

Soft Factors of Influencing SSCM Implementation in Indian Thermal Power Plants

Jitendra Narayan Biswal¹, Kamalakanta Muduli², Suchismita Satapathy³

¹C V Raman College of Engineering, Bhubaneswar, Odisha (India)

²Papua New Guinea University of Technology, Lae, Morobe Province

^{1,3}KIIT University, Bhubaneswar, Odisha (India)

ABSTRACT

Sustainable Supply Chain Management has received tremendous appreciation from practitioners as well as academicians including thermal power plants owing to its ability to reduce socio-environmental impacts of organizations while helping them achieve the desired economic objective. Similar to any management strategies success of SSCM also depends largely on human resources associated with its implementation. Hence, an understating of the behavioural factors or soft factors that influence human behavior is important. In this context this research has been carried out to explore various behavioural factors of SSCM in thermal power plants. This study has explored 14 soft factors. Prior knowledge of these factors will help the decision makers in analyzing SSCM implementation problem in a better way.

Keywords: *Behavioural Factors, Thermal Power Plants, Sustainable Supply Chain Management (SSCM), Coal*

I. INTRODUCTION

Worldwide awareness on sustainability campaigns for a cleaner and safer earth have initiated the implementation of various policies and stringent regulatory norms towards attaining higher level of TBL sustainability including social, economic and environmental [1]. Moreover, industries are also facing inquiries from global community through non-governmental organizations (NGOs) and media pertaining to the sustainability aspect of their development [2]. In the context of the mentioned, various efforts have been made by several practitioners and academicians to reformulate the traditional supply chain according to socio-environmental priorities, which has led to emergence of SSCM as a potential solution. Several authors have been advocated SSCM implementation could enable organisations to meet their stakeholders' requirements while raising social responsibility and ecological efficiency in supply chains [3-6]. The argument is also supported by several industrial cases which have indicated how a company has earned huge profitability, through sustainable supply chain practices, such as Wal-Mart, Nike, IKEA, Boeing, CISCO, Siemens, Nestle, Herman Miller, Holcim, Lafarge, Dell, and many others [7]. Fascinated by the positive outcomes of SSCM, many organizations across the world are increasingly showing their inclination towards SSCM adoption.

However, effectiveness of SSCM practices of any industry largely depends upon its suppliers. This is because, organizations acquire waste from their suppliers and so the environment is affected by the burden of their downstream supply chain partners [8-9]. In that sense research on issues related to sustainable practices of thermal power industries which act as suppliers to many organisations assumes its importance, particularly when the former has been recognized as the second largest polluting industry, owing to Green House Gasses (GHG) emissions caused by burning of fossil fuels [10]. Further, SSCM practices in thermal power plants (TPPs) depends largely on human resources involved with its implementation. Thus, the objective of this research is to: Explore the soft factors that have an impact on SCSM implementation in thermal power plants

II. SSCM

There has been growing consensus that many of today's socio-environmental hazards have their roots in unsustainable patterns of industrial activities. Consequently, organizations are increasingly focusing on restructuring their supply chain with an aim to reduce their contribution towards these socio-environmental issues either under the influence of external factors such regulation, media, NGOs, customers or with the overall goal to gain a competitive advantage through a green branding. In this context, many organizations see sustainable supply chain management (SSCM) as a potential solution. SSCM is the systemic coordination of key inter-firm business processes to achieve social, environmental, and economic goals [11-12]. SSCM can also be considered as the integration of corporate sustainability into SCM whereby the key dimensions of corporate sustainability are combined with SCM characteristics [3, 13]. Research on SSCM suggests that proactive sustainability yields competitiveness, economic benefits, and better corporate social responsibility [14].

III. SSCM AND SOFT FACTORS

SSCM implementation is a complex phenomenon and its effectiveness depends highly on the human resources of the organization like any other business strategy, because employees are a primary source of organizational strength [15]. The willingness of a person to perform a certain action is equally important as his ability to do particular work owing to the fact that without personal interest and zeal, no one can perform to a level that reaches or exceeds his ability [15]. Hence, the success of operations management tools and techniques, and the accuracy of its theories, relies heavily on our understanding of human behaviour [16]. People often fail to make choices consistent with normative or optimal policy and do so in specific and systematic ways [17-18] suggest that in order to be successful in the application of improvement techniques, it is important to recognize the human element including the resistance to, and, fear of change [19]. Hence, understanding of behavioural factors, representing those aspects that have the potential to affect the behaviour of a person to work for a certain objective [20] is highly essential for enhancement of SSCM performance.

IV. SOFT FACTORS INFLUENCING SSCM

A review of literature on behavioural factors was conducted and identified that few studies addressed behavioural factors in supply chain area. An ISM based hierarchical framework is developed to examine the interrelationship among various behavioural factors affecting green supply chain management implementation in Indian mining industries [15]. In another study [21] compared the relative importance of behavioural and non-behavioural factors on SSCM implementation in Indian mining industries. An integrative model is proposed to study relationship among human behavior and green supply chain [22] Effects of human behaviour, judgment and decision making examined in logistics and supply chain management [17].

The review of literature revealed that no studies has been conducted on soft factors influencing SSCM in TPPs. To bridge this gap the present study attempted to identify potential soft factors of SSCM. Altogether 14 soft factors has been explored in this study which has been listed in the table 1.

Table 1: Behavioural Factors of SSCM

| Behavioural Factors | Description | Reference |
|--|--|-----------|
| 1. Scale of Managerial support for SSCM Implementation | The level of support by the top management of any organization particularly in thermal power plants plays a significant role to motivate it’s employee for effective implementation of SSCM adoption and efficient utilization of environmental resources to excel SSCM practices. It has been argued by the several researchers and practitioners that, the continuous effort and leadership made by top management of any organization prevails its outstanding performance in SSCM practices. | [23-26] |
| 2. Alignment of Incentive | Incentive program is a part of the cash compensation reward system implemented in order to successfully focus employees on the desired outcomes perceived to have a direct link to any corporate or organization success. Employee’s psychological motivation and passion can be boosted by acknowledging their performance with a way of perfect aligned incentive system. | [27] |
| 3. Job security | An employee will be satisfied with his job only when he knows his job is permanent for a long run without fear for turn out of the job at any time. Feeling insecure in the job has a tremendous negative impact on decision making, sincerity, truthfulness towards work performance of an employee. | [28-30] |

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| 4. Education and Training on SSCM | Training is a kind of learning process by which an employee gets more awareness, motivated and shows positive attitude to do the work responsibility with more confidence level to attain organizations goals and success. Poor knowledge and less awareness is the obstacle and failure of a system to adopt a new technology like SSCM, in thermal power plants to maintain its overall performance. | [31-33] |
| 5. Coordination among Various Teams | Efficient coordination, communication, common believes and understanding among various groups of members acting as teams is mostly required to share information, responsibilities, norms, complementary, knowledge, technicalities to attain goals and objectives of an organization than the individual knowledge which may be reluctant to change to implement SSCM practices. | [31, 34,35] |
| 6. Participative work culture | It is the philosophy, which is the cornerstone of diversity and empowerment to enhance SSCM adoption practices to acknowledge different cultures to build up powerful working relationships to attain potential sustainable growth. It is also an incredibly crucial powerful source to determine the success of adoption practices involving employees and the organization satisfactorily. | [15-31] |
| 7. Technological Innovation towards SSCM | Innovations are the ingenious thoughts of a group of members or of an individual's through various skill development and knowledge based training keeping in view of research and development for a successful implementation of SSCM practices to improve waste reduction and reutilization processes. | [20, 31, 34, 36] |
| 8. Employee Readiness for Adoption of SSCM related changes | Readiness can be defined as prepared mentally and physically for an experience or an activity. Readiness to adopt changes by the people (employees or other stakeholders) is the critical precursor either for a successful organizational change or failure, those who are the genuine cause of and vehicle to clinch or resist changing. | [37-39] |
| 9. Continuous improvement in SSCM effort | Bhuiyan and Bagehel (2005) reviewed some definitions of CI which is otherwise known as continual improvement and defined it as "a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization. It involves everyone working together to make improvements without necessarily making huge capital investments. In the competitive global market environment, it is a trend of challenge | [40-41] |

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| | to sustain tremendous pressure on the thermal power organizations to adopt SSCM practices to enhance their capabilities to pose its position in the marketplace which needs the initiatives keeping in view of innovative quality strategies and performance development of the organizations. | |
| 10. Safety at Work Place | Providing better workplace with safety for the employees, an organization improves job satisfaction level, physical and moral conditions to its highest degree leading to enhancement in productivity. Since thermal power plants are prone to unsafe and un-hygienic working conditions, it is the responsibility of thermal power industries to provide its employees the best working place with adequate safety measures to eliminate accidents, hazards and environmental pollutions. | [27, 34, 42-44] |
| 11. Organizational Policies towards SSCM | Maintaining a success, smooth, efficient and effective management, the organizations should formulate the policies so as to reduce the complexity of the rules and regulations imposed on the employees to work freely with sovereignty to build up more new idea in an effective ways. | [45-47] |
| 12. Policies to Recruit and Retain Good Talent | Policies by the organization should be framed keeping in view the long term retention capacity of the employees with good talent so as to achieve the best performance. Poor recruiting process may have the negative effects on the performance due to more costs to be expensed on training to increase the performance, subsequently increasing the morality of the employees. | [48-49] |
| 13. Knowledge sharing | Knowledge sharing is regarded as an intellectual capital of an employee. It facilitates incorporation of new idea, methods, processes and techniques instead of older one along with extra knowledge of the employees, essential to enhance effectiveness of SSCM practices of the organization. | [50-51] |
| 14. Quality of Work life | Different psychological issues related to societal, economic and environmental along with physical conditions and aesthetics are the part of excellence of quality of work of life. Effective innovativeness is the basic criteria to improve organization performance and job satisfaction which can be upgraded by providing best quality of life to the employees | [52-53] |

V. CONCLUSION

The kinds of problems a thermal power industry may encounter during SSCM practices are many and complex in nature, involving not only the ability to use materials and processes but also to manage human resources successfully. Human resources, being responsible for implementation of any business strategies influence the performance of organizational objectives, including those related to environmental and social performance [31]. In this context, an understanding of the behavioural factors that affect the willingness and ultimately the effectiveness of human resources in the SSCM environment assumes importance [15]. The present work sought to explore the potential behavioural factors influencing SSCM in Indian TTPs. Fourteen behavioural factors has been identified in the study through review of relevant literature followed by consultation with experts.

REFERENCES

- [1] P. R. C. Gopal and J. Thakkar, Analyzing critical success factors to implement sustainable supply chain practices in Indian automobile industry: a case study, *Production Planning & Control*, 27(12), 2016, 1005-1018.
- [2] S. Zailani, K. Jeyaraman, G. Vengadasan, and R. Premkumar, Sustainable supply chain management (SSCM) in Malaysia: A survey, *International Journal of Production Economics*, 140(1), 2012, 330–340.
- [3] P. Ahi and C. Searcy, A comparative literature analysis of definitions for green and sustainable supply chain management, *Journal of Cleaner Production*, 52, 2013, 329–341.
- [4] J. Gualandris and M. Kalchschmidt, Customer pressure and innovativeness: Their role in sustainable supply chain management, *Journal of Purchasing and Supply Management*, 20(2), 2014, 92–103.
- [5] Q. Zhu, J. Sarkis, and Y. Geng, Green supply chain management in China: pressures, practices and performance, *International Journal of Operations & Production Management*, 25(5), 2005, 449-468.
- [6] J. Gualandris and M. Kalchschmidt, Mitigating the effect of risk conditions on supply disruptions: the role of manufacturing postponement enablers, *Production Planning & Control*, 26(8), 2015, 637-653.
- [7] R. Dubey, A. Gunasekaran, and S. S. Ali, Exploring the relationship between leadership, operational practices, institutional pressures and environmental performance: A framework for green supply chain, *International Journal of Production Economics*, 160, 2015, 120–132.
- [8] T. H. Arimura, N. Darnall, and H. Katayama, Is ISO 14001 a gateway to more advanced voluntary action? The case of green supply chain management, *Journal of Environmental Economics and Management*, 61(2), 2011, 170–182.
- [9] K. Govindan, K. Muduli, K. Devika, and A. Barve, Investigation of the influential strength of factors on adoption of green supply chain management practices: An Indian mining scenario. *Resources, Conservation and Recycling*, 107, 2016, 185–194.
- [10] S. Soda, A. Sachdeva, and R. K. Garg, Green Supply Chain Management in Power Industry of Punjab: Evaluation of Key Drivers by using ISM, *Proceedings of SOM*, 2014, 418-429

- [11] F. Teuteberg and D. Wittstruck, A Systematic Review of Sustainable Supply Chain Management Research - What is there and what is missing? In Tagungsband zur Multikonferenz Wirtschaftsinformatics, 203, 2010, 1001–1015.
- [12] B. J. Mariadoss, T. Chi, T. P. Anshaj, and N. Pomirleanu, Influences of Firm Orientations on Sustainable Supply Chain Management, *Journal of Business Research*, 69(9), 2016, 3406-3414.
- [13] D. Turker and C. Altuntas, Sustainable supply chain management in the fast fashion industry: An analysis of corporate reports, *European Management Journal*, 32(5), 2014, 837–849.
- [14] Y.H. Lin and M. L. Tseng, Assessing the competitive priorities within sustainable supply chain management under uncertainty, *Journal of Cleaner Production*, 112, 2014, 2133–2144.
- [15] K. Muduli, K. Govindan, A. Barve, D. Kannan, and Y. Geng, Role of behavioural factors in green supply chain management implementation in Indian mining industries, *Resources, Conservation and Recycling*, 76, 2013, 50-60.
- [16] E. Bendoly, K. Donohue, and K. L. Schultz, Behavior in operations management: Assessing recent findings and revisiting old assumptions, *Journal of Operations Management*, 24(6), 2006, 737–752.
- [17] T. Tokar, Behavioural research in logistics and supply chain management, *The International Journal of Logistics Management*, 21(1), 2010, 89–103.
- [18] D. Reis and L. Pena, Reengineering the motivation to work, *Management Decision*, 39(8), 2001, 666-675.
- [19] C. Atilgan and P. McCullen, Improving supply chain performance through auditing: a change management perspective, *Supply Chain Management: An International Journal*, 16(1), 2011, 11–19.
- [20] S. Grover, V. P. Agrawal, and I. A. Khan, Role of human factors in TQM: a graph theoretic approach, *Benchmarking: An International Journal*, 13(4), 2006, 447-468.
- [21] L. Shen, K. Muduli, and A. Barve, Developing a sustainable development framework in the context of mining industries: AHP approach, *Resources Policy*, 46, 2015, 15–26.
- [22] C. J. C. Jabbour and A. B. L. de S. Jabbour, Green Human Resource Management and Green Supply Chain Management: linking two emerging agendas, *Journal of Cleaner Production*, 2015, 1–10.
- [23] S. Luthra, V. Kumar, S. Kumar, and A. Haleem, Barriers to implement green supply chain management in automobile industry using interpretive structural modeling technique: An Indian perspective, *Journal of Industrial Engineering and Management*, 4(2), 2011, 231-257.
- [24] M. L. Tseng, Y. H. Lin, A. S. F. Chiu, and J. C. H. Liao, Using FANP approach on selection of competitive priorities based on cleaner production implementation: a case study in PCB manufacturer, Taiwan, *Clean technologies and environmental policy*, 10(1), 2008, 17-29.
- [25] R. K. Mudgal, R. Shankar, P. Talib, and T. Raj, Modelling the barriers of green supply chain practices: an Indian perspective, *International Journal of Logistics Systems and Management*, 7(1), 2010, 81-107.
- [26] E. U. Olugu, K. Y. Wong, and A. M. Shaharoun, Development of key performance measures for the automobile green supply chain, *Resources, conservation and recycling*, 55(6), 2011, 567-579.

- [27] R. Bhool and M. S. Narwal, An analysis of drivers affecting the implementation of green supply chain management for the Indian manufacturing industries, *International Journal of Research in Engineering and Technology*, 2(11), 2013, 2319-1163.
- [28] G. Kraja, Job Security and Performance: Case Study of the Albanian Public Administration, *Academic Journal of Interdisciplinary Studies*, 4(2), 2015, 19.
- [29] S. Anwar, M. Aslam, and M. R. Tariq, Temporary job and its impact on employee performance, *Global Journal of Management and Business Research*, 11(8), 2011.
- [30] G. Jandaghi, A. Mokhles, and H. Bahrami, The impact of job security on employees' commitment and job satisfaction in Qom municipalities, *African Journal of Business Management*, 5(16), 2011, 6853.
- [31] C. J. C. Jabbour and F. C. A. Santos, Relationships between human resource dimensions and environmental management in companies: proposal of a model, *Journal of Cleaner Production*, 16(1), 2008, 51–58.
- [32] H. Walker, L. Di Sisto, and D. McBain, Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors, *Journal of Purchasing and Supply Management*, 14(1), 2008, 69–85.
- [33] W. Y. Wong, A holistic perspective on quality quests and quality gains: The role of environment, *Total Quality Management*, 9(4-5), 1998, 241-245.
- [34] K. Muduli and A. Barve, Sustainable development practices in mining sector: a GSCM approach, *International Journal of Environment and Sustainable Development*, 12(3), 2013, 222-243.
- [35] R. Müller, K. Spang, and S. Ozcan, Cultural differences in decision making in project teams, *International Journal of Managing Projects in Business*, 2(10), 2008, 70-93.
- [36] A. Barve, A. Kanda, and R. Shankar, The role of human factors in agile supply chains, *European Journal of Industrial Engineering*, 3(1), 2009, 2–20.
- [37] A. E. Rafferty, N. L. Jimmieson, and A. A. Armenakis, Change readiness: A multilevel review, *Journal of Management*, 39(1), 2013, 110-135.
- [38] A. Shirazi, S. Mortazavi, and N. Pourazad, Factors affecting employees' readiness for knowledge management, *European journal of economics, Finance and Administrative Sciences*, 2011, 7.
- [39] S. Hendrickson and E. J. Gray, Legitimizing resistance to organizational change: a social work social justice perspective, *International Journal of Humanities and Social Science*, 2(5), 2012, 50-59.
- [40] M. Lepmets, A. Cater-Steel, F. Gacenga, and E. Ras, Extending the IT service quality measurement framework through a systematic literature review, *Journal of Service Science Research*, 4(1), 2012, 7-47.
- [41] M. Radenkovic, B. Jeremic, P. Todorovic, M. Djapan, M. Milosevic, and P. Mijovic, Improvement of quality in production process by applying kaikaku method, *International Journal for Quality Research*, 7(4), 2013, 585-594.
- [42] S. Luthra, M. A. Qadri, D. Garg, and A. Haleem, Identification of critical success factors to achieve high green supply chain management performances in Indian automobile industry, *International Journal of Logistics Systems and Management* 1, 18(2), 2014, 170-199.

- [43] L. K. Toke, R. C. Gupta, and M. Dandekar, An empirical study of green supply chain management in Indian perspective, *International Journal of Applied Sciences and Engineering Research* 1(2), 2012, 372–383.
- [44] R. K. Mudgal, R. Shankar, P. Talib, and T. Raj, Greening the supply chain practices: an Indian perspective of enablers' relationships, *International Journal of Advanced Operations Management*, 1(2/3), 2009, 151.
- [45] H. Abbasi, Corporate Social Responsibilities: Issues and Challenges, *International Journal of Engineering Science*, 6(5), 2016, 5821-5826.
- [46] S. Luthra, V. Kumar, S. Kumar, and A. Haleem, Barriers to implement green supply chain management in automobile industry using interpretive structural modeling technique: An Indian perspective, *Journal of Industrial Engineering and Management*, 4(2), 2011, 231-257.
- [47] C. Y. Lin and Y. H. Ho, An empirical study on logistics service providers' intention to adopt green innovations, *Journal of Technology Management & Innovation*, 3(1), 2008, 17-26.
- [48] M. Kanyemba, C. G. Iwu, and C. O. K. Allen-Ile, Impact of recruitment and selection on organizational productivity. Evidence from staff of a university in South Africa, *Corporate Ownership and Control*, 12(2), 2015, 177–185.
- [49] Y. S. Mangusho, R. K. Murei, and E. Nelima, Evaluation of Talent Management on Employees Performance in Beverage Industry: A Case of Delmonte Kenya Limited, *International Journal of Humanities and Social Science*, 5(8), 2015, 191-199.
- [50] H. Abdul-Jalal, P. Toulson, and D. Tweed, Knowledge sharing success for sustaining organizational competitive advantage. *Procedia Economics and Finance*, 7, 2013, 150-157.
- [51] O. H. Kuzu and D. Ozilhan, The effect of employee relationships and knowledge sharing on employees' performance: An empirical research on service industry, *Procedia-Social and Behavioral Sciences*, 109, 2014, 1370-1374.
- [52] R. Geetha and R. S. Mani, Quality of Work Life: A Literature Review, *International Journal of Applied Engineering Research*, 11(16), 2016, 8928-8931.
- [53] B. Parsa, K. B. Idris, B. B. A. Samah, N. W. B. A. Wahat, and P. Parsa, Relationship between quality of work life and career advancement among Iranian academics, *Procedia-Social and Behavioral Sciences*, 152, 2014, 108-111.