TABLE OF CONTENTS

	ACKNOWLEDGEMENTS	V
	TABLE OF CONTENTS	VI
	LIST OF FIGURES	IX
	LIST OF TABLES	X
	LIST OF ABBREVIATIONS	XI
	LIST OF SYMBOLS	XIII
	PREFACE	XIV
1	INTRODUCTION	1
1.1	Overview	1
1.2	Objectives	9
1.3	Approach	10
1.4	Structure of the Thesis	12
1.5	Scope of the Thesis	16
2	LITERATURE REVIEW	19
2.1	Assessing Customer Preferences, Requirements and Perceptions of the Co-operative Dairy	19
2.1.1	Assessing Customer Preferences	20
2.1.1.1	Voice of the Customers	21
2.1.1.2	Significance Testing	22
2.1.2	Functional Requirements from Customer Preferences	23
2.1.2.1	Quality Function Deployment	23
2.1.2.2	House of Quality	25
2.1.3	Brand Value Measurement	26
2.1.3.1	Brand Value Comparison	28
2.2	Achieving Competitive Advantages for Co-operative Dairy through Market Planning	29
2.2.1	Delphi Method	31
2.2.2	Analytic Hierarchical Process (AHP) Method	33
2.2.3	System Dynamics Modelling	34
2.3	Minimisation of Distribution Cost using Vehicle Routing Problem (VRP)	36
2.3.1	Supply Chain Management	37

2.3.2	Logistics	37
2.3.3	Vehicle Routing Problem (VRP)	38
2.3.4	Vehicle Routing for Perishable Products	42
2.3.5	Capacitated Clustering Problem	43
3	ASSESSING CUSTOMER PREFERENCES, REQUIREMENTS AND PERCEPTION OF CO-OPERATIVE DAIRY	45
3.1	Overview of Customer Prefereneces for Dairy Products	46
3.1.1	Methodology	48
3.1.2	Results of Statistical Analysis	49
3.2	Customer Requirements and Perception of Co-operative Dairy	57
3.2.1	Methodology	58
3.2.1.1	Quality Function Deployment Method	58
3.2.1.2	Multi-Dimensional Scaling Method	60
3.2.2	Results of House of Quality (HoQ) and Multi-Dimensional Scaling (MDS)	63
3.3	Conclusions	73
4	ACHIEVING COMPETITIVE ADVANTAGES FOR CO-OPERATIVE DAIRY THROUGH MARKET PLANNING	75
4.1	Identifying Low-Cost Advertisement Channels	75
4.1.1	Methodology	75
4.1.2	Results of Delphi and Analytic Hierarchical Process (AHP)	78
4.2	Integrated View of Production-Inventory Model for Co-operative Dairy	85
4.2.1	Methodology	86
4.2.2	Results of System Dynamics Modelling	86
4.3.	Conclusions	94
5	MINIMISATION OF DISTRIBUTION COST USING CENTRE OF GRAVITY (CG) AND VEHICLE ROUTING PROBLEM (VRP) APPROACH	95
5.1	Problem Definition	95
5.2	Mathematical Formulation	97
5.2.1	Indices	98
5.2.2	Parameters	98

5.2.3	Decision Variables	99
5.2.4	Mathematical Model	99
5.3	Methodology	101
5.4	Results	103
5.5	Conclusions	106
6	MINIMISATION OF DISTRIBUTION COST USING K-MEANS CLUSTERING AND CHEAPEST LINK ALGORITHM	107
6.1	Methodology and Algorithm	107
6.1.1	Clustering	108
6.1.2	Capacitated Vehicle Routing Problem (CVRP)	110
6.2	Results	116
6.3	Conclusions	120
7	SUMMARY AND CONCLUSIONS	121
7.1	Summary	121
7.2	Conclusions	122
7.3	Limitations and Future Research	126
	REFERENCES	129
	APPENDIX A	147
	APPENDIX B	151
	APPENDIX C	157
	APPENDIX D	159
	APPENDIX E	161
	APPENDIX F	163
	APPENDIX G	173