

HIGH-SPEED RAIL TECHNOLOGIES AND GLOBAL MARKETS



ENG004A
October 2014

Aneesh Kumar
Project Analyst

ISBN: 1-56965-979-6



BCC Research
49 Walnut Park, Building 2
Wellesley, MA 02481 USA
866-285-7215 (toll-free within the USA),
or (+1) 781-489-7301
www.bccresearch.com
information@bccresearch.com

TABLE OF CONTENTS

TOPIC	PAGE NO.
CHAPTER 1 INTRODUCTION	2
STUDY GOALS AND OBJECTIVES	2
REASONS FOR DOING THE STUDY	3
SCOPE OF THE REPORT	3
INTENDED AUDIENCE	4
INFORMATION SOURCES	4
ANALYST'S CREDENTIALS	4
RELATED BCC RESEARCH REPORTS	4
BCC RESEARCH WEBSITE	5
DISCLAIMER	5
CHAPTER 2 SUMMARY	7
<i>SUMMARY TABLE GLOBAL HIGH-SPEED RAIL MARKET, THROUGH 2019 (\$ MILLIONS)</i>	7
<i>SUMMARY FIGURE GLOBAL TRENDS IN THE HIGH-SPEED RAIL MARKET, 2013-2019 (\$ MILLIONS)</i>	7
CHAPTER 3 OVERVIEW	11
MAIN TYPES OF HIGH-SPEED RAIL TRACKS	11
DEDICATED HIGH-SPEED RAIL	11
MIXED HIGH-SPEED RAIL	11
MIXED CONVENTIONAL HIGH-SPEED RAIL	11
FULLY MIXED HIGH-SPEED RAIL	12
<i>FIGURE 1 FLOW CHART FOR TYPES OF HIGH-SPEED RAIL TRACKS</i>	12
HIGH-SPEED RAIL TRAIN SET (ROLLING STOCK) BY TECHNOLOGY	12
DISTRIBUTED TRACTION	12
PUSH-PULL MODE	13
COMPONENTS OF A HIGH-SPEED RAIL SYSTEM	13
TRACK	13
SIGNAL AND COMMUNICATIONS NETWORKS	13
MAGNETIC LEVITATION (MAGLEV)	14
BENEFITS OF HIGH-SPEED RAIL	14
REDUCED HIGHWAY AND AIRPORT CONGESTION	14
REDUCED POLLUTION AND REDUCED ENERGY CONSUMPTION BY THE TRANSPORTATION SECTOR	14
IMPROVED TRANSPORTATION SAFETY	14
CHAPTER 4 GLOBAL MARKET FOR HIGH-SPEED RAIL	17
GLOBAL FORECAST FOR THE HIGH-SPEED RAIL MARKET	17
<i>TABLE 1 FORECAST FOR THE GLOBAL HIGH-SPEED RAIL MARKET, THROUGH 2019 (\$ MILLIONS)</i>	17
<i>TABLE 2 GLOBAL FORECAST FOR HIGH-SPEED RAIL BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	17
GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACKS CONSTRUCTED BY REGION	18
<i>TABLE 3 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACKS CONSTRUCTED BY REGION, THROUGH 2019 (KM)</i>	18
<i>TABLE 4 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACKS CONSTRUCTED IN ASIA-PACIFIC, THROUGH 2019 (KM)</i>	19

TOPIC	PAGE NO.
<i>TABLE 5 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACKS CONSTRUCTED IN EUROPE, THROUGH 2019 (KM)</i>	20
<i>GLOBAL FORECAST FOR HIGH-SPEED RAIL TRAIN SET FLEETS BY REGION</i>	21
<i>TABLE 6 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY REGION, THROUGH 2019 (UNITS)</i>	21
<i>TABLE 7 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRAIN SET FLEETS IN ASIA-PACIFIC, THROUGH 2019 (UNITS)</i>	22
<i>TABLE 8 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRAIN SET FLEET IN EUROPE, THROUGH 2019 (UNITS)</i>	23
<i>GLOBAL HIGH-SPEED RAIL INFRASTRUCTURE SPENDING BY REGION</i>	24
<i>TABLE 9 GLOBAL FORECAST FOR HIGH-SPEED RAIL INFRASTRUCTURE SPENDING BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	25
<i>TABLE 10 GLOBAL FORECAST FOR HIGH-SPEED RAIL INFRASTRUCTURE SPENDING IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)</i>	25
<i>TABLE 11 GLOBAL FORECAST FOR HIGH-SPEED RAIL INFRASTRUCTURE SPENDING IN EUROPE, THROUGH 2019 (\$ MILLIONS)</i>	26
<i>GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET BY REGION</i>	27
<i>TABLE 12 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	28
<i>TABLE 13 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)</i>	28
<i>TABLE 14 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS IN EUROPE, THROUGH 2019 (\$ MILLIONS)</i>	29
<i>GLOBAL HIGH-SPEED RAIL TRACK MAINTENANCE SPENDING BY REGION</i>	30
<i>TABLE 15 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACK MAINTENANCE SPENDING BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	30
<i>TABLE 16 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACK MAINTENANCE SPENDING IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)</i>	31
<i>TABLE 17 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACK MAINTENANCE SPENDING IN EUROPE, THROUGH 2019 (\$ MILLIONS)</i>	32
<i>GLOBAL HIGH-SPEED TRAIN SET FLEET MAINTENANCE SPENDING BY REGION</i>	33
<i>TABLE 18 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET MAINTENANCE SPENDING BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	33
<i>TABLE 19 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET MAINTENANCE SPENDING IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)</i>	34
<i>TABLE 20 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET MAINTENANCE SPENDING IN EUROPE, THROUGH 2019 (\$ MILLIONS)</i>	35
<i>TABLE 21 FORECAST FOR GLOBAL HIGH-SPEED RAIL ROLLING STOCK MAINTENANCE (EXCLUDING TRAIN SETS) BY REGION, THROUGH 2019 (MILLIONS)</i>	36
<i>GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY TECHNOLOGY</i>	37
<i>TABLE 22 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY TECHNOLOGY, THROUGH 2019 (UNITS)</i>	37
<i>TABLE 23 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET BY TECHNOLOGY IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)</i>	37
<i>TABLE 24 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY TECHNOLOGY IN EUROPE, THROUGH 2019 (MILLIONS)</i>	38
<i>CHAPTER 5 DRIVERS AND CHALLENGES FOR HIGH-SPEED RAIL MARKET</i>	40
<i>INCREASING MEGACITIES AND URBANIZATION</i>	40
<i>TABLE 25 URBAN AND RURAL POPULATION BY REGION, 2014 (MILLIONS)</i>	40
<i>FIGURE 2 REGIONAL SHARE OF URBAN POPULATION, 2014 (%)</i>	40

TOPIC	PAGE NO.
<i>FIGURE 3 GLOBAL URBANIZATION RATES, 2014 (%)</i>	41
<i>FIGURE 4 GLOBAL SHARE OF MEGACITIES BY REGION, 2014 (%)</i>	42
<i>FIGURE 5 TOP 10 MEGACITIES BY POPULATION, 2014 (MILLIONS)</i>	43
<i>FIGURE 6 TOP 10 MEGACITIES BY POPULATION, 2030 (MILLIONS)</i>	44
INCREASING FUEL PRICES AND CO2 EMISSIONS	46
<i>TABLE 26 TOP OIL-PRODUCING REGIONS, 2011 (MILLION TONS)</i>	46
<i>FIGURE 7 GLOBAL OIL RECOVERABLE RESERVES BY REGION (%)</i>	47
<i>TABLE 27 GLOBAL OIL PRICES, 2003-2013 (\$ PER BARREL)</i>	48
<i>TABLE 28 EXPECTED GLOBAL OIL PRICES, 2014-2040 (\$ PER BARREL)</i>	48
<i>TABLE 29 GLOBAL CO2 EMISSIONS AND PRIMARY ENERGY DEMAND, THROUGH 2035 (GIGATONS)</i>	49
<i>FIGURE 8 TOTAL ENERGY CONSUMPTION BY SECTOR IN 2035, NEW POLICIES SCENARIO (%)</i>	49
<i>TABLE 30 EUROPEAN CO2 EMISSIONS FROM TRAIN OPERATIONS, THROUGH 2020 (MILLION TONS)</i>	50
<i>TABLE 31 CARBON FOOTPRINT OF SELECTED HIGH-SPEED TRANSPORTATION SERVICES, 2010 (G CO2/PKM)</i>	50
MULTI-MODAL TRANSPORTATION	51
POTENTIAL GROWTH OF HIGH-SPEED RAIL IN ASIA	52
HIGH COST AND MORE TIME	53
AUSTRALIAN HIGH-SPEED RAIL	54
<i>TABLE 32 COMMENCEMENT AND OPERATIONAL MILESTONES FOR OPTIMAL STAGING OF AUSTRALIAN HIGH-SPEED RAIL</i>	55
<i>TABLE 33 COMMENCEMENT AND OPERATIONAL MILESTONES FOR ACCELERATED STAGING OF AUSTRALIAN HIGH-SPEED RAIL</i>	55
CALIFORNIA HIGH-SPEED RAIL	56
REGULATIONS	58
<i>TABLE 34 FEDERAL RAILROAD ADMINISTRATION TRACK CLASSES (MPH)</i>	58
<i>TABLE 35 FEDERAL RAILROAD ADMINISTRATION SPEED TIER DESIGNATIONS</i>	59
<i>TABLE 36 EUROPEAN LIMITING VALUES LPAEQ,TP FOR THE PASS-BY NOISE OF ROLLING STOCK</i>	59
<i>TABLE 37 EUROPEAN STAGE III A STANDARDS FOR RAIL TRACTION ENGINES</i>	60
<i>TABLE 38 EUROPEAN STAGE III B STANDARDS FOR RAIL TRACTION ENGINES</i>	60
CHAPTER 6 CHINA, JAPAN AND EUROPE	62
CHINA	62
<i>FIGURE 9 CHANGE IN HIGH-SPEED RAIL SPENDING IN CHINA, FROM 2014 TO 2019 (%)</i>	62
<i>FIGURE 10 CHANGE IN HIGH-SPEED RAIL MAINTENANCE SPENDING IN CHINA, FROM 2014 TO 2019 (%)</i>	63
<i>TABLE 39 MAJOR HIGH-SPEED RAIL LINES UNDER CONSTRUCTION IN CHINA, 2014 (KM)</i>	65
<i>TABLE 40 MAJOR PLANNED HIGH-SPEED RAIL LINES IN CHINA, 2014 (KM)</i>	67
JAPAN	67
<i>FIGURE 11 CHANGE IN HIGH-SPEED RAIL SPENDING IN JAPAN, FROM 2014 TO 2019 (%)</i>	68
<i>FIGURE 12 CHANGE IN HIGH-SPEED RAIL MAINTENANCE SPENDING IN JAPAN, FROM 2014 TO 2019 (%)</i>	69
EUROPE	70
<i>TABLE 43 OPERATIONAL HIGH-SPEED RAIL TRACKS IN EUROPE, 2014 (KM)</i>	71

TOPIC	PAGE NO.
<i>FIGURE 13 HIGH-SPEED RAIL TRACK IN EUROPE BY COUNTRY 2014 AND 2019 (%)</i>	72
<i>FIGURE 14 HIGH-SPEED TRAIN SET FLEET IN EUROPE BY COUNTRY, 2014 AND 2019 (%)</i>	73
<i>FIGURE 15 HIGH-SPEED TRAIN SET FLEET IN EUROPE BY COUNTRY, 2014 AND 2019 (%)</i>	74
MAJOR SUPPLIERS IN EUROPE	75
MAJOR OPERATORS OF HSR IN EUROPE	75
<i>TABLE 44 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN FRANCE, 2014 (KM)</i>	76
<i>TABLE 45 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN GERMANY, 2014 (KM)</i>	76
<i>TABLE 46 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN SPAIN, 2014 (KM)</i>	77
<i>TABLE 47 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN SWITZERLAND, 2014 (KM)</i>	77
<i>TABLE 48 PROPOSED HIGH-SPEED RAIL TRACKS IN EUROPE, 2014 (KM)</i>	78
HIGH-SPEED RAIL SAFETY REGULATIONS IN EUROPE	79
COMMERCIAL SUCCESS OF HIGH-SPEED RAIL IN EUROPE	80
CHAPTER 7 SUPPLIER LANDSCAPE AND COMPANY PROFILES	82
<i>TABLE 49 OPERATIONAL HIGH-SPEED TRAINS OF MAJOR MANUFACTURERS</i>	82
<i>FIGURE 16 MARKET SHARE FOR OPERATIONAL HIGH-SPEED TRAIN SETS BY MANUFACTURER (EXCLUDING JOINT VENTURES), 2013 (%)</i>	87
<i>FIGURE 17 MARKET SHARE FOR OPERATIONAL HIGH-SPEED TRAIN SETS BY MANUFACTURER (ONLY JOINT VENTURES), 2013 (%)</i>	88
<i>FIGURE 18 MARKET SHARE FOR HIGH-SPEED TRAIN SETS BY REGION, 2013 (%)</i>	89
MANUFACTURERS OF HIGH-SPEED TRAIN SETS	90
ALSTOM	90
<i>TABLE 50 ALSTOM'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (MILLIONS)</i>	92
<i>FIGURE 19 ALSTOM'S REVENUE BY BUSINESS SEGMENT, 2013 (%)</i>	93
<i>FIGURE 20 ALSTOM'S REVENUE BY REGION FOR TRANSPORT SECTOR, 2013 (%)</i>	93
ANSALDOBREDA	94
BOMBARDIER	95
<i>TABLE 51 BOMBARDIER'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	97
<i>FIGURE 21 BOMBARDIER'S REVENUE BY BUSINESS SEGMENT, 2013 (%)</i>	97
<i>FIGURE 22 BOMBARDIER'S REVENUE FROM TRANSPORT SECTOR, 2013 (%)</i>	97
<i>FIGURE 23 BOMBARDIER'S REVENUE BY REGION FOR TRANSPORT SECTOR, 2013 (%)</i>	98
CAF	99
<i>TABLE 52 CAF'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS/%)</i>	99
<i>FIGURE 24 CAF'S REVENUE BY BUSINESS SEGMENT, 2013 (%)</i>	100
<i>FIGURE 25 CAF'S REVENUE BY REGION, 2013 (%)</i>	100
CHINA CNR CORP., LTD.	101
<i>TABLE 53 CHINA CNR'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS/%)</i>	102
CSR CORP., LTD.	102

TOPIC	PAGE NO.
<i>TABLE 54 CSR'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS/%)</i>	103
<i>FIGURE 26 CSR'S REVENUE BY SEGMENT 2013 (%)</i>	104
<i>FIGURE 27 CSR'S REVENUE BY REGION, 2013 (%)</i>	105
FIREMA TRASPORTI SPA	105
HITACHI LTD.	106
<i>TABLE 55 HITACHI'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	107
<i>FIGURE 28 HITACHI'S REVENUE BY SEGMENT, 2013 (%)</i>	107
<i>FIGURE 29 HITACHI'S REVENUE BY REGION, 2013 (%)</i>	109
HYUNDAI ROTEM	109
<i>TABLE 56 HYUNDAI ROTEM'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	110
<i>FIGURE 30 HYUNDAI ROTEM'S REVENUE BY BUSINESS SEGMENT, 2013 (%)</i>	110
<i>FIGURE 31 HYUNDAI ROTEM'S REVENUE BY REGION, 2013 (%)</i>	111
JAPAN TRANSPORT ENGINEERING CO.	112
KAWASAKI HEAVY INDUSTRIES, LTD.	112
<i>TABLE 57 KAWASAKI HEAVY INDUSTRIES' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	113
<i>FIGURE 32 KAWASAKI HEAVY INDUSTRIES' REVENUE BY BUSINESS SEGMENT, 2013 (%)</i>	113
<i>FIGURE 33 KAWASAKI HEAVY INDUSTRIES' REVENUE BY REGION, 2013 (%)</i>	114
KINKI SHARYO CO., LTD. (THE)	115
<i>TABLE 58 KINKI SHARYO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	115
NABTESCO CORP.	116
<i>TABLE 59 NABTESCO CORP.'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	117
<i>FIGURE 34 NABTESCO CORP.'S REVENUE BY BUSINESS SEGMENT, 2013 (%)</i>	117
<i>FIGURE 35 NABTESCO CORP.'S REVENUE BY REGION, 2013 (%)</i>	117
NIPPON SHARYO, LTD.	118
<i>TABLE 60 NIPPON SHARYO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	119
<i>FIGURE 36 NIPPON SHARYO'S REVENUE BY REGION, 2013 (%)</i>	120
<i>FIGURE 37 NIPPON SHARYO'S REVENUE BY SEGMENT, 2013 (%)</i>	120
SIEMENS AG	121
<i>TABLE 61 SIEMENS' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	123
<i>FIGURE 38 SIEMENS' REVENUE BY LOCATION, 2013 (%)</i>	123
<i>FIGURE 39 SIEMENS' REVENUE BY BUSINESS SEGMENT, 2013 (%)</i>	124
TALGO	124
MANUFACTURERS OF HIGH-SPEED RAIL SIGNALING SYSTEMS, BRAKING SYSTEMS AND INFRASTRUCTURE	125
ADIF	125
AKEBONO BRAKE INDUSTRY CO., LTD.	126
<i>TABLE 62 AKEBONO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	127
<i>FIGURE 40 AKEBONO'S REVENUE BY REGION, 2013 (%)</i>	127
<i>FIGURE 41 AKEBONO'S REVENUE BY PRODUCT, 2013 (%)</i>	127
ANSALDO STS	128

TOPIC	PAGE NO.
<i>TABLE 63 ANSALDO STS' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	129
<i>FIGURE 42 ANSALDO STS' REVENUE BY REGION, 2013 (%)</i>	129
<i>FIGURE 43 ANSALDO STS' REVENUE BY SEGMENT, 2013 (%)</i>	130
BEIJING TRAFFIC CONTROL TECHNOLOGY CO., LTD. (BEIJING TCT)	130
FAIVELEY TRANSPORT SA	131
<i>TABLE 64 FAIVELEY TRANSPORT'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	132
<i>FIGURE 44 FAIVELEY TRANSPORT'S REVENUE BY REGION, 2013 (%)</i>	132
<i>FIGURE 45 FAIVELEY TRANSPORT'S REVENUE BY PRODUCT, 2013 (%)</i>	133
GE TRANSPORTATION	134
<i>TABLE 65 GE TRANSPORTATION'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	134
HOLLYSYS AUTOMATION TECHNOLOGIES LTD.	135
<i>TABLE 66 HOLLYSYS AUTOMATION TECHNOLOGIES' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	136
INFRABEL	136
THE KNORR-BREMSE GROUP	136
<i>TABLE 67 KNORR BREMSE'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	137
<i>FIGURE 46 KNORR BREMSE'S REVENUE BY SEGMENT, 2013 (%)</i>	138
<i>FIGURE 47 KNORR BREMSE'S REVENUE BY SEGMENT, 2013 (\$ MILLIONS)</i>	138
LSIS CO., LTD.	139
<i>TABLE 68 LSIS' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	140
<i>FIGURE 48 LSIS' REVENUE BY REGION, 2012 (%)</i>	140
<i>FIGURE 49 LSIS' REVENUE BY SEGMENT, 2012 (%)</i>	140
mitsubishi heavy industries, LTD.	141
<i>TABLE 69 MHI'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	142
<i>FIGURE 50 MHI'S REVENUE BY SEGMENT, 2013 (%)</i>	142
NIPPON SIGNAL CO., LTD.	143
<i>TABLE 70 NIPPON SIGNAL'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	144
SUMITOMO CORP.	144
<i>TABLE 71 SUMITOMO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	145
<i>FIGURE 52 SUMITOMO'S REVENUE BY SEGMENT, 2012 (%)</i>	145
<i>FIGURE 53 SUMITOMO'S REVENUE BY REGION, 2012 (%)</i>	146
THALES GROUP	147
<i>TABLE 72 THALES GROUP'S RECENT FINANCIAL PERFORMANCE, THROUGH 201' (\$ MILLIONS)</i>	148
<i>FIGURE 54 THALES GROUP'S REVENUE BY REGION, 2013 (%)</i>	148
<i>FIGURE 55 THALES GROUP'S REVENUE BY SEGMENT, 2013 (%)</i>	149
TOSHIBA CORP.	149
<i>TABLE 73 TOSHIBA'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)</i>	150
<i>FIGURE 56 TOSHIBA'S REVENUE BY REGION, 2013 (%)</i>	150
<i>FIGURE 57 TOSHIBA'S REVENUE BY SEGMENT, 2013 (%)</i>	151

LIST OF TABLES

TABLE HEADING	PAGE NO.
SUMMARY TABLE GLOBAL HIGH-SPEED RAIL MARKET, THROUGH 2019 (\$ MILLIONS)	7
TABLE 1 FORECAST FOR THE GLOBAL HIGH-SPEED RAIL MARKET, THROUGH 2019 (\$ MILLIONS)	17
TABLE 2 GLOBAL FORECAST FOR HIGH-SPEED RAIL BY REGION, THROUGH 2019 (\$ MILLIONS)	17
TABLE 3 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACKS CONSTRUCTED BY REGION, THROUGH 2019 (KM)	18
TABLE 4 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACKS CONSTRUCTED IN ASIA-PACIFIC, THROUGH 2019 (KM)	19
TABLE 5 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACKS CONSTRUCTED IN EUROPE, THROUGH 2019 (KM)	20
TABLE 6 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY REGION, THROUGH 2019 (UNITS)	21
TABLE 7 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRAIN SET FLEETS IN ASIA-PACIFIC, THROUGH 2019 (UNITS)	22
TABLE 8 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRAIN SET FLEET IN EUROPE, THROUGH 2019 (UNITS)	23
TABLE 9 GLOBAL FORECAST FOR HIGH-SPEED RAIL INFRASTRUCTURE SPENDING BY REGION, THROUGH 2019 (\$ MILLIONS)	25
TABLE 10 GLOBAL FORECAST FOR HIGH-SPEED RAIL INFRASTRUCTURE SPENDING IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)	25
TABLE 11 GLOBAL FORECAST FOR HIGH-SPEED RAIL INFRASTRUCTURE SPENDING IN EUROPE, THROUGH 2019 (\$ MILLIONS)	26
TABLE 12 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY REGION, THROUGH 2019 (\$ MILLIONS)	28
TABLE 13 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)	28
TABLE 14 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS IN EUROPE, THROUGH 2019 (\$ MILLIONS)	29
TABLE 15 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACK MAINTENANCE SPENDING BY REGION, THROUGH 2019 (\$ MILLIONS)	30
TABLE 16 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACK MAINTENANCE SPENDING IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)	31
TABLE 17 GLOBAL FORECAST FOR HIGH-SPEED RAIL TRACK MAINTENANCE SPENDING IN EUROPE, THROUGH 2019 (\$ MILLIONS)	32
TABLE 18 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET MAINTENANCE SPENDING BY REGION, THROUGH 2019 (\$ MILLIONS)	33
TABLE 19 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET MAINTENANCE SPENDING IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)	34
TABLE 20 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET MAINTENANCE SPENDING IN EUROPE, THROUGH 2019 (\$ MILLIONS)	35
TABLE 21 FORECAST FOR GLOBAL HIGH-SPEED RAIL ROLLING STOCK MAINTENANCE (EXCLUDING TRAIN SETS) BY REGION, THROUGH 2019 (MILLIONS)	36
TABLE 22 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY TECHNOLOGY, THROUGH 2019 (UNITS)	37
TABLE 23 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEET BY TECHNOLOGY IN ASIA-PACIFIC, THROUGH 2019 (\$ MILLIONS)	37
TABLE 24 GLOBAL FORECAST FOR HIGH-SPEED TRAIN SET FLEETS BY TECHNOLOGY IN EUROPE, THROUGH 2019 (MILLIONS)	38
TABLE 25 URBAN AND RURAL POPULATION BY REGION, 2014 (MILLIONS)	40
TABLE 26 TOP OIL-PRODUCING REGIONS, 2011 (MILLION TONS)	46

TABLE HEADING	PAGE NO.
TABLE 27 GLOBAL OIL PRICES, 2003-2013 (\$ PER BARREL)	48
TABLE 28 EXPECTED GLOBAL OIL PRICES, 2014-2040 (\$ PER BARREL)	48
TABLE 29 GLOBAL CO2 EMISSIONS AND PRIMARY ENERGY DEMAND, THROUGH 2035 (GIGATONS)	49
TABLE 30 EUROPEAN CO2 EMISSIONS FROM TRAIN OPERATIONS, THROUGH 2020 (MILLION TONS)	50
TABLE 31 CARBON FOOTPRINT OF SELECTED HIGH-SPEED TRANSPORTATION SERVICES, 2010 (G CO2/PKM)	50
TABLE 32 COMMENCEMENT AND OPERATIONAL MILESTONES FOR OPTIMAL STAGING OF AUSTRALIAN HIGH-SPEED RAIL	55
TABLE 33 COMMENCEMENT AND OPERATIONAL MILESTONES FOR ACCELERATED STAGING OF AUSTRALIAN HIGH-SPEED RAIL	55
TABLE 34 FEDERAL RAILROAD ADMINISTRATION TRACK CLASSES (MPH)	58
TABLE 35 FEDERAL RAILROAD ADMINISTRATION SPEED TIER DESIGNATIONS	59
TABLE 36 EUROPEAN LIMITING VALUES LPAEQ,TP FOR THE PASS-BY NOISE OF ROLLING STOCK	59
TABLE 37 EUROPEAN STAGE III A STANDARDS FOR RAIL TRACTION ENGINES	60
TABLE 38 EUROPEAN STAGE III B STANDARDS FOR RAIL TRACTION ENGINES	60
TABLE 39 MAJOR HIGH-SPEED RAIL LINES UNDER CONSTRUCTION IN CHINA, 2014 (KM)	65
TABLE 40 MAJOR PLANNED HIGH-SPEED RAIL LINES IN CHINA, 2014 (KM)	67
TABLE 43 OPERATIONAL HIGH-SPEED RAIL TRACKS IN EUROPE, 2014 (KM)	71
TABLE 44 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN FRANCE, 2014 (KM)	76
TABLE 45 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN GERMANY, 2014 (KM)	76
TABLE 46 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN SPAIN, 2014 (KM)	77
TABLE 47 MAJOR HIGH-SPEED RAIL TRACKS UNDER CONSTRUCTION IN SWITZERLAND, 2014 (KM)	77
TABLE 48 PROPOSED HIGH-SPEED RAIL TRACKS IN EUROPE, 2014 (KM)	78
TABLE 49 OPERATIONAL HIGH-SPEED TRAINS OF MAJOR MANUFACTURERS	82
TABLE 50 ALSTOM'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (MILLIONS)	92
TABLE 51 BOMBARDIER'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	97
TABLE 52 CAF'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS/%)	99
TABLE 53 CHINA CNR'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS/%)	102
TABLE 54 CSR'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS/%)	103
TABLE 55 HITACHI'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	107
TABLE 56 HYUNDAI ROTEM'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	110
TABLE 57 KAWASAKI HEAVY INDUSTRIES' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	113
TABLE 58 KINKI SHARYO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	115
TABLE 59 NABTESCO CORP.'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	117
TABLE 60 NIPPON SHARYO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	119

TABLE HEADING	PAGE NO.
TABLE 61 SIEMENS' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	123
TABLE 62 AKEBONO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	127
TABLE 63 ANSALDO STS' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	129
TABLE 64 FAIVELEY TRANSPORT'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	132
TABLE 65 GE TRANSPORTATION'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	134
TABLE 66 HOLLYSYS AUTOMATION TECHNOLOGIES' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	136
TABLE 67 KNORR BREMSE'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	137
TABLE 68 LSIS' RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	140
TABLE 69 MHI'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	142
TABLE 70 NIPPON SIGNAL'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	144
TABLE 71 SUMITOMO'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	145
TABLE 72 THALES GROUP'S RECENT FINANCIAL PERFORMANCE, THROUGH 201' (\$ MILLIONS)	148
TABLE 73 TOSHIBA'S RECENT FINANCIAL PERFORMANCE, THROUGH 2013 (\$ MILLIONS)	150

LIST OF FIGURES

FIGURE TITLE	PAGE NO.
SUMMARY FIGURE GLOBAL TRENDS IN THE HIGH-SPEED RAIL MARKET, 2013-2019 (\$ MILLIONS)	7
FIGURE 1 FLOW CHART FOR TYPES OF HIGH-SPEED RAIL TRACKS	12
FIGURE 2 REGIONAL SHARE OF URBAN POPULATION, 2014 (%)	40
FIGURE 3 GLOBAL URBANIZATION RATES, 2014 (%)	41
FIGURE 4 GLOBAL SHARE OF MEGACITIES BY REGION, 2014 (%)	42
FIGURE 5 TOP 10 MEGACITIES BY POPULATION, 2014 (MILLIONS)	43
FIGURE 6 TOP 10 MEGACITIES BY POPULATION, 2030 (MILLIONS)	44
FIGURE 7 GLOBAL OIL RECOVERABLE RESERVES BY REGION (%)	47
FIGURE 8 TOTAL ENERGY CONSUMPTION BY SECTOR IN 2035, NEW POLICIES SCENARIO (%)	49
FIGURE 9 CHANGE IN HIGH-SPEED RAIL SPENDING IN CHINA, FROM 2014 TO 2019 (%)	62
FIGURE 10 CHANGE IN HIGH-SPEED RAIL MAINTENANCE SPENDING IN CHINA, FROM 2014 TO 2019 (%)	63
FIGURE 11 CHANGE IN HIGH-SPEED RAIL SPENDING IN JAPAN, FROM 2014 TO 2019 (%)	68
FIGURE 12 CHANGE IN HIGH-SPEED RAIL MAINTENANCE SPENDING IN JAPAN, FROM 2014 TO 2019 (%)	69
FIGURE 13 HIGH-SPEED RAIL TRACK IN EUROPE BY COUNTRY 2014 AND 2019 (%)	72
FIGURE 14 HIGH-SPEED TRAIN SET FLEET IN EUROPE BY COUNTRY, 2014 AND 2019 (%)	73
FIGURE 15 HIGH-SPEED TRAIN SET FLEET IN EUROPE BY COUNTRY, 2014 AND 2019 (%)	74
FIGURE 16 MARKET SHARE FOR OPERATIONAL HIGH-SPEED TRAIN SETS BY MANUFACTURER (EXCLUDING JOINT VENTURES), 2013 (%)	87
FIGURE 17 MARKET SHARE FOR OPERATIONAL HIGH-SPEED TRAIN SETS BY MANUFACTURER (ONLY JOINT VENTURES), 2013 (%)	88
FIGURE 18 MARKET SHARE FOR HIGH-SPEED TRAIN SETS BY REGION, 2013 (%)	89
FIGURE 19 ALSTOM'S REVENUE BY BUSINESS SEGMENT, 2013 (%)	93
FIGURE 20 ALSTOM'S REVENUE BY REGION FOR TRANSPORT SECTOR, 2013 (%)	93
FIGURE 21 BOMBARDIER'S REVENUE BY BUSINESS SEGMENT, 2013 (%)	97
FIGURE 22 BOMBARDIER'S REVENUE FROM TRANSPORT SECTOR, 2013 (%)	97
FIGURE 23 BOMBARDIER'S REVENUE BY REGION FOR TRANSPORT SECTOR, 2013 (%)	98
FIGURE 24 CAF'S REVENUE BY BUSINESS SEGMENT, 2013 (%)	100
FIGURE 25 CAF'S REVENUE BY REGION, 2013 (%)	100
FIGURE 26 CSR'S REVENUE BY SEGMENT 2013 (%)	104
FIGURE 27 CSR'S REVENUE BY REGION, 2013 (%)	105
FIGURE 28 HITACHI'S REVENUE BY SEGMENT, 2013 (%)	107
FIGURE 29 HITACHI'S REVENUE BY REGION, 2013 (%)	109
FIGURE 30 HYUNDAI ROTEM'S REVENUE BY BUSINESS SEGMENT, 2013 (%)	110
FIGURE 31 HYUNDAI ROTEM'S REVENUE BY REGION, 2013 (%)	111
FIGURE 32 KAWASAKI HEAVY INDUSTRIES' REVENUE BY BUSINESS SEGMENT, 2013 (%)	113
FIGURE 33 KAWASAKI HEAVY INDUSTRIES' REVENUE BY REGION, 2013 (%)	114
FIGURE 34 NABTESCO CORP.'S REVENUE BY BUSINESS SEGMENT, 2013 (%)	117
FIGURE 35 NABTESCO CORP.'S REVENUE BY REGION, 2013 (%)	117
FIGURE 36 NIPPON SHARYO'S REVENUE BY REGION, 2013 (%)	120
FIGURE 37 NIPPON SHARYO'S REVENUE BY SEGMENT, 2013 (%)	120

FIGURE TITLE	PAGE NO.
FIGURE 38 SIEMENS' REVENUE BY LOCATION, 2013 (%)	123
FIGURE 39 SIEMENS' REVENUE BY BUSINESS SEGMENT, 2013 (%)	124
FIGURE 40 AKEBONO'S REVENUE BY REGION, 2013 (%)	127
FIGURE 41 AKEBONO'S REVENUE BY PRODUCT, 2013 (%)	127
FIGURE 42 ANSALDO STS' REVENUE BY REGION, 2013 (%)	129
FIGURE 43 ANSALDO STS' REVENUE BY SEGMENT, 2013 (%)	130
FIGURE 44 FAIVELEY TRANSPORT'S REVENUE BY REGION, 2013 (%)	132
FIGURE 45 FAIVELEY TRANSPORT'S REVENUE BY PRODUCT, 2013 (%)	133
FIGURE 46 KNORR BREMSE'S REVENUE BY SEGMENT, 2013 (%)	138
FIGURE 47 KNORR BREMSE'S REVENUE BY SEGMENT, 2013 (\$ MILLIONS)	138
FIGURE 48 LSIS' REVENUE BY REGION, 2012 (%)	140
FIGURE 49 LSIS' REVENUE BY SEGMENT, 2012 (%)	140
FIGURE 50 MHI'S REVENUE BY SEGMENT, 2013 (%)	142
FIGURE 52 SUMITOMO'S REVENUE BY SEGMENT, 2012 (%)	145
FIGURE 53 SUMITOMO'S REVENUE BY REGION, 2012 (%)	146
FIGURE 54 THALES GROUP'S REVENUE BY REGION, 2013 (%)	148
FIGURE 55 THALES GROUP'S REVENUE BY SEGMENT, 2013 (%)	149
FIGURE 56 TOSHIBA'S REVENUE BY REGION, 2013 (%)	150
FIGURE 57 TOSHIBA'S REVENUE BY SEGMENT, 2013 (%)	151