THE RELATIONSHIP OF SOCIO-TECHNICAL 5S PRACTICES ON SUSTAINABILITY PERFORMANCE THROUGH RELATIONAL COORDINATION IN JAVA ISLAND MANUFACTURING SMEs

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DOCTOR OF PHILOSOPHY

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A dissertation submitted
in partial fulfillment of the requirements for the degree of
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2024

DECLARATION

I declare that this dissertation entitled “The Relationship of Socio-Technical 5S Practices on Sustainability Performance Through Relational Coordination in Java Island Manufacturing SMEs“ is the result of my own research except as cited in the references. The dissertation has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :.....

Name : Nashrullah Setiawan.....

Date : 15/08/2024….....

APPROVAL

I hereby declare that I have read this dissertation and in my opinion this dissertation is sufficient in terms of scope and quality as a partial fulfillment of Doctor of Philosophy

Signature :.....

Supervisor Name : Profesor Dr. Mohd Rizal Bin Salleh.....

Date : 15/08/2024.....

DEDICATION

To my beloved mother Hj. Hestuti and father H. Syafaruddin Alwi.

To my beloved mother-in-law Hj. Mursiyah and father-in-law H. Kadiran.

To my beloved wife Arsi Noviana Sari.

To my children Nurul Fasya Azzahra, Muhammad Rafiq Alhaqqi, Muhammad Azhar Khairi, Muhammad Adzka ‘Ilmi, and Muhammad Fawwaz Ramadhan.

To my beloved brother and sister.

ABSTRACT

The enhancement of sustainability performance becomes a critical parameter for enhancing the competitiveness of small and medium enterprises (SMEs) in the manufacturing sector on Java Island, Indonesia. One strategy that is widely recognized as the basic continuous improvement process is through the implementation of 5S practices. However, there were problems and research gaps in balancing social and technical aspects that support the sustainability of 5S practices. These issues have been addressed in previous studies through the integration of 5S practices with various technical management platforms such as Plan-Do-Check-Action, Reducing Waste, Total Quality Management, and Quality Management System. However, there were limited studies that focused on social mechanisms such as relational coordination. Therefore, this study aims to propose a conceptual model that examines the influence relationship between social aspects of 5S practices (SA5S) and technical aspects of 5S practices (TA5S) on sustainability performance (SP) mediated by relational coordination (RC) variables among stakeholders (leaders, employees, customers, and suppliers). This research was conducted with a deductive-quantitative strategy, survey questionnaires, and a cross-sectional study to examine the relationship between variables through the proposed hypotheses. The population frame and sample size are based on manufacturing SMEs units in Java Island, Indonesia, that focused on implementing 5S practices assisted by government agencies. The research has gathered 131 participants, predominantly managers, through purposive sampling. The data were then analyzed using structural equation modeling (SEM) with IBM-SPSS-AMOS version 24.0 software. The findings of this study showed that the proposed model has achieved the validity based on Goodness of Fit criteria of SEM. From the hypothesis analysis, the social and technical aspects of 5S practices have a positive and significant direct effect on relational coordination among stakeholders (Hypothesis 1 and Hypothesis 2). Similarly, relational coordination has a positive and significant direct impact on sustainability performance (Hypothesis 5). In term of the influence social aspects of 5S practices on sustainability performance, it is a significant direct effect (Hypothesis 3). In contrast, the technical aspects of 5S practices do not has a significant direct effect on sustainability performance (Hypothesis 4). Based on the mediation test, the results show that relational coordination is proven to be significant in mediating the social aspects of 5S practices, partially affecting sustainability performance (hypothesis 6). Meanwhile, relational coordination fully mediates between the technical aspects of 5S practices and sustainability performance (hypothesis 7). Finally, it could be concluded that the valid model can be illustrated by the achievement level of all latent constructs (SA5S, TA5S, RC, and SP), and hypothetically, the social and technical aspects of 5S practices considerably affect sustainability performance through relational coordination among stakeholders in manufacturing SMEs in Java Island, Indonesia.

HUBUNGAN AMALAN SOSIO-TEKNIKAL 5S TERHADAP KEMAMPANAN PRESTASI MELALUI PENYELARASAN HUBUNGAN DI PKS PEMBUATAN DI PULAU JAWA

ABSTRAK

Peningkatan prestasi kemampanan menjadi parameter kritikal untuk meningkatkan daya saing perusahaan kecil dan sederhana (PKS) dalam sektor pembuatan di Pulau Jawa, Indonesia. Satu strategi yang diiktiraf secara meluas sebagai proses penambahbaikan berterusan asas adalah melalui pelaksanaan amalan 5S. Walau bagaimanapun, terdapat masalah dan jurang penyelidikan dalam mengimbangi aspek sosial dan teknikal yang menyokong kemampanan amalan 5S. Isu-isu ini telah ditangani dalam kajian lepas melalui penyepaduan amalan 5S dengan pelbagai platform pengurusan teknikal seperti Plan-Do-Check-Action, Mengurangkan Sisa, Pengurusan Kualiti Menyeluruh dan Sistem Pengurusan Kualiti. Walau bagaimanapun, terdapat kajian terhad yang memberi tumpuan kepada mekanisme sosial seperti penyelarasan hubungan. Oleh itu, kajian ini bertujuan untuk mencadangkan model konseptual yang mengkaji hubungan pengaruh antara aspek sosial amalan 5S (SA5S) dan aspek teknikal amalan 5S (TA5S) terhadap prestasi kelestarian (SP) yang dimediasi oleh pembolehubah koordinasi hubungan (RC) di kalangan pihak berkepentingan (pemimpin, pekerja, pelanggan dan pembekal). Penyelidikan ini dijalankan dengan strategi deduktif-kuantitatif, soal selidik tinjauan, dan kajian keratan rentas untuk mengkaji hubungan antara pembolehubah melalui hipotesis yang dicadangkan. Rangka populasi dan saiz sampel adalah berdasarkan unit PKS pembuatan di Pulau Jawa, Indonesia, yang memberi tumpuan kepada pelaksanaan amalan 5S dibantu oleh agensi kerajaan. Penyelidikan telah mengumpulkan 131 peserta, kebanyakannya pengurus, melalui persampelan bertujuan. Data tersebut kemudiannya dianalisis menggunakan pemodelan persamaan struktur (SEM) dengan perisian IBM-SPSS-AMOS versi 24.0. Dapatan kajian ini menunjukkan model yang dicadangkan telah mencapai kesahan berdasarkan kriteria kesesuaian untuk SEM. Daripada analisis hipotesis, aspek sosial dan teknikal amalan 5S mempunyai kesan langsung yang positif dan signifikan terhadap penyelarasan hubungan di kalangan pihak berkepentingan (Hipotesis 1 dan Hipotesis 2). Begitu juga, penyelarasan hubungan mempunyai kesan langsung yang positif dan signifikan terhadap prestasi kemampanan (Hipotesis 5). Dari segi pengaruh aspek sosial amalan 5S terhadap prestasi kemampanan, ia merupakan kesan langsung yang ketara (Hipotesis 3). Sebaliknya, aspek teknikal amalan 5S tidak mempunyai kesan langsung yang ketara ke atas prestasi kemampanan (Hipotesis 4). Berdasarkan ujian pengantaraan, keputusan menunjukkan bahawa penyelarasan hubungan terbukti signifikan dalam pengantaraan aspek sosial amalan 5S, sebahagiannya mempengaruhi prestasi kemampanan (hipotesis 6). Sementara itu, penyelarasan hubungan menjadi pengantara sepenuhnya antara aspek teknikal amalan 5S dan prestasi kemampanan (hipotesis 7). Akhirnya, boleh disimpulkan bahawa model yang sah boleh digambarkan melalui tahap pencapaian semua konstruk latent (SA5S, TA5S, RC, dan SP), dan secara hipotesis, aspek sosial dan teknikal amalan 5S banyak mempengaruhi prestasi kemampanan melalui penyelarasan hubungan antara pihak berkepentingan dalam pembuatan PKS di Pulau Jawa, Indonesia.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AHP	-	Analytical Hierarchical Process
AMOS	-	Analysis of Moment Structure
CFA	-	Confirmatory Factor Analysis
CnV	-	Convergent Validity
CR	-	Critical Ratio
CSFs	-	Critical Success Factors
CV	-	Coefficient of Variations
GDP	-	Gross Domestic Product
ISM	-	Interpretive Structural Model
ISO	-	International Standardization Organization
JIT	-	Just In Time
LM	-	Lean Manufacturing
LSS	-	Lean Six Sigma
MD	-	Mahalanobis Distance
MDC	-	Managerial Design Competencies
MP	-	Manufacturing Performance
MPC	-	Malaysia Productivity Corporation
MSMEs	-	Micro, Small and Medium Enterprises
MT	-	Mediating Theory
OE	-	Organizational Effectiveness
OHS	-	Occupational Health and Safety
OP	-	Operational Performance
PCFA	-	Pooled Confirmatory Factor Analysis

PDSA	-	Plan, Do, Study, and Action
RC	-	Relational Coordination
SA5S	-	Social Aspects of 5S Practices
SD	-	System Dynamic
SEM	-	Structural Equation Model
SMED	-	Single Minutes Exchange of Dies
SMEs	-	Small and Medium Enterprises
SP	-	Sustainability Performance
SPSS	-	Statistical Package for the Social Sciences
STD	-	Standard Deviation
STS	-	Socio-technical System
TA5S	-	Technical Aspect of 5S Practices
TPM	-	Total Productive Maintenance
TPS	-	Toyota Production System
TQM	-	Total Quality Management
VSM	-	Value Stream Mapping

LIST OF SYMBOLS

α	-	Cronbach's alpha
β	-	Regression coefficient of the causal effect between X and Y
β_0	-	Regression coefficient of constant variable
df	-	Degree of freedom
e_i	-	Error of variance
IDR	-	Indonesian Rupiahs
L_i	-	Loading factor
X	-	Exogenous Variable
Y	-	Endogenous Variable
k	-	The number of items in the questionnaire instrument
σ_i^2	-	The sum of the variances of the instrument items
σ_x^2	-	Total score variance
s	-	Standard deviation
$\bar{x}$	-	Means value
n	-	Number of samples