, productive work, high skill levels;
- ergonomic machinery and equipment and tools.

2-processing and operations:

- designing, material handling, mismatched facilities;
- safety performances;
- proper techniques and coordinated work;
- good utilization of facilities.

3-outputs:

- planned rendering services;
- high services quality;
- information and knowledge;
- security and healthy for citizens and customers and also for line and staff employees.

4-other affected variables:

These factors consist of green culture, use of green techniques and tools, external and internal recovery, and international regulations, value systems. With respected to goal-oriented model, three basic dimension and their factors consist of:

Fig. 2. Goal- Oriented Green Management Conceptual Model

- environmental considerations: environmental standards, government policies, and international policies;
- productivity (reducing cost): raw material, energy, information, material handling, usage technology and procurement;
- voice of customer: ergonomic (anthropometry and physiology), communication and interaction, aesthetics, securities and healthy, designing.

It is reported that a lot of organizations are now using environmental issues to strengthen their situation; in society. It's also reported that between 1997 and 2002 the worldwide certification of ISO 14000 had increased more than ten fold, which indicates the increasing interests of the organizations to manage factors of their operation. In addition productivity as the most important methodology for improvement is considered these days. So integration these two components as a new methodology is called green productivity. The conceptualized models are designed in this research. Transportation system is the most important section in sustainable development. And defining a suitable model as a guideline to implementing of the green factors in transportation system is very important. The mentioned models can be used for next step (implementation).

In this way the role of GM and GP in transportation systems are rapid, safety, economical and economical transportation that focused on transportation system functions in this ministry.

5 Recommendation

At the results of the findings of this paper, developing an action plan, introducing critical success factors (CSF) and special notices to green culture are presented for new projects.

Fig. 3. The conceptual Model with process approach

References

- [1] A guide to pollution control legislation affecting manufacturing industries. Hong Kong Government Publication, Hong Kong, 1995.
- [2] H. Aspan. Running in nonconcentric circles: Why environmental management isn't being integrated into business management. *Environmental Quality Management*, 2000, **9**(4): 9–75.
- [3] M. Berry, D. Rondinelli. Proactive corporate environmental management: A new industrial revolution. *Academy of Management Executive*, 1998, **12**(2): 38–50.
- [4] F. Cairncross. *Costing the Earth: The Challenge for Governments, the Opportunities for Business*. Harvard Business School Press, Boston, 1995.
- [5] C. Carter, L. Ellram, L. Kathryn. Environmental purchasing: Benchmarking our German counterparts. *International Journal of Purchasing & Materials Management*, 1998, **34**(4): 28–38.
- [6] T. Chapman. Achieving better environmental performance: Are you ready? *Green Productivity*, 1994, (4): 4–9.
- [7] M. Chavan. An appraisal of environment management systems. *Management of environmental quality*, 2005, **16**(5): 444–463.
- [8] R. Clements. *Complete Guide to ISO 14000*. 1996, 1996.
- [9] M. Drumwright. Socially responsible organizational buying: environmental concern as a noneconomic buying criterion. *Journal of Marketing*, 1994, **58**: 1–19.
- [10] J. Hall. Environmental supply-chain innovation. *Greener Management International*, 2001, (35): 105–119.
- [11] G. Hamel, C. Prahalad. Strategic intent. *Harvard Business Review*, 1989, **67**: 63–76.
- [12] K. Hansmann, K. Claudia. Green manufacturing and operations: from design to delivery and back. 2001, 192–204.
- [13] P. James, M. Bennett. Environmental-related performance measurement in business: From emissions to profit and sustainability? *Ashridge Management Research Group*, 1994.
- [14] B. Kam, G. Smyrnios, R. Walker. Strategic business operations, freight transport and eco-efficiency: A conceptual model. in: *Greening the Supply Chain*, 2003.
- [15] W. Lee. *ISO 14000 Certifications: Environmental Management System*. Prentice-Hall, 1997.
- [16] H. Lewis, J. Gretsakis. Design environment: A global guide to designing greener goods. in: *Greenleaf Publishing*, 2001.

- [17] C. Lin. The significance of ISO 14000 environmental standards for Asia-Pacific. *APO Productivity Journal*, 1995, 65–82.
- [18] R. Mohanty, S. Deshmukh. Managing green productivity: Some strategic directions. *Production Planning and Control*, 1998, **9**(7).
- [19] A. Mosley. Overcoming the practical barriers to implementing performance measures which are linked to organisational goals. London, 1996, 17–18.
- [20] G. Noci. Environmental reporting in Italy: current practices and future developments. *Business Strategy and the Environment*, 2000, **9**: 211–223.
- [21] P. Rao. Greening production: A South East Asian experience. *International Journal of Operations & Production Management*, 2004, **24**(3): 289–320.
- [22] P. Rao, D. Holt. Do green supply chains lead to competitiveness and economic performance. *Journal of operations and production management*, 2005, **25**(9): 898–916.
- [23] D. Sayre. *Inside ISO 14000: the Competitive Advantage of Environmental Management*. St Lucie Press, 1996.
- [24] S. Dobscha, J. Ozanne. An ecofeminist analysis of environmentally sensitive women using qualitative methodology: The emancipatory potential of an ecological life. *Journal of Public Policy & Marketing*, 2001, **20**(2): 201–217.
- [25] R. Sroufe. A framework for strategic environmental sourcing. **in:** *Greening the Supply Chain*, 2003.
- [26] P. Winsemius, U. Guntram. Responding to the environmental challenge. *Business Horizons*, 1992, **35**(2): 12–20.
- [27] G. Zsidisin, S. Siferd. Environmental purchasing: A framework for theory development. *European Journal of Purchasing & Supplying Management*, 2001, **7**: 1–73.
- [28] A. Zuckerman. Changes in the offing on the European standards front. *Journal for Quality & Participation*, 1996, **19**(4): 92–96.