

FOREWORD	1
CHAPTER ONE: COMMERCIAL BUILDING AUTOMATION PRODUCTS:	
TECHNOLOGIES AND GLOBAL MARKETS (IFT010B)	2
STUDY GOALS AND OBJECTIVES	2
REASONS FOR DOING THE STUDY	3
SCOPE OF REPORT	4
INTENDED AUDIENCE.....	4
INFORMATION SOURCES	5
INFORMATION SOURCES (CONTINUED).....	6
ANALYST CREDENTIALS	7
RELATED BCC REPORTS	7
BCC ONLINE SERVICES.....	7
DISCLAIMER	8
SUMMARY	8
<i>TABLE 1 FORECAST FOR GLOBAL BUILDING AUTOMATION</i>	
<i>SYSTEMS MARKET BY PRODUCT SEGMENT, THROUGH 2014 (\$</i>	
<i>MILLIONS)</i>	9
<i>FIGURE 1 FORECAST FOR GLOBAL BUILDING AUTOMATION</i>	
<i>SYSTEMS MARKET BY PRODUCT SEGMENT, 2008-2014 (\$</i>	
<i>MILLIONS)</i>	10
OVERVIEW.....	10
BUILDINGS COST MONEY TO BUILD, OWN, MAINTAIN, AND	
OPERATE	11
FIVE MARKETS FOR INTEGRATED BUILDING AUTOMATION	
PRODUCTS	12
<i>TABLE 2 FORECAST FOR MARKET SHARE OF BUILDING</i>	
<i>AUTOMATION SYSTEM PRODUCTS BY CATEGORY, 2009 AND</i>	
<i>2014 (\$ MILLIONS/%)</i>	12
<i>TABLE 3 FORECAST FOR GLOBAL MARKET FOR BUILDING</i>	
<i>AUTOMATION SYSTEMS BY SERVICE AND UNITS, THROUGH</i>	
<i>2014 (\$ MILLIONS)</i>	13
<i>TABLE 4 TOP FIVE BUILDING AUTOMATION SYSTEM VENDORS,</i>	
<i>2009 (\$ MILLIONS)</i>	14
COMPUTER TECHNOLOGY MAKES BUILDINGS INTELLIGENT	14
SENSORS	15
INTERNAL BACKUP AND RESTORING.....	16
MANUAL PROGRAMMING	16
INTERNET CONNECTIONS.....	16
OUTPUTS.....	16
FIVE TYPES OF CONTROL SYSTEMS	17
HEURISTICS	18
Heuristics (Continued)	19
WHY HAVE SMART BUILDINGS BEEN SLOW TO EVOLVE?	20

WHAT HAS CHANGED?.....	20
INTELLIGENT BUILDINGS BECOME EASIER TO IMPLEMENT	21
WIRELESS COMMUNICATIONS AND RETROFITTING	22
WHO BENEFITS FROM AN INTELLIGENT BUILDING?.....	23
MERGING IT AND BUILDING MANAGEMENT.....	23
NEED FOR OPEN SYSTEMS.....	24
TANGIBLE BENEFITS AND CAPABILITIES	24
FAST SERVICE	25
GROWING NEED FOR SECURITY	25
RAPID RATE OF CHANGE	26
RETHINKING DESIGN AND CONSTRUCTION	27
IMPORTANCE OF THE PROJECT TEAM.....	27
SAVING COSTS, BUILDING VALUE.....	28
HURDLES TO SMART BUILDING DEPLOYMENTS.....	28
END-TO-END OPENNESS.....	29
HURDLES TO DEPLOYMENT	29
Hurdles to deployment (Continued).....	30

CHAPTER TWO: VOICE RECOGNITION: TECHNOLOGIES AND

GLOBAL MARKETS (IFT039B).....	31
REASONS FOR THE STUDY AND ITS IMPORTANCE.....	31
OBJECTIVES OF THE STUDY.....	31
AUDIENCE FOR THE REPORT	32
SCOPE OF THE REPORT	33
METHODOLOGY AND INFORMATION SOURCES.....	33
AUTHOR'S CREDENTIALS	34
RELATED BCC REPORTS	34
SUMMARY.....	34
SUMMARY (CONTINUED)	35
<i>TABLE 5 GLOBAL VOICE RECOGNITION MARKET, THROUGH 2015</i> <i>(\$ BILLIONS)</i>	36
<i>FIGURE 2 GLOBAL VOICE RECOGNITION MARKET, 2009-2015 (\$</i> <i>BILLIONS)</i>	37
IMPORTANCE OF THE INDUSTRY	37
<i>TABLE 6 GLOBAL REVENUES FORECAST FOR CUSTOMER</i> <i>RELATIONSHIP MANAGEMENT, THROUGH 2015 (\$ BILLIONS)</i>	38
INVESTOR CONFIDENCE	39
<i>TABLE 7 U.S. VENTURE CAPITAL FINANCING IN RELATED</i> <i>SECTORS, THROUGH 2009 (\$ BILLIONS)</i>	39
<i>TABLE 8 NUMBER OF U.S. SOFTWARE INDUSTRY DEALS, 2008</i> <i>AND 2009</i>	39
HISTORY OF THE INDUSTRY.....	40
SPEECH RECOGNITION LIFE CYCLE	41
<i>TABLE 9 SPEECH RECOGNITION LIFE CYCLE</i>	42

DESCRIPTION OF THE INDUSTRY: MAJOR CATEGORIES.....	42
HARDWARE	42
TABLE 10 INFRASTRUCTURE HARDWARE.....	43
SOFTWARE.....	43
TABLE 11 SOFTWARE	43
ENHANCED DEVICES	44
TABLE 12 ENHANCED DEVICES.....	44
FUNDAMENTAL FUNCTIONS OF VOICE TECHNOLOGY	44
TABLE 13 SCOPE OF REPORT CLASSIFIED BY VOICE RECOGNITION FUNCTION.....	44
TABLE 13 (CONTINUED).....	45
SCOPE OF REPORT CLASSIFIED BY MARKET	45
TABLE 14 SCOPE OF REPORT CLASSIFIED BY MARKET.....	45
EFFECT ON THE FUTURE	46
MARKETS BY PRODUCT TYPE.....	46
HARDWARE	46
Global Hardware Dollar Sales Forecast	47
TABLE 15 GLOBAL HARDWARE MARKET FORECAST, THROUGH 2015 (\$ BILLIONS).....	47
Forecast: 2010 Hardware Market.....	47
TABLE 16 HARDWARE SALES BY END USE, 2009 AND 2010* (%/\$ BILLIONS).....	48
FIGURE 3 HARDWARE SALES BY END USE, 2010* (%).....	48
Forecast: 2015 Hardware Market.....	48
TABLE 17 PERCENT OF HARDWARE SALES BY END USE, 2015 (%/\$ BILLIONS).....	49
FIGURE 4 HARDWARE SALES BY END USE, 2015 (%)	49
HARDWARE MARKET	49
Sound Cards.....	50
TABLE 18 GLOBAL SOUND CARD MARKET FORECAST, THROUGH 2015 (\$ BILLIONS).....	50
TABLE 19 SOUND CARD MAJOR PLAYERS, PRODUCTS, AND END MARKETS.....	50
Digital Signal Processors (DSP).....	50
TABLE 20 GLOBAL DSP MARKET FORECAST, THROUGH 2015 (\$ BILLIONS).....	51
TABLE 21 DIGITAL SIGNAL PROCESSOR MAJOR PLAYERS, PRODUCTS AND END MARKETS.....	51
Softswitches	52
TABLE 22 GLOBAL SOFTSWITCH MARKET FORECAST, THROUGH 2015 (\$ BILLIONS).....	52
TABLE 23 SOFTSWITCH MAJOR PLAYERS, PRODUCTS, AND END MARKETS.....	52
Voice-enabled Gateways.....	53

<i>TABLE 24 GLOBAL GATEWAY MARKET FORECAST, THROUGH 2015</i> <i>(\$ BILLIONS)</i>	53
<i>TABLE 25 GATEWAY MAJOR PLAYERS, PRODUCTS, AND END</i> <i>MARKETS</i>	53

CHAPTER THREE: BIOMETRICS: TECHNOLOGIES AND GLOBAL

MARKETS (IFT042C)	54
STUDY GOALS AND OBJECTIVES.....	54
REASONS FOR DOING THIS STUDY	54
INTENDED AUDIENCE.....	54
SCOPE OF REPORT	55
METHODOLOGY AND INFORMATION SOURCES.....	55
RELATED BCC RESEARCH REPORTS.....	55
ANALYST CREDENTIALS.....	56
SUMMARY.....	56
MARKET SUMMARY FOR BIOMETRIC TECHNOLOGIES.....	57
<i>TABLE 26 GLOBAL MARKET FOR BIOMETRIC TECHNOLOGIES,</i> <i>THROUGH 2015 (\$ MILLIONS)</i>	57
<i>FIGURE 5 GLOBAL MARKET FOR BIOMETRIC TECHNOLOGIES,</i> <i>2008-2015 (\$ MILLIONS)</i>	58
DEFINITION OF THE INDUSTRY	58
CONCEPTS IN THE INDUSTRY	58
IMPORTANCE OF THE INDUSTRY	59
LIFE-CYCLE ASSESSMENT OF BIOMETRICS DEVICES	59
TECHNOLOGY LIFE CYCLE	60
COST ANALYSIS	60
LIFE-CYCLE COST ANALYSIS.....	61
HISTORY AND DEVELOPMENT OF BIOMETRIC TECHNOLOGY	61
HISTORY OF FINGERPRINTING.....	62
HISTORY OF RETINAL SCANNING	63
HISTORY OF KEYSTROKE DYNAMICS (KD).....	64
FORMATION OF BIOMETRICS ORGANIZATIONS	64
GOVERNMENT REGULATIONS	64
PRIVACY PROTECTION THROUGH SELF-REGULATORY	
CODES	65
PRIVACY PROTECTION THROUGH LAW	65
BIOMETRIC STANDARDS.....	66
THE IMPORTANCE OF BIOMETRICS STANDARDS.....	67
Role of Product Manufacturers	68
Responsibility of Standard Organizations.....	68
BIOMETRICS STANDARDS DEVELOPMENT	68
ORGANIZATIONS INVOLVED IN BIOMETRICS STANDARDS	69
INTERNATIONAL ORGANIZATION FOR	
STANDARDIZATION (ISO).....	69

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)	69
ISO/IEC JOINT TECHNICAL COMMITTEE 1 (JTC 1)	69
INCITS (INTERNATIONAL COMMITTEE FOR INFORMATION TECHNOLOGY STANDARDS)	70
INCITS TECHNICAL COMMITTEE M1 BIOMETRICS	70
OASIS (ORGANIZATION FOR THE ADVANCEMENT OF STRUCTURED INFORMATION STANDARDS).....	71
THE OPEN GROUP	71
ASC X9 (ACCREDITED STANDARD COMMITTEE)	71
BIOAPI CONSORTIUM	72
ANSI NIST STANDARDS	72
BIOMETRIC CONSORTIUM	73
COMMON BIOMETRIC EXCHANGE FILE FORMAT (CBEFF)	73
OTHER STANDARDS	74
BIOMETRICS - ISSUES AND CONCERNS	74
SAFETY OF BIOMETRICS DEVICES	74
MISUSE OF PERSONAL INFORMATION.....	75
LOSS OF PHYSICAL TRAIT	75
REVELATION OF PERSONAL INFORMATION.....	75
MARKET BY TECHNOLOGY	75
PRESENTLY USED BIOMETRIC TECHNOLOGIES	76
EMERGING BIOMETRIC TECHNOLOGIES	76
GLOBAL MARKET FOR BIOMETRIC TECHNOLOGIES.....	77
<i>TABLE 27 GLOBAL MARKET FOR BIOMETRIC TECHNOLOGIES, THROUGH 2015 (\$ MILLIONS).....</i>	<i>78</i>
<i>FIGURE 6 GLOBAL MARKET FOR BIOMETRIC TECHNOLOGIES, 2008-2015 (\$ MILLIONS).....</i>	<i>79</i>
 CHAPTER FOUR: TRANSPARENT ELECTRONICS: TECHNOLOGIES AND GLOBAL MARKETS (IFT065A)	
DEFINITION	80
STUDY GOALS AND OBJECTIVES.....	80
STUDY GOALS AND OBJECTIVES (CONTINUED)	81
REASONS FOR DOING THE STUDY	82
SCOPE OF THE REPORT	83
INTENDED AUDIENCE.....	83
METHODOLOGY AND INFORMATION SOURCES.....	84
ABOUT THE AUTHOR.....	84
RELATED BCC REPORTS	85
SUMMARY.....	85
<i>TABLE 28 DOLLAR SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY MATERIAL, THROUGH 2015 (\$ MILLIONS).....</i>	<i>85</i>

<i>FIGURE 7 DOLLAR SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY MATERIAL, 2008-2015 (\$ MILLIONS)</i>	86
<i>INTRODUCTION TO TRANSPARENT ELECTRONICS</i>	87
<i>KEY ENTITIES IN THE TRANSPARENT ELECTRONICS VALUE CHAIN</i>	88
<i>CONDUCTING MATERIALS</i>	88
<i>SUBSTRATES</i>	88
<i>PROCESSES</i>	89
<i>MARKET OVERVIEW</i>	89
<i>TABLE 29 SHIPMENT SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY MATERIAL, THROUGH 2015 (UNIT MILLIONS)</i>	89
<i>FIGURE 8 SHIPMENT SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY MATERIAL, 2008-2015 (UNIT MILLIONS)</i>	90
<i>TABLE 30 SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY END APPLICATION, THROUGH 2015 (\$ MILLIONS)</i>	91
<i>FIGURE 9 SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY END APPLICATION, 2008-2015 (\$ MILLIONS)</i>	91
<i>TABLE 31 SHIPMENTS OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY END APPLICATION, THROUGH 2015 (MILLIONS)</i>	92
<i>FIGURE 10 SHIPMENTS OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY END APPLICATION, 2008-2015 (MILLIONS)</i>	93
<i>TABLE 32 SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY REGION, THROUGH 2015 (\$ MILLIONS)</i>	94
<i>FIGURE 11 SALES OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY REGION, 2008-2015 (\$ MILLIONS)</i>	94
<i>TABLE 33 SHIPMENTS OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY REGION, THROUGH 2015 (MILLIONS)</i>	95
<i>FIGURE 12 SHIPMENTS OF TRANSPARENT ELECTRONICS COMPONENTS TO SEMICONDUCTOR DEVICE MANUFACTURERS, BY REGION, 2008-2015 (MILLIONS)</i>	96
<i>MARKET OVERVIEW (CONTINUED)</i>	96

CHAPTER FIVE: SEMICONDUCTOR MEMORY: TECHNOLOGIES AND	
GLOBAL MARKETS (IFT072A).....	97
STUDY GOALS AND OBJECTIVES.....	97
REASONS FOR DOING THE STUDY	98
SCOPE OF THE REPORT	99
INTENDED AUDIENCE.....	100
METHODOLOGY AND INFORMATION SOURCES.....	100
ABOUT THE AUTHOR.....	101
RELATED BCC REPORTS	101
SUMMARY.....	101
<i>TABLE 34 GLOBAL VALUE SALES OF OVERALL MEMORY TO</i>	
<i>SEMICONDUCTOR DEVICE MANUFACTURERS AND END USERS,</i>	
<i>THROUGH 2014 (\$ MILLIONS).....</i>	<i>102</i>
<i>FIGURE 13 GLOBAL VALUE SALES OF OVERALL MEMORY TO</i>	
<i>SEMICONDUCTOR DEVICE MANUFACTURERS AND END USERS,</i>	
<i>2007-2014 (\$ MILLIONS).....</i>	<i>102</i>
SUMMARY (CONTINUED)	103
TECHNOLOGY ANALYSIS.....	103
THE ANATOMY OF MAINSTREAM SEMICONDUCTOR	
FABRICATION PROCESSES.....	104
SEMICONDUCTORS AND THE PERIODIC TABLE	104
THE CARBON FAMILY	104
The Carbon Family (Continued)	105
SILICON—THE DOMINANT SEMICONDUCTOR	106
SILICON, COMPLEMENTARY METAL OXIDE	
SEMICONDUCTOR CMOS AND FABRICATION.....	106
MEMORY PACKAGING TECHNIQUES	107
DUAL IN LINE PACKAGE (DIL)	108
SINGLE IN LINE PIN PACKAGE (SIPP).....	108
SINGLE IN LINE MEMORY MODULE (SIMM).....	109
DUAL IN LINE MEMORY MODULE (DIMM)	109
SMALL OUTLINE DIMM (SO-DIMM).....	110
ADVANCES IN MEMORY PACKAGING TECHNIQUES	110
Package Footprint Reduction: Chip Scale Package	
(CSP)/Wafer Level Packaging (WLP)	111
Size and Weight Efficiency	112
Ease of Implementation.....	112
Compatibility	112
Mismatch and Revision Elimination.....	113
Time to Market Reduction.....	113
Package-to-PCB Bonding: PGA.....	113
Lower Thermal Resistance and High Thermal Heat	
Dissipation	114
Better Signal Quality.....	114

High Reliability.....	114
Package-to-PCB Attachment/Bonding: BGA.....	114
High Density	115
Heat Conduction Efficiency	115
Low Inductance Leads	115
Die-to-Package Substrate Attachment/Bonding: FC	115
Size Efficiency	116
Speedy Interconnect.....	116
I/O Efficiency.....	116
Cost Benefits	117
Assembly Process Efficiency.....	117
Multi-Functional Integration on the Package: MCM	117
Better Performance.....	117
Improved Signal Quality	118
Size Reduction.....	118
Economic Advantages	118
Multi-Functional Integration on the Package: SiP	118
Size Efficiency	119
Performance Enhancement	119
Design and Review Flexibility.....	120
Cost Advantage	120
Reduced Time-to-Market.....	120
Multi-Functional Integration on the Package: PoP	120
Saving in Board Surface Area	121
Ease in System Design	121
Reduction in PCB Complexity	121
Enhanced Performance.....	121
Reduced Time-to-Market.....	122
INTRODUCTION TO THE MEMORY MARKET	122
<i>TABLE 35 GLOBAL VOLUME SALES OF OVERALL MEMORY TO SEMICONDUCTOR DEVICE MANUFACTURERS AND END USERS, THROUGH 2014 (MILLIONS).....</i>	<i>122</i>
VOLATILE MEMORY	123
NONVOLATILE (NV) MEMORY.....	123
MAINSTREAM MEMORY TECHNOLOGIES.....	124
<i>TABLE 36 GLOBAL VALUE SALES OF MAINSTREAM MEMORY TO SEMICONDUCTOR DEVICE MANUFACTURERS AND END USERS, THROUGH 2014 (\$ MILLIONS).....</i>	<i>124</i>
<i>TABLE 37 GLOBAL VOLUME SALES OF MAINSTREAM MEMORY TO SEMICONDUCTOR DEVICE MANUFACTURERS AND END USERS, THROUGH 2014 (MILLIONS).....</i>	<i>125</i>
<i>TABLE 38 ASP OF MAINSTREAM MEMORY TO SEMICONDUCTOR DEVICE MANUFACTURERS AND END USERS, 2007-2014 (\$)</i>	<i>125</i>

<i>TABLE 39 GLOBAL VALUE SALES OF MAINSTREAM MEMORY CATEGORIZED BY END APPLICATIONS, THROUGH 2014 (\$ MILLIONS)</i>	126
<i>TABLE 40 GLOBAL VOLUME SALES OF MAINSTREAM MEMORY CATEGORIZED BY END APPLICATIONS, THROUGH 2014 (MILLIONS)</i>	127
<i>TABLE 41 ASP OF MAINSTREAM MEMORY CATEGORIZED BY END APPLICATIONS, 2007-2014 (\$)</i>	127
MAINSTREAM MEMORY TECHNOLOGIES	128

CHAPTER SIX: ANTENNAS FOR SYSTEMS AND DEVICES:

TECHNOLOGIES AND GLOBAL MARKETS (IFT073).....	129
ANTENNAS FOR SYSTEMS AND DEVICES:.....	129
STUDY GOALS AND OBJECTIVES.....	130
REASONS FOR DOING THE STUDY	130
SCOPE OF THE REPORT	131
INTENDED AUDIENCE.....	131
METHODOLOGY	132
INFORMATION SOURCES.....	132
AUTHOR CREDENTIALS	133
RELATED BCC PUBLICATIONS	133
SUMMARY.....	133
<i>TABLE 42 SIZE OF GLOBAL ANTENNA MARKET, THROUGH 2014 (\$ MILLIONS/MILLION UNITS)</i>	134
<i>FIGURE 14 SIZE OF GLOBAL ANTENNA MARKET, 2007-2014 (\$ MILLIONS)</i>	134
SUMMARY (CONTINUED)	134
INTRODUCTION TO ANTENNAS	135
HISTORY OF ANTENNAS	136
ANTENNAS: CONCEPTS AND TERMINOLOGY	136
APERTURE	136
BALUN	136
BLUETOOTH.....	137
CODE DIVISION MULTIPLE ACCESS (CDMA).....	137
DIPOLE	138
DIPOLE ANTENNA	138
DIRECTIVITY.....	139
DIVERSITY	139
ENHANCED DATA RATES FOR GSM EVOLUTION (EDGE)	139
EFFICIENCY	139
ELECTROMAGNETIC WAVE.....	139
EQUIVALENT ISOTROPICALLY RADIATED POWER (EIRP)	140
FADING.....	140
FREQUENCY AND WAVELENGTH	140
FREQUENCY BANDS.....	140

GENERAL PACKET RADIO SERVICE (GPRS).....	141
GPS	142
GSM	142
IMPEDANCE	143
ISM BAND.....	143
LONG-TERM EVOLUTION (LTE)	143
MAXWELL'S THEOREM.....	144
MONOPOLE.....	145
N CONNECTOR.....	145
ORTHO MODE TRANSDUCERS (OMTS)	145
POLARIZATION	145
POWER GAIN	146
Q-FACTOR	146
RADIATION PATTERN	146
RADOME.....	146
RFID	147
SIDE LOBES	147
UMTS.....	147
ULTRA WIDE BAND (UWB)	148
VOLTAGE STANDING WAVE RATIO (VSWR)	148
WAVEGUIDES.....	149
WAVEGUIDE BENDS.....	149
WIFI/WLAN	150
WIMAX	150
ZIGBEE.....	151
ANTENNA TECHNOLOGIES	151
MARKET OVERVIEW AND ANALYSIS.....	151
<i>TABLE 43 GLOBAL ANTENNA MARKET BY TECHNOLOGY,</i> <i>THROUGH 2014 (\$ MILLIONS).....</i>	<i>152</i>
Shipments	152
<i>TABLE 44 GLOBAL ANTENNA SHIPMENTS BY TECHNOLOGY,</i> <i>THROUGH 2014 (MILLION UNITS).....</i>	<i>153</i>
<i>TABLE 45 GLOBAL ANTENNA SHIPMENTS BY TECHNOLOGY, 2007-</i> <i>2014 (\$/UNIT)</i>	<i>153</i>
Shipments (Continued).....	154
CHAPTER SEVEN: CUSTOMER-FACING RETAIL TECHNOLOGIES AND GLOBAL MARKETS (IFT075A).....	155
THIS REPORT	155
STUDY GOALS AND OBJECTIVES.....	155
REASONS FOR DOING THE STUDY	156
SCOPE OF REPORT	156
INTENDED AUDIENCE.....	157
METHODOLOGY AND INFORMATION SOURCES.....	158
ANALYST CREDENTIALS.....	158

RELATED BCC REPORTS	158
SUMMARY	159
<i>TABLE 46 GLOBAL MARKET FOR RETAIL CUSTOMER-FACING TECHNOLOGIES, THROUGH 2015 (\$ MILLIONS)</i>	159
<i>FIGURE 15 GLOBAL MARKET FOR CUSTOMER-FACING STORE TECHNOLOGIES, 2009-2015 (\$ MILLIONS)</i>	159
POINT-OF-SALE TERMINALS OVERVIEW	160
OVERVIEW (CONTINUED)	161
MARKET SEGMENTATION	162
KEY CHALLENGES AND CONCERNS	163
SYSTEMS INTEGRATION	163
PRICE PRESSURE	163
ADVENT OF OTHER SHOPPING CHANNELS: MOBILE AND ONLINE	164
INDUSTRY REGULATIONS AND COMPLIANCE	164
MARKET FORCES: DRIVERS AND IMPEDIMENTS	165
MARKET DRIVERS.....	165
Replacement Systems Lead to New Terminal Sales.....	165
Demand from Emerging Nations	166
Demand for “Green” Technology Products	166
Increasing Demand for Advanced Multi-functional POS Terminals.....	167
Payment Card Industry Data Security Standard Compliance	167
Price Reductions	168
MARKET IMPEDIMENTS.....	168
Saturated Market in North America and the EMEA	168
Long Replacement Cycles.....	169
Self-Service Technologies	169
Technological Advancements	170
Economic Conditions’ Influence on Retailers’ Buying Decisions	170
TECHNOLOGY TRENDS	171
HARDWARE	171
SOFTWARE.....	172
OPERATING SYSTEMS.....	172
PERIPHERALS	173
PRICING TRENDS.....	173
PRICE TRENDS AND INSTALLATION COSTS.....	173
Price Trends and Installation ... (Continued)	174
WORLD MARKET FORECASTS.....	175
<i>TABLE 47 PROJECTED POS TERMINALS MARKET BY GEOGRAPHIC REGION, THROUGH 2015 (\$ MILLIONS)</i>	176

<i>FIGURE 16 PROJECTED POS TERMINALS MARKET BY GEOGRAPHIC REGION, 2009-2015 (\$ MILLIONS)</i>	176
<i>TABLE 48 PROJECTED POS TERMINAL UNIT SALES GROWTH BY GEOGRAPHIC REGION, THROUGH 2015 (THOUSANDS)</i>	177
<i>FIGURE 17 PROJECTED POS TERMINAL UNIT SALES GROWTH BY GEOGRAPHIC REGION, 2009-2015 (THOUSANDS)</i>	177
<i>FIGURE 18 POS TERMINALS REVENUE SHARES BY GEOGRAPHIC REGION, 2010 (%)</i>	178
<i>TABLE 49 POINT-OF-SALE TERMINALS REVENUE SHARES BY RETAIL VERTICALS, 2010 (%)</i>	179
<i>FIGURE 19 POINT-OF-SALE TERMINALS REVENUE SHARES BY RETAIL VERTICALS, 2010 (%)</i>	179