

Contents

Preface

Chapter 1 Introduction to Research

What is Science?	1
Theories	3
Methodology	5
Philosophies of Science	6
Research Designs	7
Methods	9
Research Process	10
Testing Theories	11
Many-model Thinking Approach	12
References	12

Chapter 2 The Research Problem

Introduction	15
Scanning for Topics	16
Scope	16
Justification	17
Objectives	17
Getting Feedback	18
Examples	18
Tally's corner	18
Occupational injury in America: An analysis of risk factors using data from the general social survey	19
Assessing creative writing	20

Organization of Study	21
References	21
Chapter 3 Theories, Hypotheses, Models, and Frameworks	23
Literature Review	23
Good journal articles and books	24
Keywords	24
Relevance	24
Methodology and data analysis	25
Findings	25
Documentation	25
Structuring the review	25
Examples	26
Tally's corner	26
7S framework	27
Housing bubble	28
Agrarian revolution	31
Research Proposal	32
Research Ethics and Risk Assessment	34
References	36
Chapter 4 Research Design I: Case Study	39
Features of Case Studies	39
Sampling	40
Examples	40
Urban regimes	40
God's choice	43
Reliability and Validity	46
References	47
Chapter 5 Research Design II: Survey	49
Features of Surveys	49
Types of Surveys	49
Sampling	50
Probability Samples	51

Simple random sample	52
Systematic sampling	52
Stratified sampling	52
Cluster sampling	53
Non-probability Samples	53
Convenience sampling	54
Judgmental sampling	54
Quota sampling	54
Snowball sampling	55
Adaptive sampling	55
Sample Size	55
Pilot Survey	58
Examples	58
Perceptions of train service	58
Perceptions of shopping mall	60
Reliability and Validity	61
References	62
Chapter 6 Research Design III: Comparative Design	65
Features of Comparative Designs	65
Types of Comparative Designs	66
Comparative Sampling	67
Examples	67
Four little dragons	67
Colonial origins of comparative development	70
Reliability and Validity	71
References	71
Chapter 7 Research Design IV: Experiment	75
Features of Experimental Design	75
Classical Experimental Design	76
Quasi-experimental Designs	77
Parallel Group Design	77
Repeated Measures Design	78
Randomized Block Design	79

Latin Square Design	79
Reliability and Validity	80
References	83
Chapter 8 Research Design V: Regression	85
Features of Regression Design	85
Sampling	86
Examples	87
Hedonic price model	87
Learning curve	88
Reliability and Validity	89
References	91
Chapter 9 Methods of Data Collection	93
Data Collection Methods	93
Scales	93
Observations	95
Interviews	96
Questionnaires	97
Standardized Tests	100
Physical Instruments	100
Simulation	100
Review of Documents	102
Crowdsourced Data	102
Sensors	103
Website Data	103
References	103
Chapter 10 Collection and Processing of Data	105
Introduction	105
Access	105
Research Assistants	107
Equipment	108
Documents	108
Note-taking	109

Tracking of Progress	109
Data Processing	110
Big Data	111
References	112
Chapter 11 Qualitative Data Analysis	113
Types of Qualitative Data	113
Reflexivity	113
Codes	115
Thematic Analysis	115
Narrative Analysis	116
Discourse Analysis	118
Content Analysis	119
Grounded Theory	119
Interpretive Phenomenological Analysis	120
References	121
Chapter 12 Quantitative Data Analysis I: Survey Data	123
Nature of Survey Data	123
Exploratory Data Analysis	123
Basics of Statistical Tests	126
Confidence Interval	128
Properties of Estimators	129
Continuous Data	130
Count Data	131
Spatial Data	133
Circular Data	135
Index Numbers	136
Price index for homogeneous product	136
Price index for heterogeneous product	136
Human Development Index (HDI)	137
Productivity index	138
Ratings	140
Unweighted ratings	140
Weighted ratings	140

Ranks	141
Rank correlation	142
Mann–Whitney test	143
Friedman test	144
Wilcoxon signed-rank test	145
References	146
Chapter 13 Quantitative Data Analysis II: Experimental Data	149
Unpaired t Test	149
Paired t Test	150
Linear Model Approach	151
References	154
Chapter 14 Quantitative Data Analysis III: Regression Data (Part I)	155
Linear Regression	155
Model Assumptions	156
Least Squares Estimation	159
Example	162
Coefficient of Determination	164
Test of Overall Significance	165
Tests of Individual Significance	166
Forecasting	167
References	168
Chapter 15 Quantitative Data Analysis III: Regression Data (Part II)	169
Dummy Variables	169
Interacting Variables	170
Transformation of Nonlinear Functions	171
Maximum Likelihood Estimation	172
Nonlinear Least Squares	176
Non-normal Errors	177
Outliers	179

Testing Restrictions on Parameters	181
Heteroscedasticity	182
Multicollinearity	184
Logistic Regression	188
Poisson Regression	192
Measurement Errors	193
Omitted Variable	194
Reverse Causality	195
References	198

Chapter 16 Quantitative Data Analysis III: Regression Data (Part III) 199

Time Series	199
Autocorrelation	199
Non-stationarity	202
Unit Root Test	204
Cointegration and Error Correction	205
Distributed Lag Model	206
Pooled Regression	208
Panel Regression	209
VAR Model	210
Causality Test	211
Spectral Analysis	212
Spatial Regression	214
Rank-deficient Models	217
References	221

Chapter 17 Machine Learning 223

The Machine Learning Approach	223
Classification of ML Algorithms	225
Regression	226
Logistic Regression	226
Random Forest Classifier	226
Naive Bayes Classifier	231
Support Vector Machine	234

Cluster Analysis	235
Principal Components Analysis	238
Factor Analysis	242
Associative Methods	244
References	247
Chapter 18 Meta-analysis	249
What is Meta-analysis?	249
Steps in Meta-analysis	250
Identifying the Issue	250
Screening Criteria	250
Literature Review	251
Data Extraction	251
Synthesis	252
References	253
Chapter 19 Concluding Your Study	255
Format	255
Summary	255
Contributions and Implications	256
Limitations	256
Recommendations	257
Suggestions for Further Research	257
References	257
Chapter 20 The Research Report	259
Format for Research Report	259
Format for Journal Articles	264
The Writing Process	266
Writing Style	267
(a) Voice	267
(b) Tenses	268
(c) Wordiness	268
(d) Qualifications	270
(e) Spelling	270

(f) Metaphors	271
(g) Other rules of grammar	272
Writing Form	274
(a) Tables, charts and diagrams	274
(b) Pagination	274
(c) Footnotes and endnotes	274
(d) Quotations	274
(e) Abbreviations	275
(f) Citations and references	276
(g) Citing legal authorities	278
(h) Units of measurement and numbers	279
(i) Mathematical symbols and equations	280
(j) Bullet list	281
(k) Layout	282
References	282
Appendix	283
Index	289