
Contents

<i>Preface</i>	xi
<i>Author Biographies</i>	xiii
<i>Acknowledgments</i>	xv
1 Technology innovation and its significance	1
1.1 <i>Introduction</i> 1	
1.2 <i>Innovation typology</i> 2	
1.3 <i>Technology innovation defined</i> 2	
1.4 <i>Important sources of technology innovation</i> 4	
1.5 <i>Significance of technological innovation</i> 6	
1.6 <i>Technological innovation in manufacturing industries</i> 8	
1.7 <i>Concluding remarks</i> 8	
2 Globalization and its impact on technology innovation	11
2.1 <i>Introduction</i> 11	
2.2 <i>Globalization and fourth industrial revolution</i> 11	
2.3 <i>Positive and negative consequences of globalization</i> 12	
2.4 <i>Effect of globalization on technology innovation in manufacturing industries</i> 13	
2.5 <i>Need for technology innovation in the era of globalization</i> 14	
2.6 <i>Concluding remarks</i> 14	
3 Technology innovation initiatives in manufacturing industries	15
3.1 <i>Introduction</i> 15	
3.2 <i>Technology innovation initiatives</i> 15	
3.2.1 <i>Entrepreneurial capability</i> 16	
3.2.1.1 <i>Education level of entrepreneur</i> 17	

3.2.1.2	<i>Entrepreneur training</i>	17
3.2.1.3	<i>Technical competencies of entrepreneur</i>	18
3.2.1.4	<i>Work experience of entrepreneur</i>	18
3.2.1.5	<i>Financial schemes and loan procedure</i>	19
3.2.2	<i>Technology infrastructure capability</i>	20
3.2.2.1	<i>Material resources</i>	20
3.2.2.2	<i>Research and development expenditure</i>	21
3.2.2.3	<i>Marketing and promoting products</i>	22
3.2.2.4	<i>Manufacturing technology entirely new to firm</i>	22
3.2.2.5	<i>Financial strategies for utilization of funds</i>	23
3.2.2.6	<i>Loans from bank for technology innovation</i>	23
3.2.3	<i>Organizational culture and climate</i>	23
3.2.3.1	<i>Motivation of employees</i>	24
3.2.3.2	<i>Training of employees</i>	25
3.2.3.3	<i>Availability of skilled manpower</i>	25
3.2.4	<i>Government initiatives</i>	26
3.2.4.1	<i>Government support in acquiring latest technology</i>	26
3.2.4.2	<i>Funds for r&d initiatives</i>	27
3.3	<i>Concluding remarks</i>	27
4	Reliability analysis of technology innovation initiatives	29
4.1	<i>Introduction</i>	29
4.2	<i>Analyses of Preliminary data</i>	29
4.2.1	<i>Entrepreneurial capability (EC) issues</i>	29
4.2.2	<i>Technology infrastructure capability (TIC) issues</i>	32
4.2.3	<i>Organization culture and climate (OCC) issues</i>	34
4.2.4	<i>Government initiative (GI) issues</i>	34
4.2.5	<i>Manufacturing performance parameter (MPP) issues</i>	36
4.3	<i>Relationship between various TIIs and MPPs</i>	38
4.4	<i>Contribution of tiis in achieving manufacturing performance enhancement</i>	41
4.4.1	<i>Validation of hypotheses</i>	44
4.5	<i>Concluding remarks</i>	45

5 Multi-criteria decision-making techniques	47
5.1 <i>Introduction</i>	47
5.2 <i>Evaluation of tiis using fuzzy-based model</i>	47
5.3 <i>Fuzzy inference systems (fis)</i>	48
5.3.1 <i>Fuzzification</i>	48
5.3.2 <i>Rule evaluation</i>	49
5.3.3 <i>Defuzzification</i>	50
5.3.3.1 <i>Fuzzification of TI</i>	50
5.3.3.2 <i>Product performance</i>	50
5.3.3.3 <i>Sales performance</i>	51
5.3.4 <i>Result: checking the suitability of TI measures</i>	51
5.3.5 <i>Fuzzy evaluation rules and solution</i>	52
5.3.5.1 <i>Interpretations and conclusions</i>	53
5.4 <i>Analytic hierarchy process (ahp)</i>	55
5.4.1 <i>Describing model structure: the sub-objectives for decision-making</i>	56
5.4.2 <i>Hierarchy formulated</i>	57
5.4.3 <i>Scale used for pair-wise comparison of attributes</i>	57
5.4.4 <i>Pair-wise comparison of different attributes</i>	57
5.4.5 <i>Normalization of comparison matrix</i>	58
5.4.6 <i>Checking for consistency</i>	59
5.4.7 <i>Priority weights for alternatives</i>	60
5.5 <i>Concluding remarks</i>	61
6 Structural equation modeling	63
6.1 <i>Introduction</i>	63
6.2 <i>Validation of fuzzy-based ti model through structural equation modeling (sem) using amos</i>	63
6.2.1 <i>Instrument used: AMOS 22.0 software</i>	64
6.2.2 <i>Independent and dependent variables</i>	65
6.2.3 <i>Structural equation modeling of TI model</i>	67
6.2.4 <i>Screening of the data with preliminary analysis</i>	68
6.2.5 <i>Confirmatory factor analysis</i>	68
6.2.6 <i>SEM_TI model and result analysis</i>	74
6.2.7 <i>Modification indices of SEM_TI model</i>	75
6.3 <i>Concluding remarks</i>	77
7 Case studies	79
7.1 <i>Introduction</i>	79
7.2 <i>Introduction to industry 'a'</i>	79

7.2.1	<i>Quality policy</i>	79
7.2.2	<i>Mission</i>	80
7.2.3	<i>Product range</i>	80
7.2.4	<i>SWOT analysis at Industry 'A'</i>	80
7.2.5	<i>SAP analysis of Industry 'A'</i>	82
7.2.5.1	<i>Situation</i>	82
7.2.5.2	<i>Actor</i>	82
7.2.5.3	<i>Process</i>	82
7.2.6	<i>LAP synthesis of Industry 'A'</i>	83
7.3	<i>Introduction to industry 'b'</i>	84
7.3.1	<i>Milestones</i>	84
7.3.2	<i>Product range</i>	84
7.3.3	<i>SWOT analysis at Industry 'B'</i>	86
7.3.4	<i>SAP analysis of Industry 'B'</i>	86
7.3.4.1	<i>Situation</i>	86
7.3.4.2	<i>Actor</i>	88
7.3.4.3	<i>Process</i>	88
7.3.5	<i>LAP synthesis at Industry 'B'</i>	89
7.4	<i>Suggestions and recommendations</i>	89
7.4.1	<i>Suggestions to the entrepreneurs</i>	89
7.4.2	<i>Suggestions to the government</i>	91
7.4.3	<i>Suggestions to banks and other financial institutions</i>	92
7.5	<i>Concluding remarks</i>	93
8	Conclusions and recommendations	95
8.1	<i>Introduction</i>	95
8.2	<i>Summary of the study</i>	96
8.3	<i>Research contributions</i>	96
8.3.1	<i>Percent points scored results</i>	96
8.3.2	<i>Statistical analysis results</i>	97
8.3.3	<i>Qualitative analysis results</i>	98
8.3.4	<i>Technology innovation implementation model</i>	100
8.4	<i>Major findings of the study</i>	100
8.5	<i>Limitations of the study</i>	101
8.6	<i>Suggestions for future research</i>	102
	<i>References</i>	103
	<i>Appendix I: Technology innovation questionnaire</i>	127
	<i>Appendix II: Letters of support from various manufacturing organizations</i>	137
	<i>Index</i>	141