

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vii
LIST OF FIGURES	xiii
LIST OF TABLES	xv
LIST OF ABBREVIATIONS	xvii
LIST OF INDICES AND PARAMETERS	xxi
PREFACE	xxvii
1. INTRODUCTION	1
1.1. Introduction	1
1.1.1. Supply Chain (SC)	3
1.1.2. Supply Chain Management (SCM)	5
1.1.3. Supply chain risk, vulnerability, and disruptions (SVDs)	7
1.1.4. Supply Chain Risk Management (SCRM)	10
1.2. The Concept of the Resilience in Supply Chain	15
1.2.1. Resilience	15
1.2.2. Resilient Supply Chain (RSC)	18
1.2.3. RSC Capabilities	22
1.2.4. RSC Practices	32
1.2.5. Barriers to the RSC	41
1.3. Modeling Practices and the Barriers of the RSC	54
1.4. Assessment of the resilient Score of the SC	59
1.5. Background and Motivation of the Topic	61
1.6. Objectives of the Research Work	65

1.7. Scope of the Work	68
1.8. Organization of the Thesis	70
2. CAUSAL DEPENDENCE RELATIONSHIPS AMONG THE PRACTICES OF THE RSC	73
2.1. Capabilities of the RSC	75
2.2. Resilient Practices of the SC	83
2.3. Methodology	97
2.3.1. Identification of the Resilient Practices	99
2.3.2. Defining the Contextual Relationship and Developing a Structural Self-Interaction Matrix (SSIM)	99
2.3.3. Interpretation of Dependence Relationships	102
2.3.4. Development of the reachability matrix	103
2.3.5. MICMAC Analysis	103
2.3.6. Level Partition of the RSC Practices	105
2.3.7. Developing Digraph	107
2.3.8. Development of an Interaction Matrix and Total Interpretive Structural Model	112
2.4. Result	122
2.5. Conclusion	126
3. ESTIMATING THE UTILITY OF THE RESILIENT PRACTICES FOR RSC	129
3.1. Conceptual framework	129
3.2. Methodology	133
3.2.1. Estimating the Importance of the Resilient Practices	134
3.2.1.1. Identification of the customer requirements	135

(WHATs) and design requirements (HOWs)	
3.2.1.2. Determination of the importance weight of WHATs	136
3.2.1.3. Evaluating the resilience performance of the case organization with respect to the resilient capabilities (P_{Res})	136
3.2.1.4. Identification of the correlation between resilient practices (g_{jk})	137
3.2.1.5. Determination of relationships between RSC practices and capabilities (R_{ji})	137
3.2.1.6. Determination of the initial ratings resilient practices of the RSC (D_j)	141
3.2.1.7. Determination of the final ratings of the resilient practices (D'_j)	143
3.2.2. Consistency Check of the Data	146
3.3. Result and Discussion	147
3.4. Conclusion	152
4. EVALUATING THE RESILIENCE LEVEL OF AN INDIAN MANUFACTURING SUPPLY CHAIN	155
4.1. Conceptual Framework	156
4.2. Methodology	170
4.2.1. Linguistic Scale for the Assessment of the Importance Weight and the Performance Rating	171
4.2.2. Collecting and Aggregating the Expert Response	172
4.2.3. Evaluating the Resilience Fuzzy Index (RFI) and	183

Performance Fuzzy Index (PFI)	
4.2.3.1. Evaluating Resilience Score at Resilient Practice	184
Level (RP_i)	
4.2.3.2. Evaluating the Resilience Fuzzy Index (RFI)	185
4.2.3.3. Approximating the Resilience Level	187
4.2.3.4. Evaluating the Performance Fuzzy Index	189
4.3. Result and Discussion	191
4.4. Conclusion	196
5. ANALYZING THE FACTORS OPPOSING THE RESILIENT	199
BEHAVIOR OF THE RSC	
5.1. Barriers to the RSC	201
5.2. Methodology	208
5.2.1. Fuzzy Set Theory	209
5.2.1.1. Normalizing Expert’s Response	211
5.2.1.2. Determining the Left (ls) and Right (rs)	213
Normalized Value	
5.2.1.3. Determining the Total Normalized Crisp Values	217
5.2.1.4. Determining the Final Crisp Values	218
5.2.1.5. Determining the direct-relation matrix	221
5.2.2. DEMATEL	221
5.2.2.1. Identification of the Factors of the System Under	222
Consideration	
5.2.2.2. Development of the Relation Matrix	222
5.2.2.3. Development of the Initial Direct-Relation Matrix	223
5.2.2.4. Calculating the Normalized Direct-Relation	223

Matrix	
5.2.2.5. Development of the Total Relational Matrix	223
5.2.2.6. Identifying the Cause Group And Influence	224
Group Factors and Developing their Causal And	
Effect Graph	
5.2.2.7. Determining the Relative Priority Weights of the	226
barriers	
5.3. Result And Discussion	229
5.4. Conclusion	234
6. CONCLUSIONS	247
6.1. Conclusions	247
6.1.1. Theoretical Contribution	251
6.1.2. Managerial Contribution	252
6.1.3. Limitations and the Future Research	256
References	259
Appendix A	
Appendix B	
List of papers published/accepted for publication	

