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Ravinder Singh

ABSTRACT

The Indian automobile industry, comprising vehicle and component manufacturers, has grown steadily since the economic liberalization of the early 1990s. The arrival of major global auto companies has galvanized the domestic sector into adopting supply management best practices. Sourcing/ supply disruptions due to various factors like tier 2 stoppages, disasters, supplier financial stress, suppliers' union issues, economic catastrophe, acts of terrorism/ war etc. have increased in the recent past, posing challenges to the Indian automobile industry. Strategic sourcing (SS) plays a centric role in the overall automotive industry competitiveness and therefore, understanding and analysing involves studying it from the risk management context. This study has covered the entire facets/ issues taken from the extensive literature survey and ensuing detailed industry scan on risk management (RM) in the automobile sector commencing with the strategic imperatives or motivation in adopting strategic sourcing risk management (SSRM) practices to the final outcome, i.e. competitive advantage. Therefore, this holistic aspect of strategic sourcing coupled with the risk management perspective makes this a unique study specifically undertaken in the context of the Indian automobile industry.

There have been quite a few studies on various aspects of sourcing/ supply network management. However, these have mainly been concentrated in developed economies and focussed on specific aspects such as import of cost, outsourcing, global sourcing and determinants of supply network management. This research has a number of implications for both academicians and practitioners. This study is one of the few that explores the issue of SSRM in developing countries. The Indian automobile sector has a strong positive correlation with macro-economic factors and therefore, managers rely on country risk analysis and exchange rate risk while decision-making. More significantly, it studies SSRM as a 'continuum' from the strategic imperatives to the overall benefits accruing, as a result, to both the vehicle manufacturers/ assemblers and their suppliers. A new comprehensive SSRM normative framework has been developed and tested which incorporates the theoretical and practical constructs of strategic sourcing and risk management.

In the literature various authors have mentioned the growing importance of risks in strategic sourcing and global sourcing. The cost structures in supply network are dynamic and static decisions based on a one particular scenario may be detrimental for the automobile industry or the whole supply network. The traditional sourcing management models and frameworks are focussed on goals like cost reduction, quality improvement, supply assurance,

new product development etc. The risk management as a sourcing management goal has been under looked. In this research we have integrated risk management with the strategic sourcing process.

First we developed a 'Risk Assessment Index' model for strategic sourcing. The generic risk sources identification and assessment framework has been developed for the Indian automobile industry by employing a Bayesian network model incorporating both qualitative and quantitative risk factors.

In the second step, we assessed the organizational process variables that help in implementing a risk management model for the strategic sourcing process. In this we established the drivers of the strategic sourcing risk management, i.e barriers and enablers, by means of an exploratory factor analysis (EFA). We analyzed the relative importance of each one and through the force field analysis (FFA) we determined the current position of Indian automotive industry with respect to SSRM barrier and enablers.

In the subsequent step, we developed a unique risk adjusted total cost of ownership (TCO) supplier selection model in the global sourcing context, wherein both the transaction costs as well as risks are incorporated for the first time. The integration of two methodologies analytical hierarchical process (AHP) and data envelopment analysis (DEA) is unique and these methods are appropriate for supplier selection in today's global volatile economic environment. An overall comprehensive normative SSRM framework has been developed and validated by means of a case study as part of this research work incorporating the above-mentioned models. This normative framework shall provide an effective practical platform to the Indian automotive industry for harnessing the advantages of SSRM.

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LIST OF ABBREVIATIONS

AHP	-	Analytical Hierarchical Process
ANNs	-	Artificial Neural Networks
BBN	-	Bayesian Belief Network
BN	-	Bayesian Network
BSES	-	Bharat stage emission standards
CPT	-	Conditional Probability Table
DEA	-	Data Envelopment Analysis
DMUs	-	Decision Making Units
DAG	-	Directed Acyclic Graph
ERM	-	Enterprise risk management
EFA	-	Exploratory Factor Analyses
FMEA	-	Failure mode and effect analysis,
FFA	-	Force Field Analysis
IIP	-	Index of Industrial Production
IDEF0	-	Integrated Definition for Function Modelling
KMO	-	Kaiser Meyer Olkin
OEM	-	Original Equipment Manufacturer
OM-AHP	-	Orders-of-Magnitude AHP
OECD	-	Organization for Economic Co-operation and Development
OGD	-	Open Government Data
PRA	-	Probabilistic Risk Assessment
PMM	-	Procurement Maturity Model
RA	-	Risk Assessment
RBA	-	Risk Benefit Analysis
RFs	-	Risk Factors
RM	-	Risk Management
RPNs	-	Risk Priority Numbers
SS	-	Strategic Sourcing
SSRM	-	Strategic Sourcing Risk Management
SMEs	-	Subject Matter Experts
SCM	-	Supply Chain Management

SCNM	-	Supply Chain Network Management
SN	-	Supply Network
SNM	-	Supply Network Management
TCO	-	Total Cost of Ownership
VA	-	Vehicle Assembler
WRPN	-	Weighted Risk Priority Numbers