FROST & SULLIVAN

Strategic Insight

2014 Outlook of Global Commercial Truck Industry

Economic Recovery in Key Markets Pushing Global Sales Upwards

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Executive Summary

Key Highlights of 2013

Global Economy Grew by 3.1 percent Leading to MD-HD Truck Sales of 2.76 Million Units.

1	**Year of Next-11 and African Market Growth and Lackluster BRIC Market performance** • BRIC markets experienced slowdown with India and Russia slowing down considerably, while China and Brazil showed growth, albeit at a much lower rate than in past. Growth in several Next-11 markets, marginally higher North American sales and new opportunities in Africa resulted in a net increase of approximately 140,000 units over 2012 levels.
2	**Natural Gas Truck Sales Increased in All Major Markets** • Natural gas truck sales increased steadily in North America, China and also moderately in Europe. Proliferation of ISX-G12 engine in North America and gradual establishment of fuelling infrastructure catalyzed rising adoption from regional haulers. Approximately 25 Thousand MD-HD natural gas trucks were sold in 2013.
3	**Change in Competitive Landscape Led By Volvo-DFM Partnership** • For the first time Volvo Group overtook Daimler as world's largest medium-heavy truck seller through a 45 Percent stake in DongFeng. The true impact of this change will be felt in 2014 and beyond. Daimler is focusing on aggressive push in growth markets to reclaim top position.
4	**Platform Strategies Experienced Rapid Implementation** • By the end of 2013, 23 Percent of all medium-heavy duty trucks sold in global markets featured platform based lineage. Platform development activities by 12 of the world's leading OEMs.
5	**Soft Technologies (non-Powertrain) Experienced Renewed OEM and Market Focus** • Joint development to share development cost and achieving breakthroughs in innovation. Daimler with Renault-Nissan and Tesla; BMW with Toyota; and General Motors with Ford are examples of some key powertrain partnerships.

Source: Frost & Sullivan

Top 6 Predictions of 2014

2014 is Expected to be the Year of New Globally Harmonized Engine Platforms, Mid-market Focused Pricing and Marketing Initiatives, Soft Technology Focused R&D and Retailing Strategies.

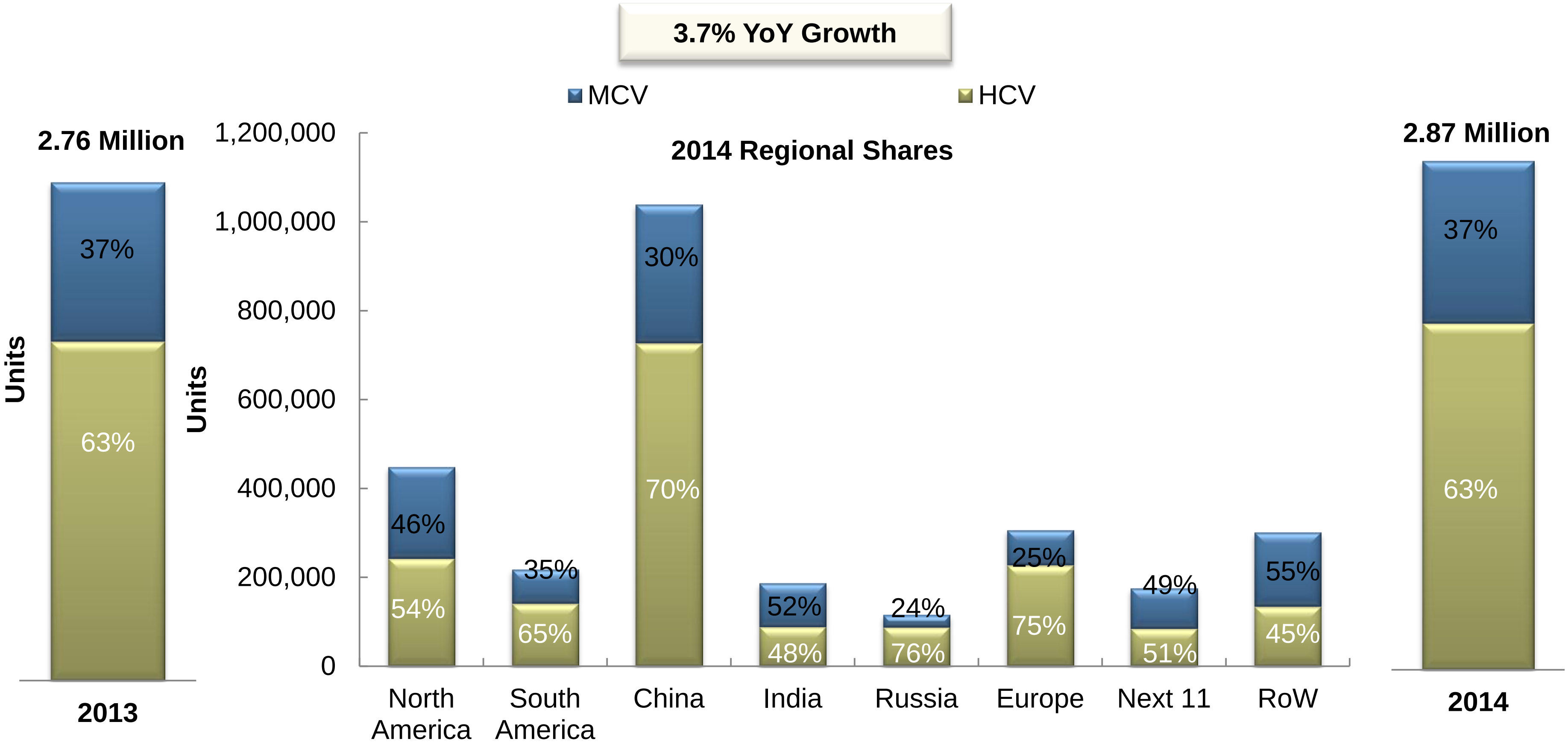
1	**Global Sales to Hit 2.87 Million as Global Economy Grows in the 3.2-3.7 Percent Range** • Improvements in North American, Chinese, European markets coupled with possible growth in Indian market to result in 3.7 percent growth in MD-HD truck sales amounting to 2.87 million units.
2	**Year of Engine Platforms while Diesel Drops to 97 Percent of Total Powertrain Fuel Mix** • Cummins' global engine platforms, Volvo's 13L dual-fuel natural gas engines, FPT/IVECO's Cursor 11 engine, Navistar's MD SCR engines will be milestones that will define powertrain market evolution. This year will mark proliferation of global engine platforms. CNG/LNG engines to account for 0.8 Percent of all truck engines featuring in new trucks. Vocational truck platforms to receive boost in 2014.
3	**Fortune at the Middle of the Diamond as 7 New Platforms Vie for Mid-Market Volume Share** • Global OEMs will recalibrate 7 recent truck platforms to target mid-level standard truck segment, rather than focusing on low-cost truck segments marking a shift in BRIC market positioning strategies.
4	**Prognostics and Multiplexing Silently Revolutionizing Truck Value Proposition** • Rising proliferation of distributed electronics will create foundation for prognostics (delivering $80 Million in OE market revenues in 2014 in NA and EU) and drive need for multiplexing, while latently creating foundation for more productive relationships between OEMs and truck owners in future.
5	**New Retailing Strategies Enabled through Digitization and Big Data Leveraging** • Digital retailing initiatives by truck OEMs will range from website based sales optimization to integration of digital marketing within existing dealership models, off-store digitization to lead generation through predictive analytics. Big data will enable several of these new retailing initiatives.
6	**City Trucks Gain OEM Attention as Urban Logistics Reshapes Freight Movement Patterns** • Rise in urban logistics and bricks-and-clicks sales models will lead OEMs towards developing and delivering city logistics enabling medium-heavy duty trucks featuring smaller powertrain footprint, faster loading/unloading access, and better connectivity with fleet hubs and infrastructure.

Source: Frost & Sullivan

Global Medium and Heavy Truck Market Forecast 2014

The Economic Recovery in Markets Such as China and North America, and the Improvement in EU MD-HD Truck Market Will Lead to a 3.7 Percent Growth in Truck Sales in 2014.

CV Outlook 2014: Medium and Heavy Trucks-Unit Shipments, Global, 2013 and 2014



Next 11 include the following countries: Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, Turkey, South Korea, Vietnam, and Bangladesh.

Key: MCV: 6T to 16T; HCV: 16T and above.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Definitions and Segmentation

Vehicle Segments

Vehicle Classification	Definition	Europe, South America, India, China, Russia and RoW	North America
Medium Commercial Vehicles (MCVs)	MCVs represent all types of mid-size trucks. The typical application includes home delivery, logistics, parcel delivery, utilities, waste and recycle collection, and airport operations.	GVWR >6 MT & <=16 MT	Class 4,5, 6, and 7 GVWR more than 14,000 lbs. and lesser than or equal to 26,000 lbs.
Heavy Commercial Vehicles (HCVs)	This constitutes all types of large trucks. The typical application includes line haul freight trucks, refuse trucks, mining and construction trucks, and other types of vocations that demand high-GVWR trucks.	GVWR >16 MT	Class 8 GVWR more than 33,000 lbs.

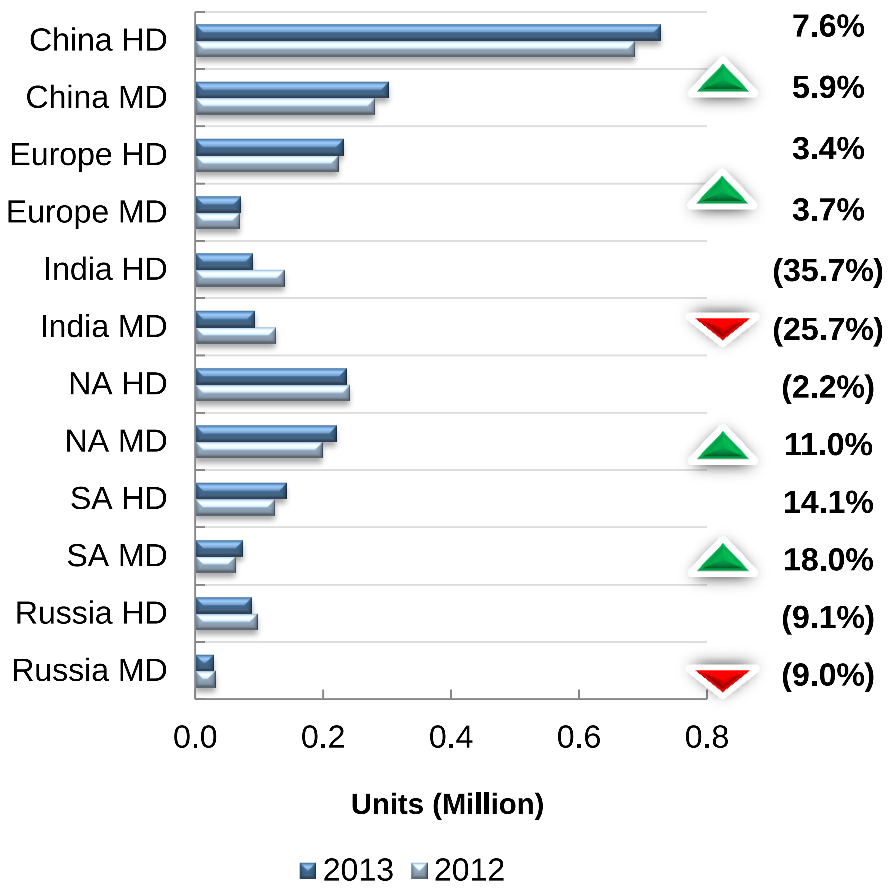
Source: Frost & Sullivan

Freight and Economic Outlook

Top CV Market Performance–2013

The Demand Recovery from China, Brazil and Europe Stoked MD-HD Truck Sales in 2013; Economic Slowdown Dragged Down Truck Sales in Russia and India.

CV Outlook 2014: Top Regions—Unit Shipments, Global, 2012 and 2013



Recovering economic growth which peaked in Q3 resulted in steady demand of commercial trucks. The market recovered from a two year slump to post positive growth.

Euro debt crisis and austerity measures across Europe weakened CV demand, impacting truck output in H1. However, pre-buying resulted in recovery of truck sales in Q3 and Q4.

Indian CV market experienced record lows in 2013. Economic slowdown with uncertain economic scenario have impacted market sentiment which poses risk into 2014.

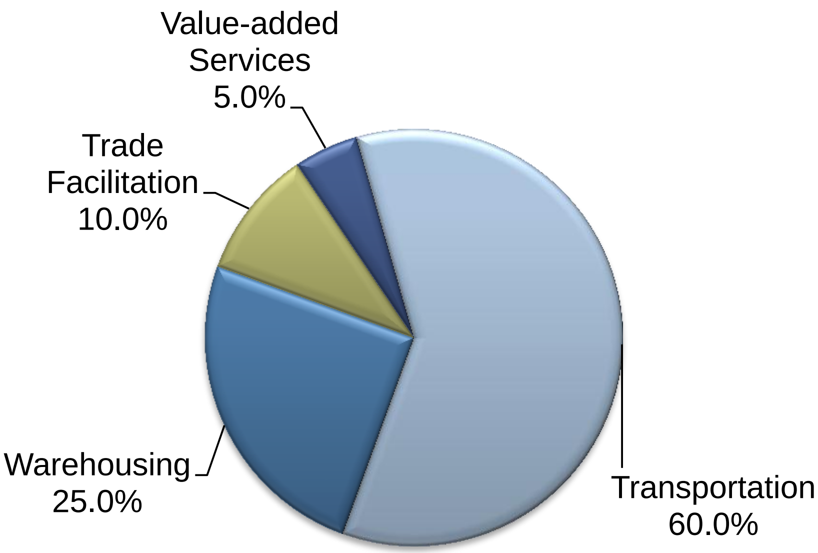
North American market grew marginally with improved sales in the Class 4-7 segment largely on account of growing demand from regional haul application.

Truck sales recovered in the first half of the year on the account of favorable interest rates in Brazil. Despite interest rate revision and an inflationary environment, growth continued to the later quarters.

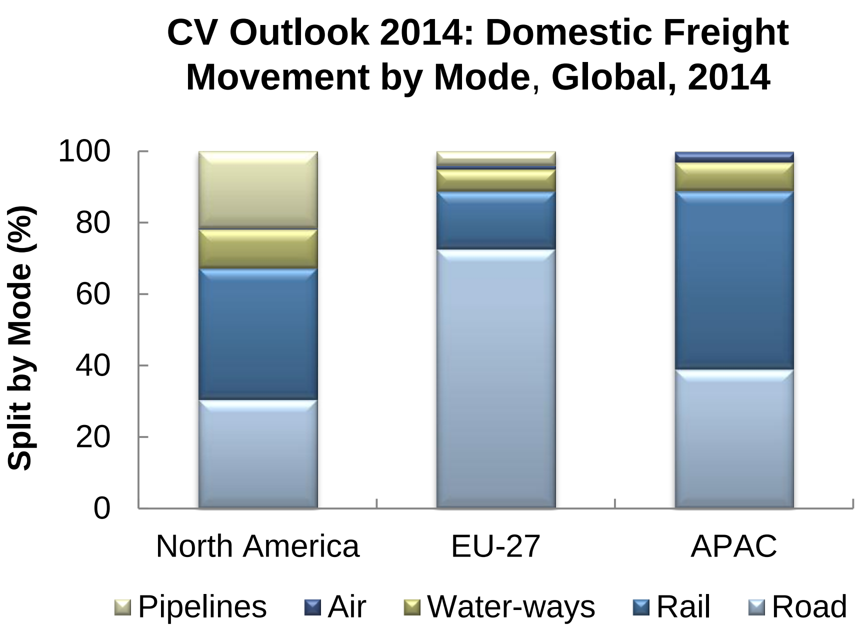
A weak economy curtailed public investments in infrastructure development in Russia, thereby impacting freight demand in 2013.

Source: Frost & Sullivan

Global Freight and Logistics Outlook 2013–2014 Global Freight Movement Increased by 2.7 percent in 2013 While Global Trade (Export Related) Declined in 2013; Logistics Transportation Spending to Exceed $5 Trillion in 2014. 71 percent of Total Tradable Goods by Tonnage Will Move in MD-HD Trucks.



Total Logistics Spend: $9 Trillion



The exhibit in total million ton per miles

- Transportation and distribution activities will account for bulk of logistics spending (60.0 percent of total global logistics spending). However optimization and multi-modality will gradually reduce spending on transportation. This coupled with less volatile fuel prices kept global logistics costs largely flat in 2013.
- While trucking's share of total logistics spend may decline marginally in developed markets, it will increase in developing markets resulting in a net marginal increase in 2014.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

2014 Global GDP and Commercial Truck Market Growth Outlook

Growth in BRIC and Next 11 Economies are Expected to Boost Global Truck Demand.

CV Outlook 2014: GDP and CV Growth Outlook Overview, Global, 2014

Region	GDP Growth Estimates: 2014 (%)	MCV Growth (YoY%)	HCV Growth (YoY%)	Overall CV Growth (YoY%)	Market Opportunity
North America	2–2.5	1.5	3.1	2.3	Moderate
South America	3-4	3.0	2.0	2.3	Moderate
Europe	1.0–1.5	3.1	2.6	2.7	Moderate
China	6–6.75	3.5	3.6	3.6	Moderate
India	5.0–6.0	5.0	6.0	5.5	Moderate
Russia	3–5	(3.0)	(3.1)	(3.1)	Low
Next 11	6–7	9.3	9.0	9.1	High
RoW	4–5	5.5	9.0	7.2	High
Global	**3.2–3.7**	**3.7**	**3.6**	**3.7**	**Moderate**

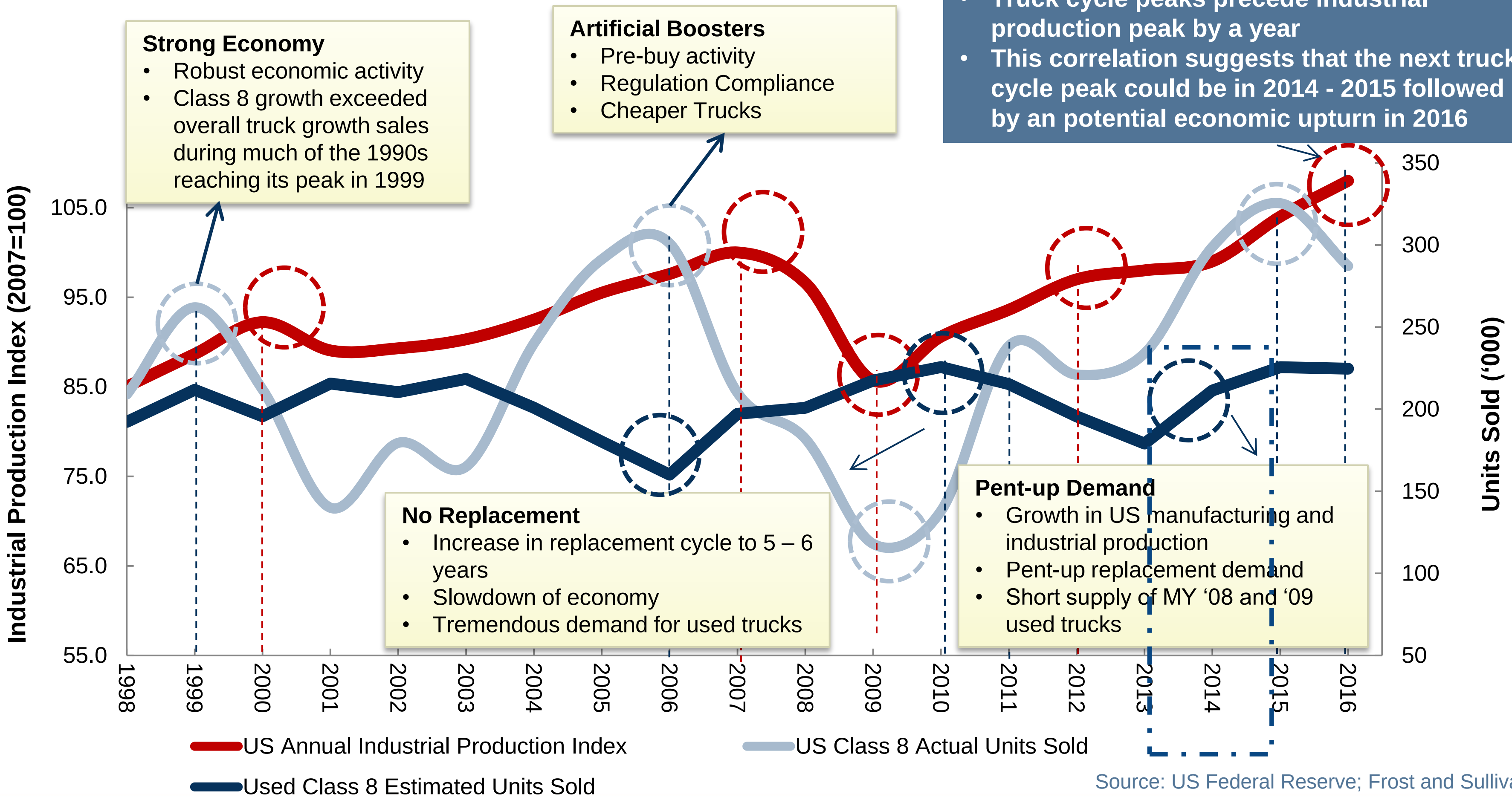
Source: World Bank, Frost & Sullivan

Truck Buying Cycles vis-a-vis Economic Cycles in USA

Both New and Used Truck Sales Expected to Increase in 2014 Indicating Improving Economic Conditions.

CV Outlook 2014: Correlation Between Truck Buying Cycle and Industrial Growth, United States, 1998–2016

- **Truck cycle peaks occur every 4th/5th year**
- **Truck cycle peaks precede industrial production peak by a year**
- **This correlation suggests that the next truck cycle peak could be in 2014 - 2015 followed by an potential economic upturn in 2016**



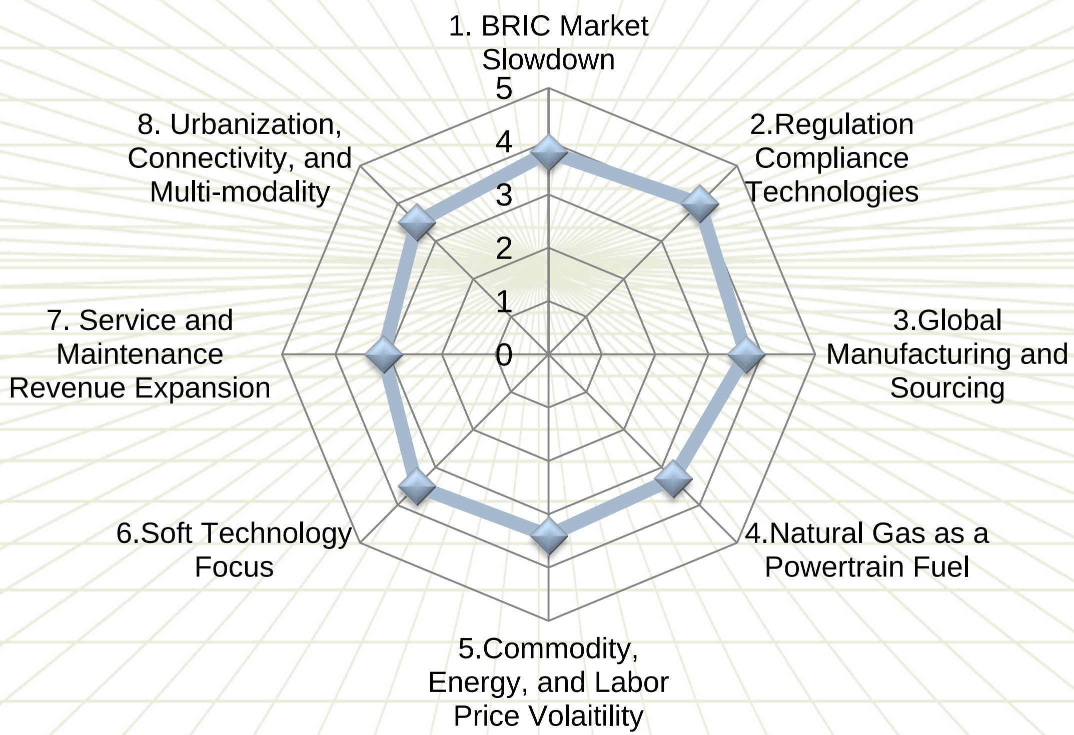
Source: US Federal Reserve; Frost and Sullivan

Global Market Forecast

2014 CV Industry Senior Management Top-of-Mind Issues

Research Focused on OEMs and Tier-1 Executives Indicates that BRIC Market Slowdown, Regulation Compliance Technologies, and Global Manufacturing/Sourcing are Key Issues for Short-Term.

CV Outlook 2014: Senior Executive Top of Mind Issues- MCV-HCV Industry, Global, 2014



Note: Data collected from 2013-2014 interviews and discussions with Sr. Manager to CEO level executives of truck OEMs and tier-1 suppliers in NA, EU, APAC, China, India, Latin America and other regions.

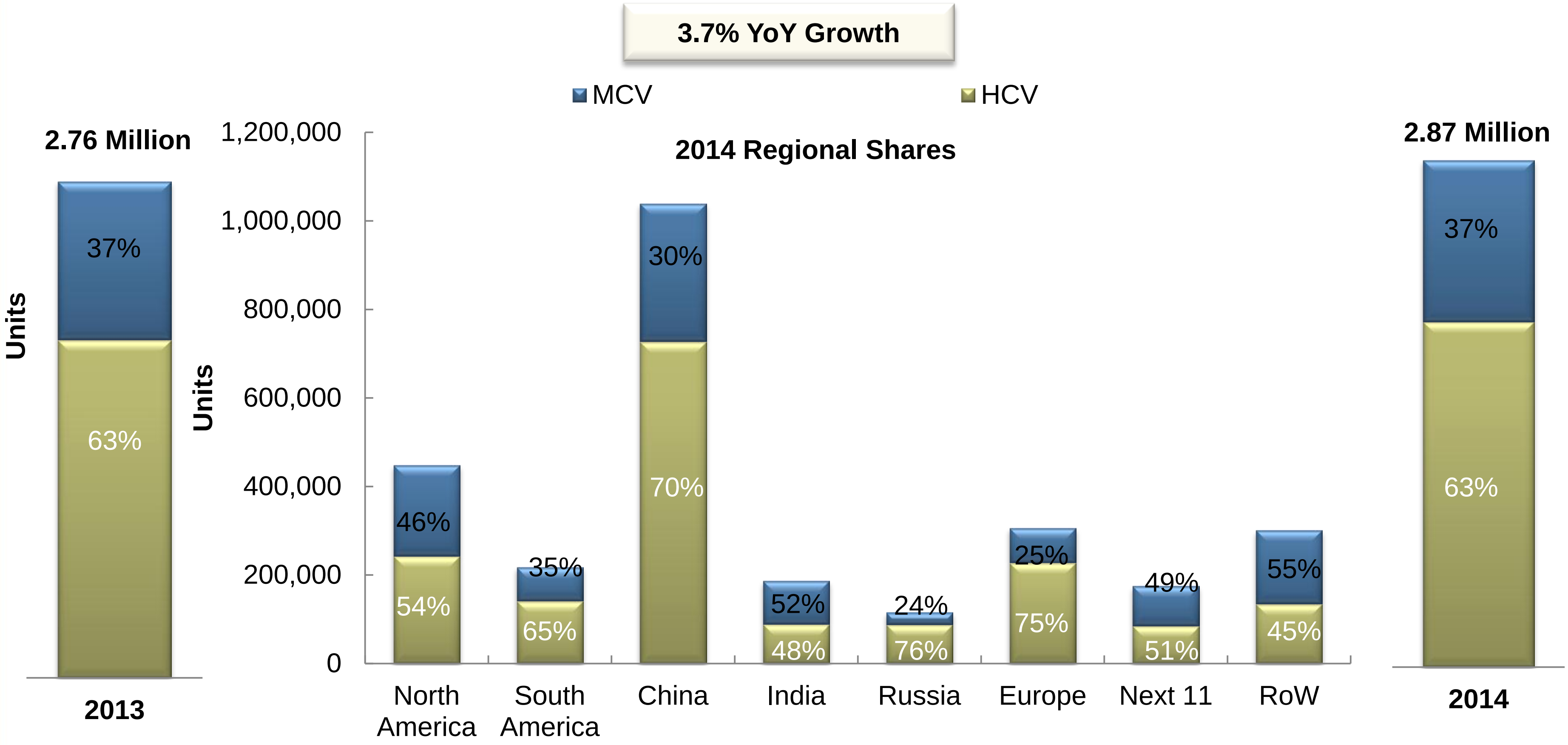
- Recent slow down of BRIC markets such as China and India are forcing global managers to recalibrate growth strategies.
- Soft technologies, although ranking lower in terms of priority feature in the decision matrix of most Western and Eastern OEMs.
- Most truck OEMs are at various stages of introduction of natural gas driven trucks and are unsure of regional/global adoption potential.
- Changing truck sales and revenues from transactional to relational model is creating lifecycle revenue opportunities through soft technologies, connectivity, and service streams.
- Urban logistics and multi-modality is influencing product development.

Source: Frost & Sullivan

Global Medium and Heavy Truck Market Forecast 2014

The Economic Recovery in Markets such as China and North America, and the Improvement in EU MD-HD Truck Market will Lead to a 3.7 Percent Growth in Truck Sales in 2014.

CV Outlook 2014: Unit Shipments, Global, 2013 and 2014



Next 11 include the following countries: Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, Turkey, South Korea, Vietnam, and Bangladesh.

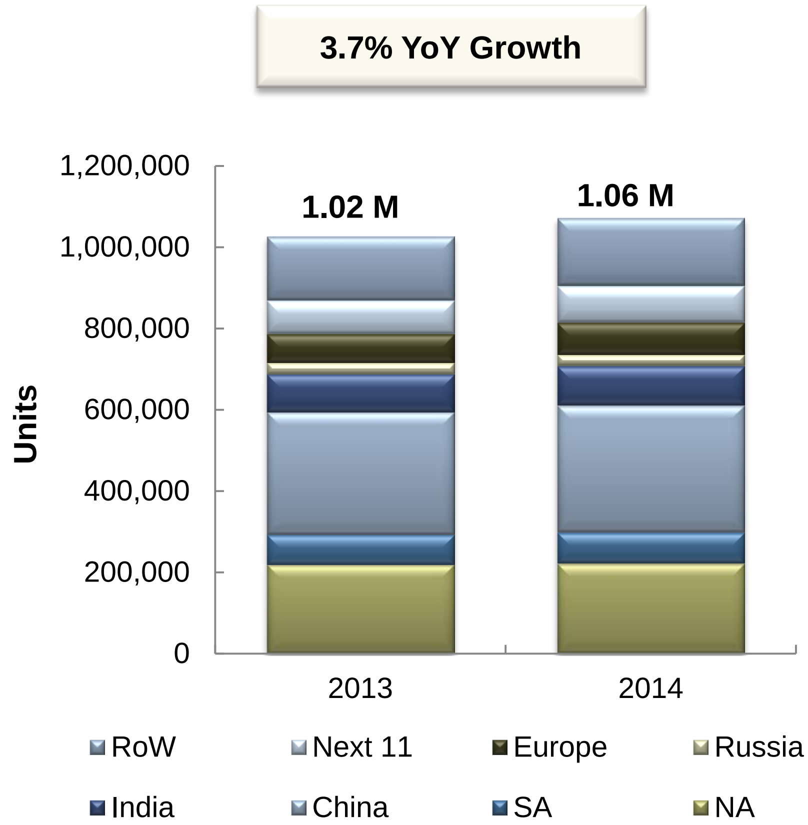
Key: MCV: 6T to 16T; HCV: 16T and above.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

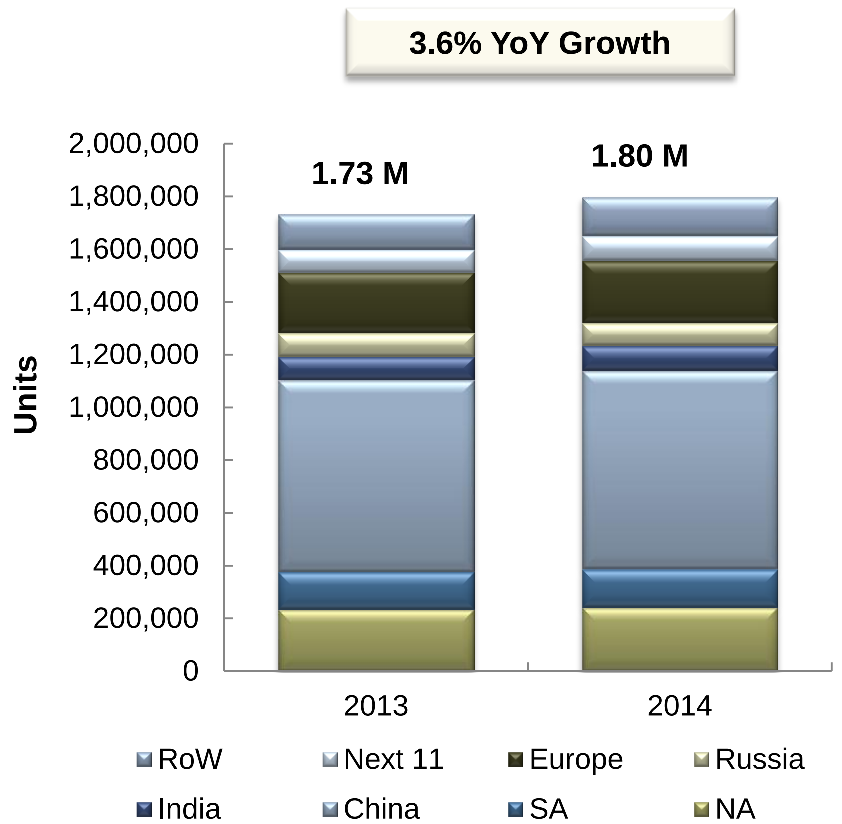
Global Medium and Heavy Commercial Truck Market Forecast 2014

Medium-duty Trucks are Expected to Grow Faster than the Heavy-duty Segment in 2014; Next 11 and RoW Markets are Expected to Contribute toward Strong Growth for the MCV Segment.

CV Outlook 2014: Forecast for Medium Truck Segment Key Markets, Global, 2013 and 2014



CV Outlook 2014: Forecast for Heavy Truck Segment Key Markets, Global, 2013 and 2014



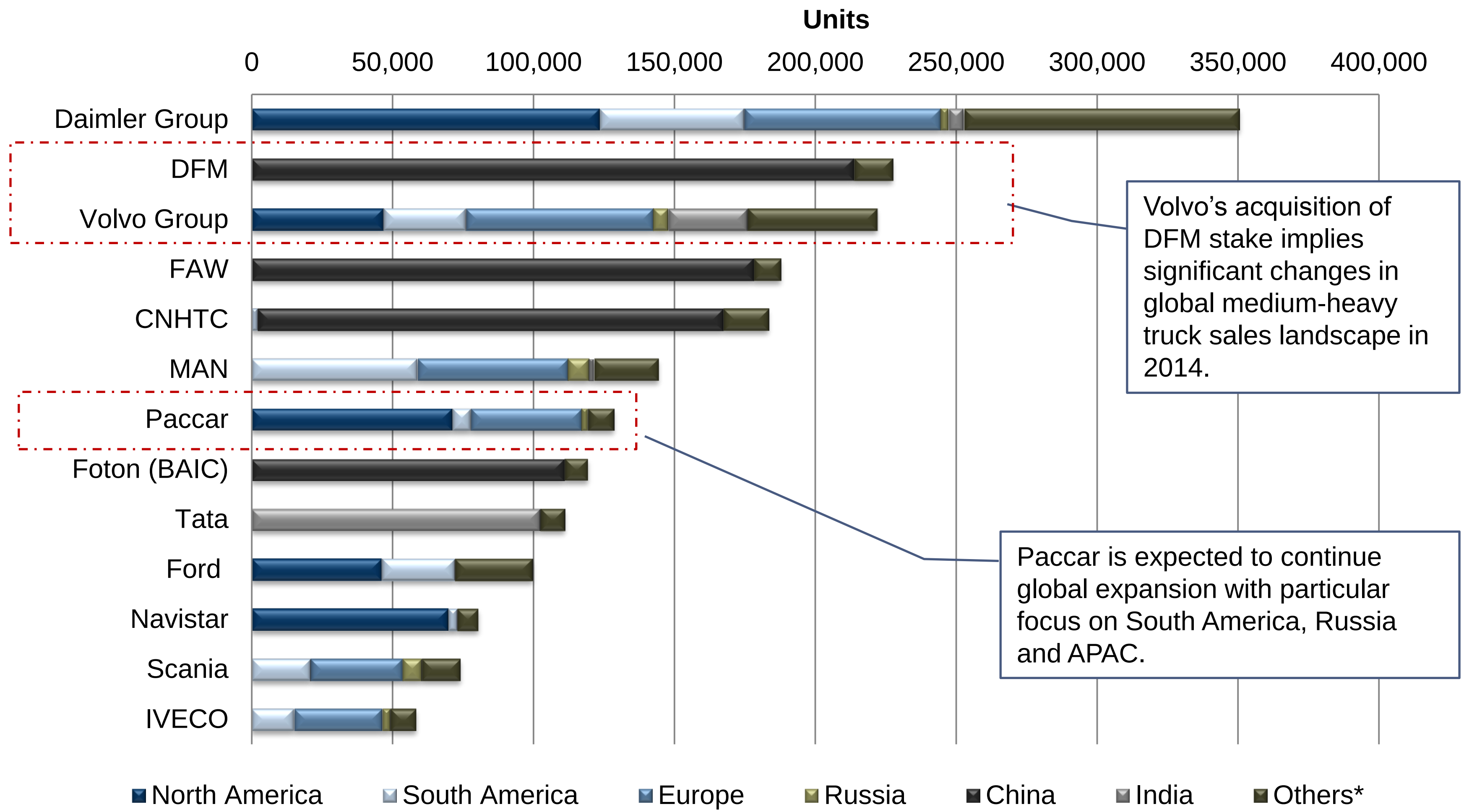
Rest of World (RoW) include Eastern Europe(excluding Turkey and Russia), APAC (excluding countries part of other regions), Middle East, and Africa.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

MD-HD Truck OEM Sales Performance 2013

Daimler Retained its Global Leadership in 2013, while Volvo Closed the Gap; Volvo's Acquisition is in DFM's Stake, and Volvo is Poised to Emerge as the World's Largest Truck Seller in 2014.

CV Outlook 2014: MD-HD Truck OEM Performance, Global, 2013



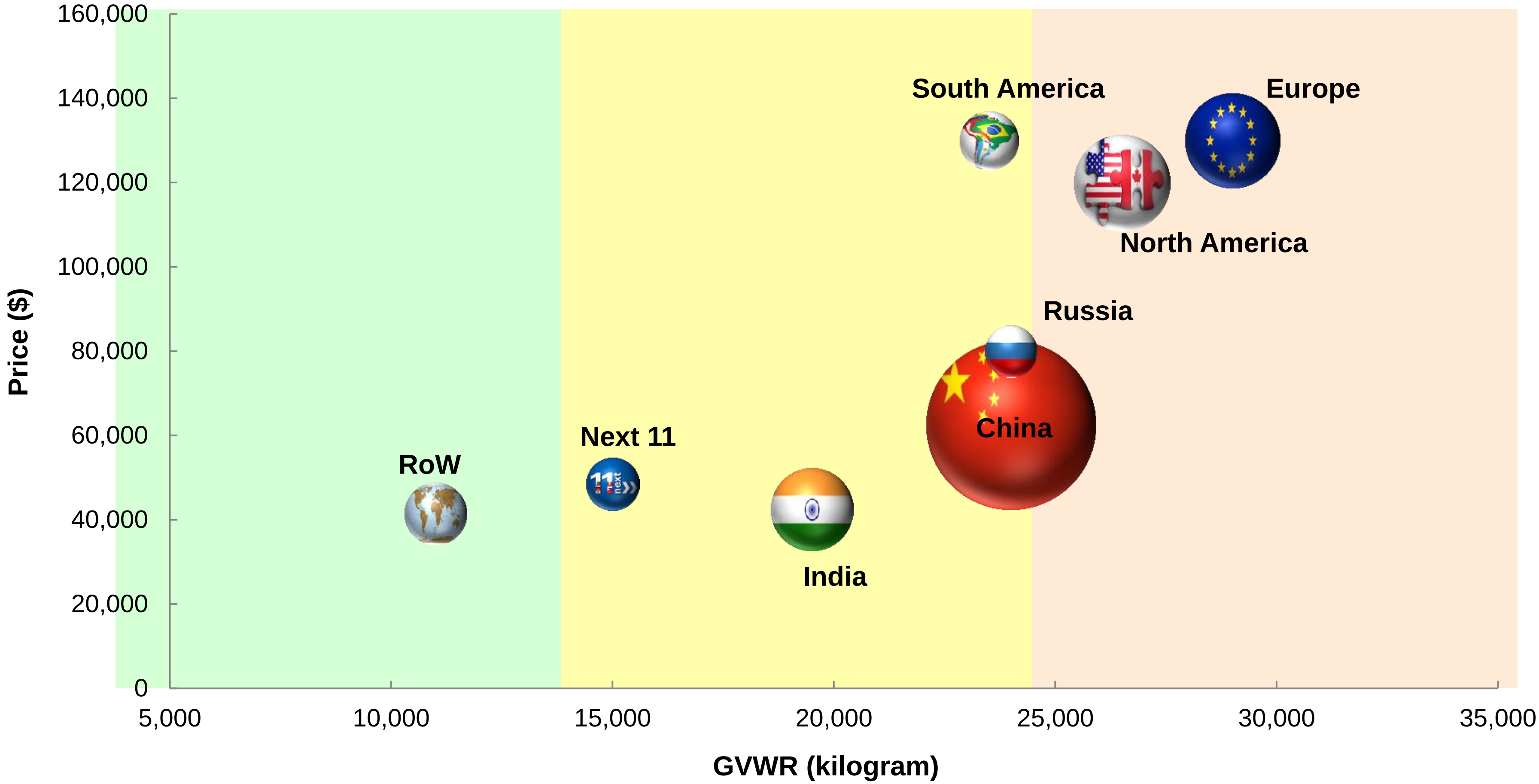
*Others include Next 11+ RoW.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Attractive Commercial Truck Segment by Region—2014

The 18 to 25 MT Segment will be the Most Attractive Among Heavy Trucks Globally at a Price Range of $40,000 to $60,000, while the 25 to 30 MT Segment will be the most Attractive in NA and EU.

CV Outlook 2014: Highest-selling Weight Segment in Each Region, Global, 2014



Key: Size of the bubble denotes Sales units of top segments in each country in 2013.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Regional Market Trends and Forecast

Key 2013/2014 Regional Highlights and Outlook North America and China to Emerge as Engines For Global CV Market Growth Supported by Next 11 and EU Market, India Faces Serious Downside Risks; Global Emission Regulations Will Spur Overall Fuel Efficiency Improvements.

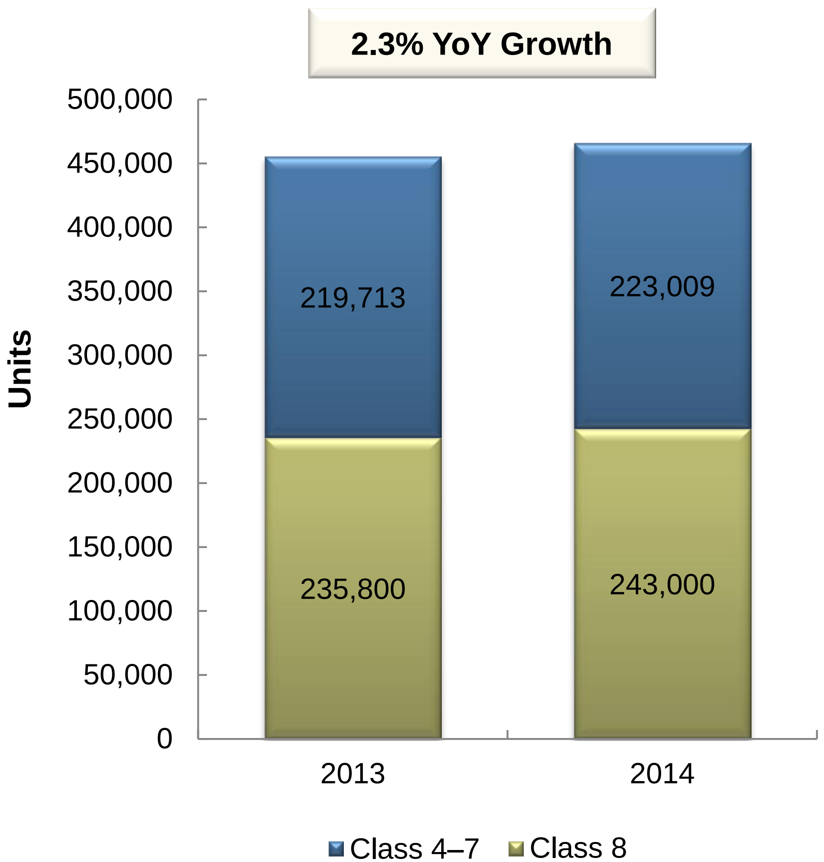
Regions	2013	2014
North America	• Freight demand recovery in the late quarters of the year compensated for a poor first half. Demand from regional haul application boosted market or the class 4-7 segment.	• Strengthening industrial output likely to result in continued growth in freight numbers thereby driving medium-heavy truck orders for 2014. • LNG/CNG truck market to experience proliferation with aggressive product line ups from OEMS and suppliers.
Europe	• From a double digit decline in first half of the year, the European market recovered to record 6 percent decline y(o)y. • Pre buying of trucks on account of Euro 6 implementation in 2014 resulted in strong orders in Q3 and Q4 of 2013.	• Pre buying in H2 2013 is likely of impact orders for first half of the year. However market is expected to stabilize in the second half with recovering economic activity. • Drying up government incentives from member states is likely to soften demand for Euro 6 trucks post implementation.
Brazil	• Brazilian market recovered from a poor 2012 on the account of low interest rates coupled with government spending to post strong growth in H1. • However record inflation has forced policy makers to increase interest rate beginning from Q3.	• The economic uncertainty on account of low growth and high inflation is expected to impact recovering truck demand. The South American market likely to post marginal growth for the year 2014. • Low cost products from Chinese and other Asian manufacturers likely to target market share growth in the South American market. Established European OEMs to experience pricing pressure on the account of expanding low-cost truck market.
China	• The economy recovered on the account of strong industrial output along with stabilizing property market. • Truck sales bounced back from a poor 2012 to post marginal gains in 2013.	• The momentum is expected to continue through to 2014 with strong economic indices projected for the Chinese economy in 2014. • Demand of premium equipment to grow faster in the market as fleets tend to migrate towards TCO backed product purchase.
India	• Diesel price de-regulation, high interest rates, weak economic outlook forced fleets to delay equipment addition in an uncertain year. • Capacity utilization remains at record lows with OEMs and suppliers expected to face eroding margins.	• Economic weakness is expected to prolong into 2014 with the CV buying cycle expected only to reverse in 2015. • From record low in 2013, market poised to post marginal gains in 2014. • Market for premium technologies and products will remain sluggish in Indian CV market.
Russia	• Slowing economy took its toll on freight demand, impacting truck sales in 2013.	• The economic scenario is unlikely to reverse in 2014, and hence the market for medium-heavy trucks is expected to remain the same level as 2013.

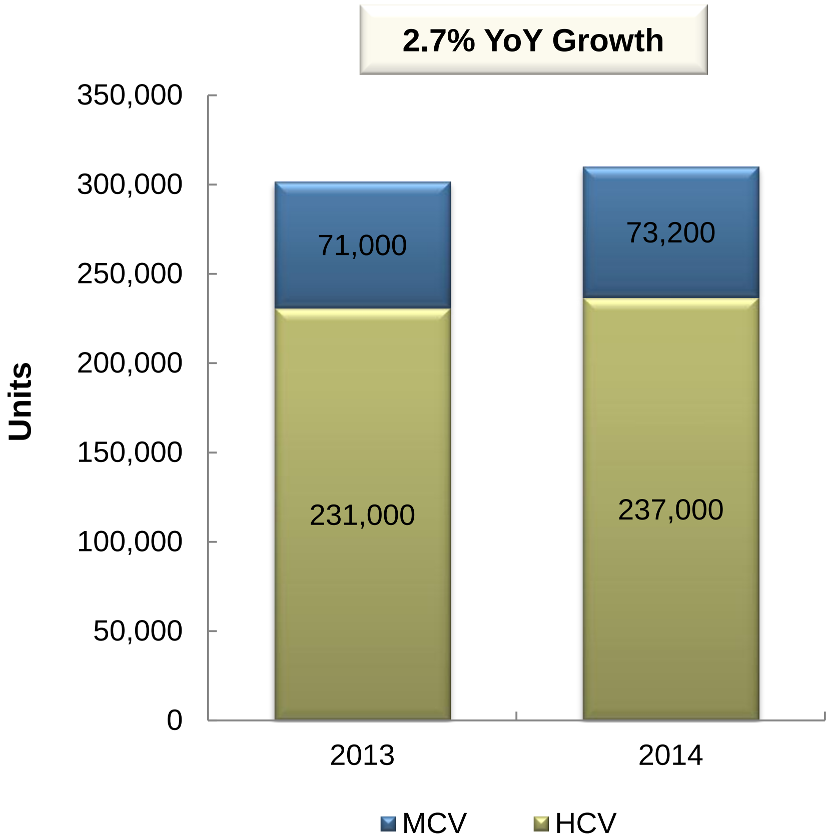
Source: Frost & Sullivan

NA-EU Market Breakdown—Market Overview

Rising Industrial Output and Consumption, Coupled with Strong Replacement Demand is Expected to Drive NA Market; Stabilizing Euro Zone to Result in Rising Truck Sales in Europe.

CV Outlook 2014: Unit Shipment Forecast, NA-EU, 2013 and 2014



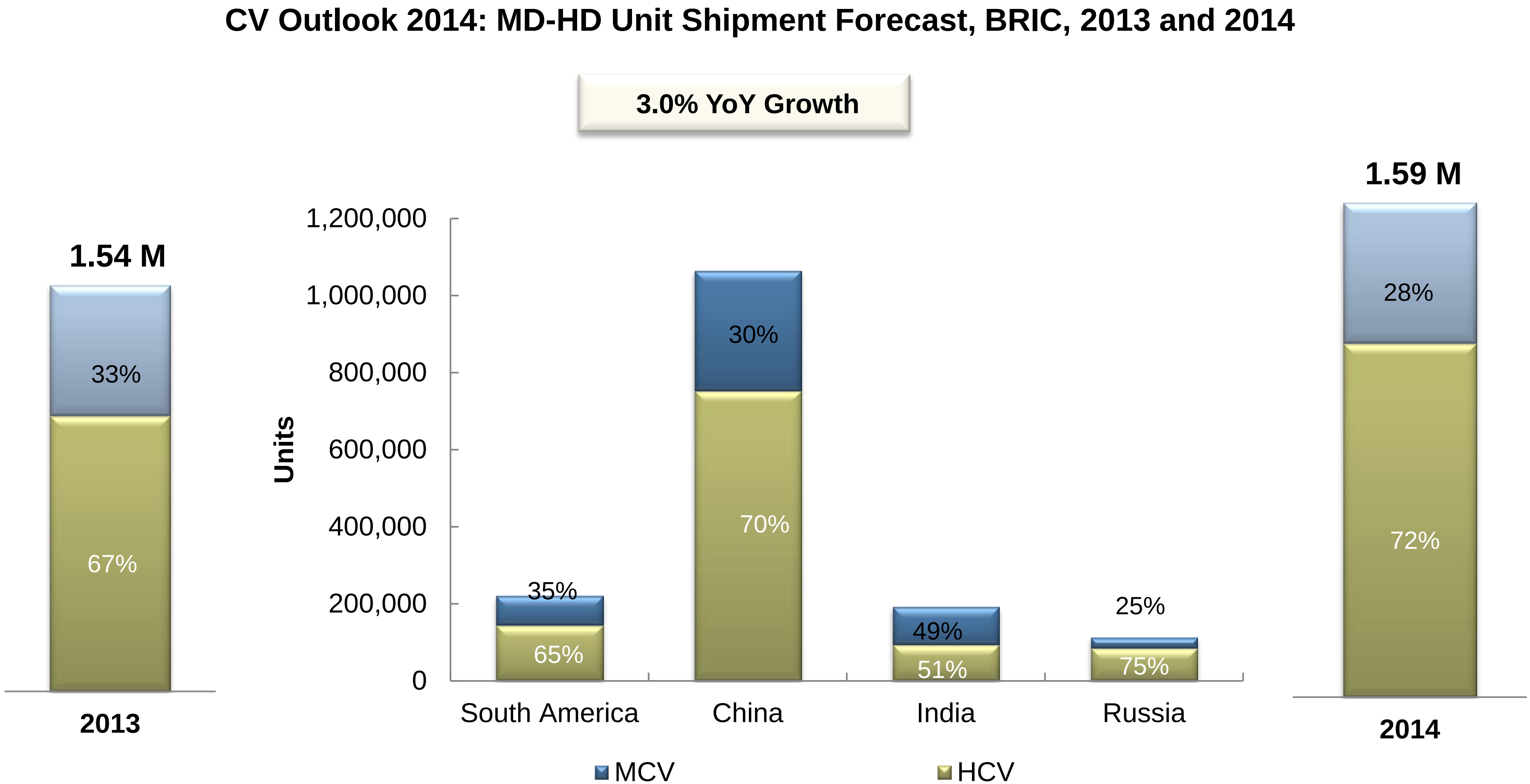


Key: In EU MCV= 6T-16T GVWR; EU HCV=1gT + GVWR.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

BRIC Market Overview

China and Brazil (South America) CV Market to Continue Growing in 2014; Indian CV Market to Post Marginal Gains After a Tumultuous 2013.

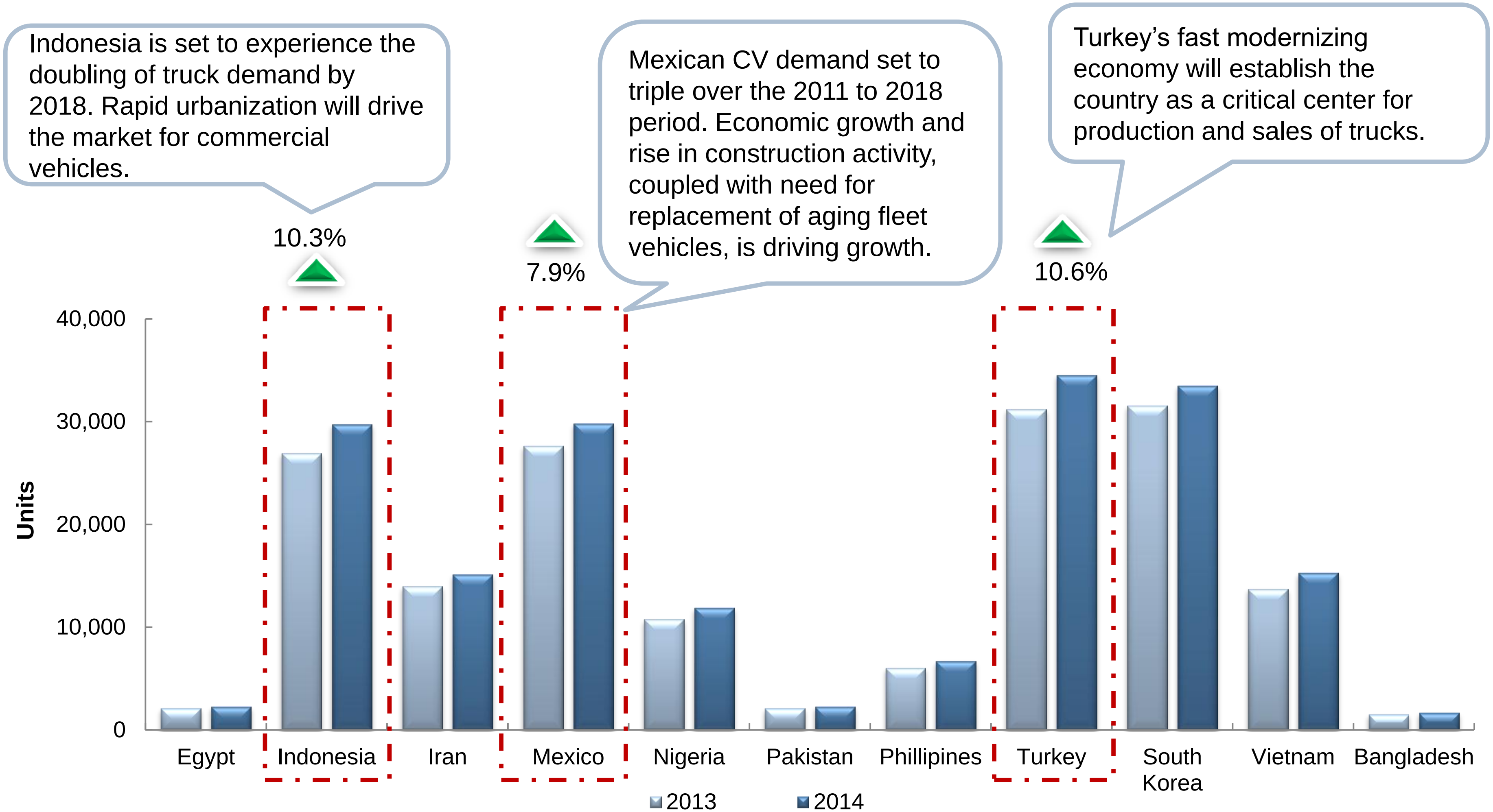


Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Growth Market Focus—Next 11 Markets

Indonesia, Turkey, and Mexico Offer Strong Growth Potential through the Forecast Period, as these Economies Experience Rapid Economic Development, Leading to Freight Movement Expansion.

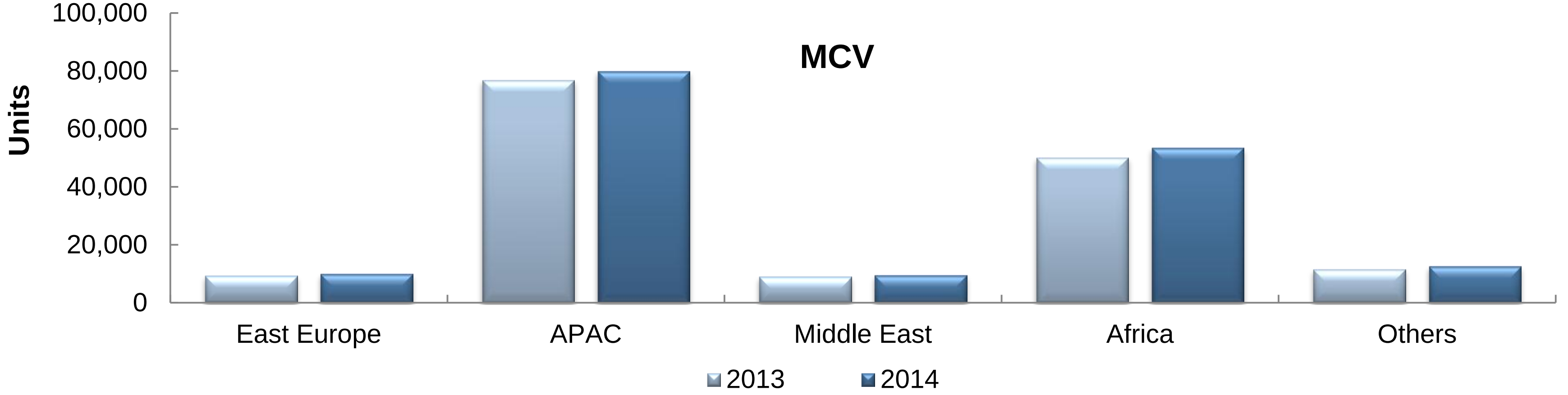
CV Outlook 2014: Unit Shipment Forecast, Next 11, 2013 and 2014

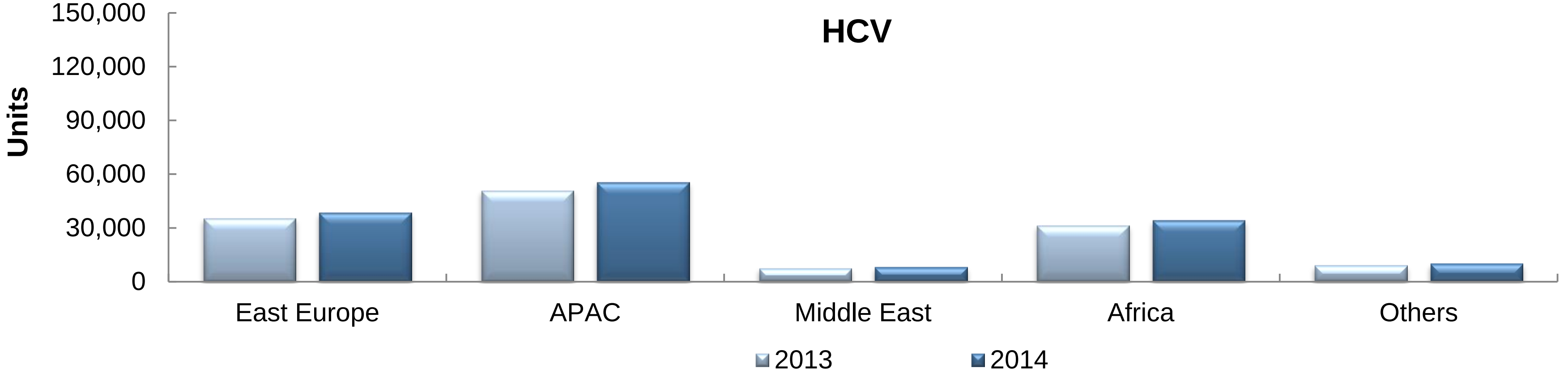


Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Rest of World—Markets Asia-Pacific and African Markets to Provide Impetus During 2014; Both Markets are Expected to be Driven Primarily by Medium-duty Truck Sales; Robust Low-cost MD Product Line to be Key Focus for OEMs Targeting Pockets within these Markets.

CV Outlook 2014: Unit Shipment Forecast, Rest of World, 2013 and 2014



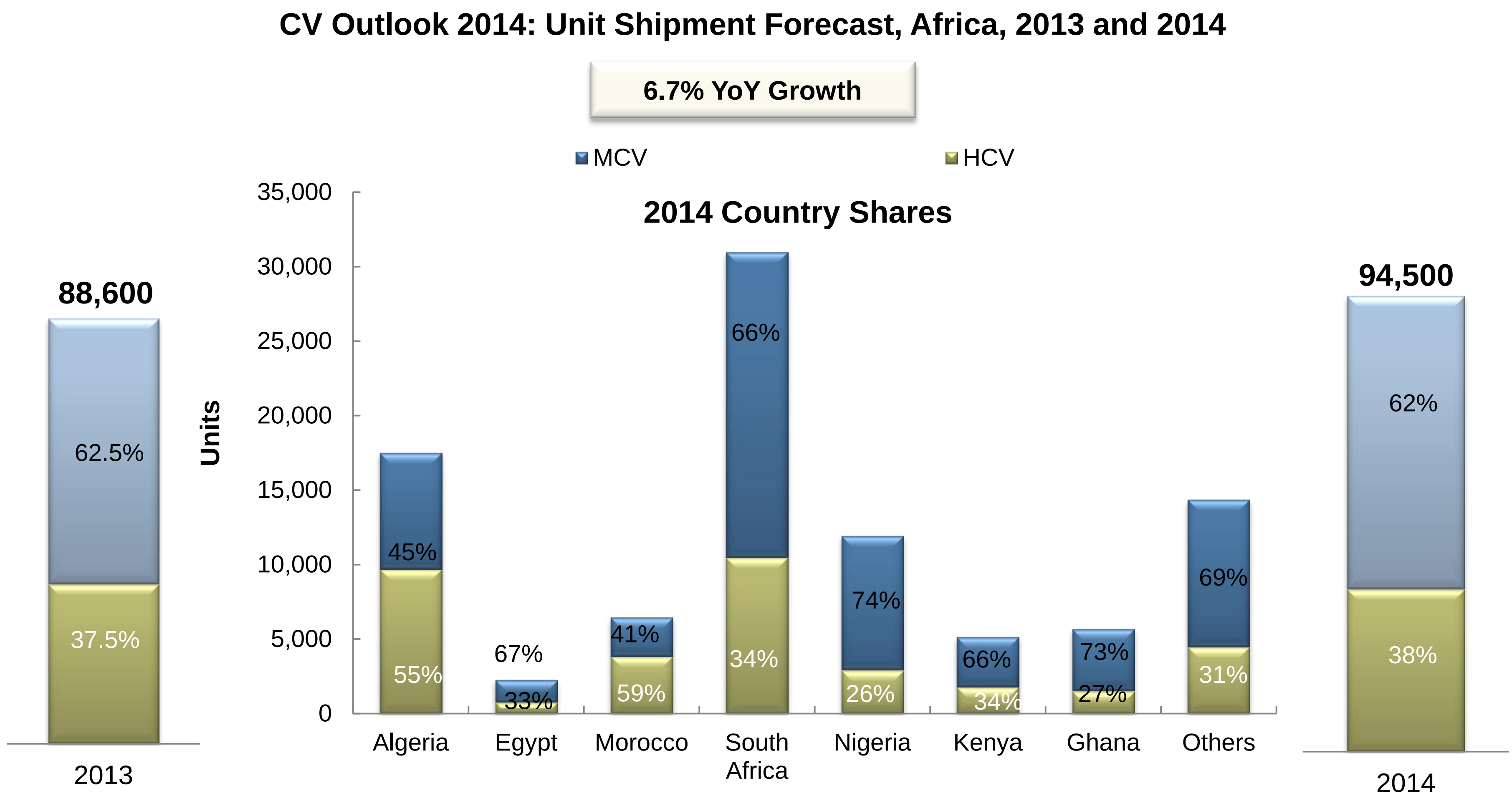


Key: Eastern Europe excludes Russia and Turkey. APAC excludes China, India, Philippines, South Korea, Vietnam, and Indonesia. Middle East excludes Iran and Pakistan. Africa excludes Egypt and Nigeria. Others includes rest of countries.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

African Medium and Heavy Truck Market Forecast

South Africa, Algeria and Nigeria to Lead African Truck Market; Low-cost Product Line, CKD Assembly and After Sales Support are Key Entry Strategies for OEMs.



*Others include Botswana, Namibia, Zambia, Zimbabwe, Angola, Mozambique, and the Rest of Africa.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Case Study—Africa Market Entry Strategy Africa Being a Diverse Market with Disparate Economies and Commercial Vehicle Demand will Warrant Distinct Market Focused Strategies for MCV-HCV Sales, as fas Been Developed by IVECO; These Strategies will be Tested Vigorously in 2014.

CV Outlook 2014: Iveco's Market Strategy, Africa, 2012–2022

Cluster A:

Algeria, Morocco, Egypt and South Africa

- EU made platforms to be are decent marketability here since the markets are exposed to high end trucks.
- BRIC platforms with marginal technology upgrades market norms thus retaining premium brand image and high margins.

Cluster B:

Nigeria, Angola, Mozambique, Ghana

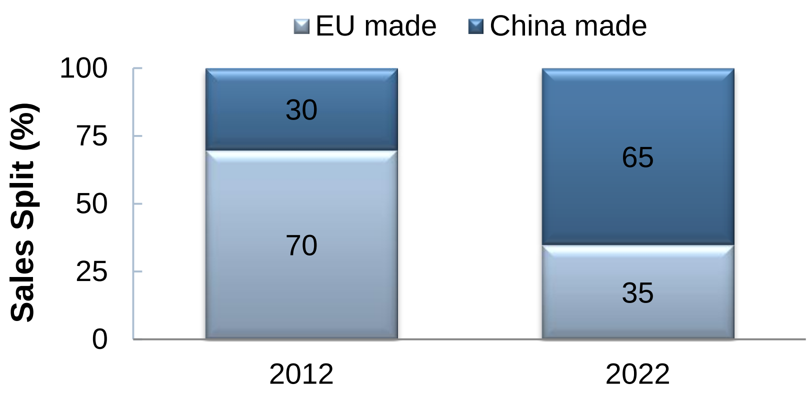
- BRIC based SAIC-IVECO platform will be focused on cluster B.
- Despite lower margins, the platform offers higher salability due to low upfront cost.

Cluster C:

Rest of Africa

- These markets offer limited growth potential in the short term.
- BRIC platform customized to specific markets will be pursued in the long term as these economies mature.

IVECO's Sales Split based of Origin of Imports, Africa, 2012–2022



Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Low-cost Truck Market Trends

Global OEMs Low-Cost Product Strategy

Exclusive Low-cost Branding will be Important in 2014 for Global OEMs Looking for Diversification and Entry into New Growth Markets.

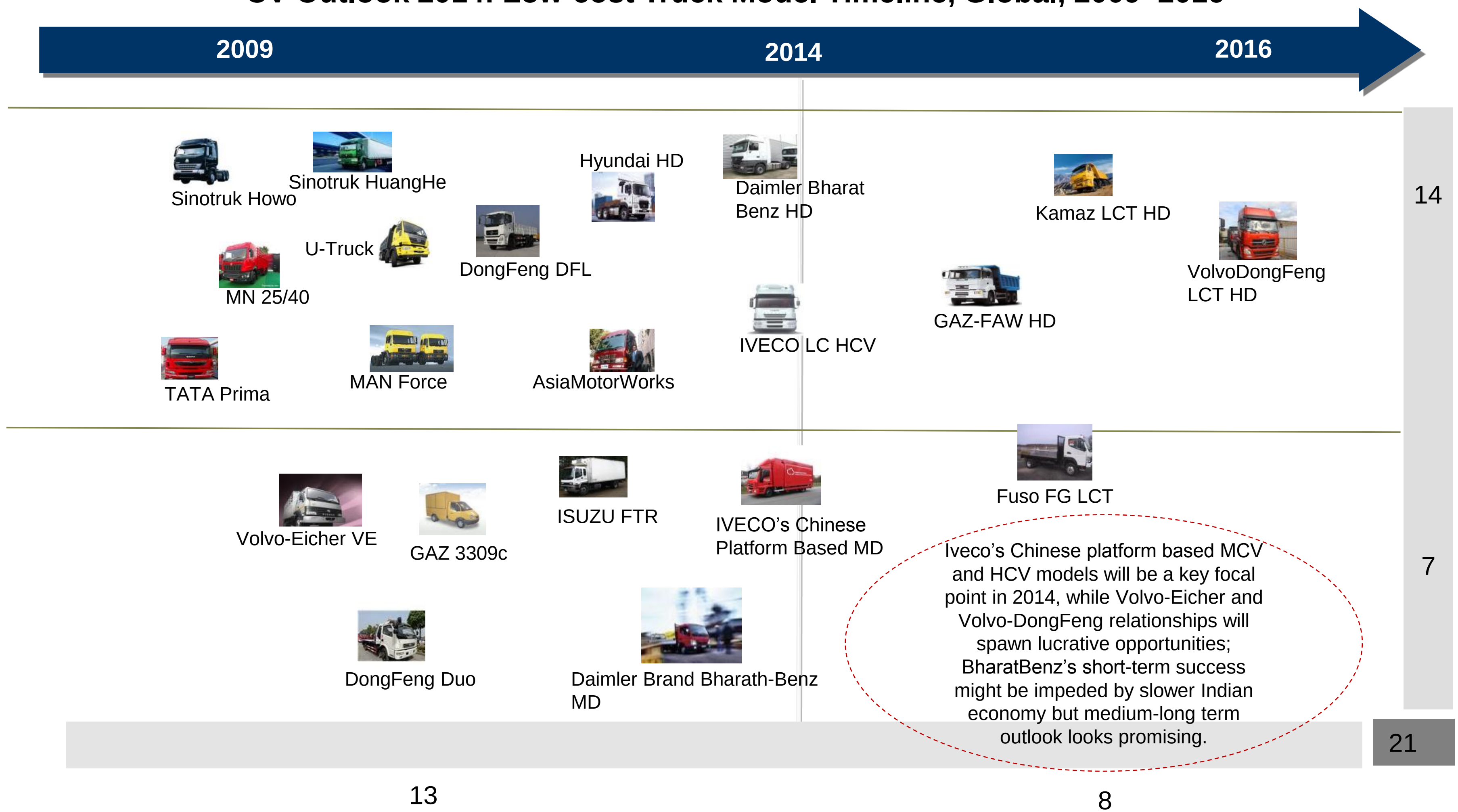
CV Outlook 2014: Key OEMs-Low Cost Product Strategy, Global, 2014

OEM	Low Cost Brands	Production Region	Target Growth Markets
Daimler	Bharath Benz	India	India, Africa, Middle East, Latin America
	Mitsubishi -Fuso	Japan, India	India, APAC, Africa
	Foton-Auman truck	China	China, APAC
	Daimler-Kamaz	Russia	Russia, Eastern Europe
Volvo	Volvo Eicher	India	India, Africa, APAC
	Volvo –DFCV	China	China, APAC, Africa,
	Volvo-UD(Quester/KuTeng)	China, Thailand	China, APAC, Africa
IVECO	SAIC-IVECO	China	China, Africa, APAC
MAN SE	MAN Sitrak	China	China, APAC, Africa
	MAN CLA	India	India, Africa, APAC
Tata	Prima, Novus	India, South Korea	India, Africa, Russia, Latin-America, APAC
CNHTC	Howo	China	China , Africa, Latin-America, APAC

Source: Frost & Sullivan

Low-cost Truck Market (Global) Over 21 Key Global Low-cost MCV-HCV Model Ranges are Expected to be Introduced by Global OEMs between 2009 and 2016; 2013-2014 seen as Crucial Period as OEMs Strive to Introduce Growth Market Focused Low-cost Platforms.

CV Outlook 2014: Low-cost Truck Model Timeline, Global, 2009–2016

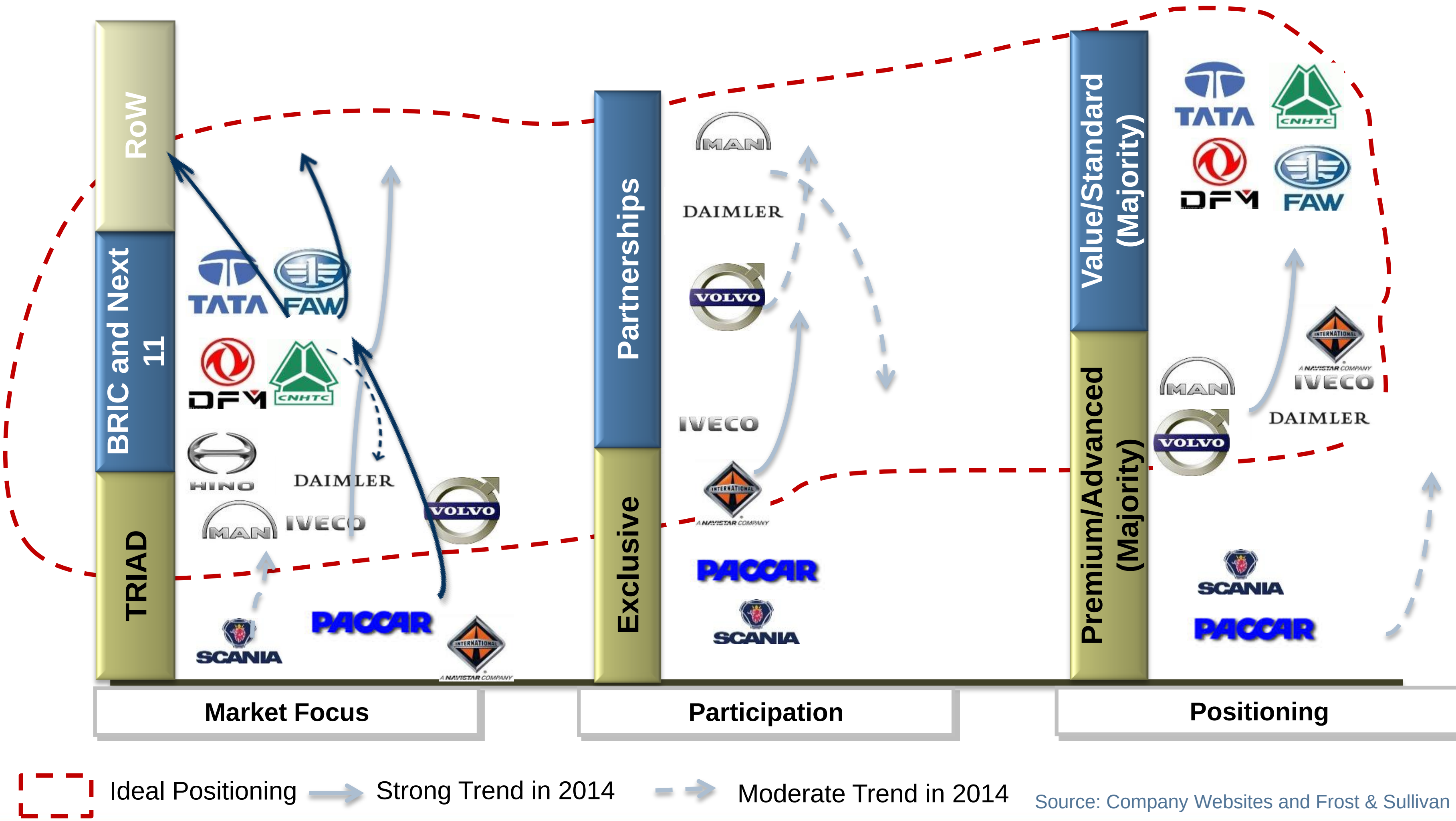


Source: Company Websites and Frost & Sullivan

Product Positioning Strategies of Leading OEMs

MD-HD Select OEM Product Positioning in 2014 Regional-haul Trucks, Next 11 Focus (Along with Improving TRIAD Conditions), Mixture of Solo and Partnership Based Participation and a Move towards Mid-Market Brands will Emerge as Key Product Positioning Focal Points for TRIAD OEMs.

CV Outlook 2014: Top OEMs-Product Positioning, Global, 2014



Source: Company Websites and Frost & Sullivan

Comparative Analysis—Select Global OEMs

Platform Strategies of Leading OEMs will Enable Margin Growth in both Developed and Developing Markets in 2014.

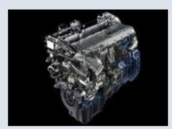
CV Outlook 2014: Comparative Analysis of HD Truck Platforms by Key OEMs, Global, 2014

Parameter	Daimler Group	Volvo Group	MAN SE	Scania AB	TATA Motors	CNHTC	IVECO	PACCAR
No. of global platforms 2014	4	3	3	3	2	2	2	2
Platform description	Actros,Axor, Auman GTL, BharatBenz	FM, FH, Quester	TGM, SITRAK, CLA	R, P, G series	Prima, Novus	SITRAK, HowoA7	Stralis, Genlyon	XF, LF
Platform hub (production)	Europe, China, India	Europe, India, APAC	Europe, China, India	Europe	India, South Korea	China	Europe, China	Europe
Target market (sales)*	Europe, South America, Asia Pacific	Europe, South America, Asia Pacific	Europe, Asia Pacific, Latin America	Europe, South America, China, India	India, Asia Pacific, Middle East, Africa	China, Asia Pacific, South America	Europe, China, Brazil, Asia Pacific, Africa	Europe, Middle East, Africa, Australia, Brazil
Avg. HD engine displacement range, 2014(in L)	12.8L–13.4L	12.6L–13.2L	12.2.L–12.8L	12.0L–12.6L	6.7L–7.0L	9.2L–10.3L	7L-11L	10.4L-12.9L
Emission compliance (best)	Euro 6, EPA 2010	EEV, EPA 2010	Euro 6, EPA 2010	Euro6	Euro 4, Euro 5 protected	Euro 4	Euro 3, Euro 4, Euro 6	Euro 5/Euro 6
Base transmission type	AMT for EU, Manual for India and China.2	AMT for EU, Manual for India	AMT for EU, Manual for India and China	AMT and AT	Manual	Manual, AMT	Manual, AMT	AMT, Manual for all markets

Source: Frost & Sullivan

Key 2014 Market Introductions—Truck Platforms, Powertrain Launches

BRIC, Next 11 and RoW Platforms to Remain Top Focus for Global OEMs in 2014; Cummins' G-Series Engine Platform will Reshape the Competitive Dynamics in Global Powertrain Market.

VOLVO Group	**North America**	D-13 LNG	
	India	PRO Series Trucks	
	APAC/ China	UD Quester/KuTeng	
	Europe	FH16 (750hp)	
Navistar	**North America**	SCR'd Maxx-Force For Medium-duty	
Tata Motors	**APAC/ Africa**	Tata Prima Multi Axle	
	APAC/ Russia	Daewoo Novus	
Cummins	**Global**	ISG 11 and ISG 12	

Daimler	**Europe**	MB Actros SLT (250T)	
	India	Bharat-Benz Tractor	
	APAC/ Africa	Fuso "FI" Series	
Paccar	**South America**	XF-105 (Brazil manufactured)	
GAZ	**Russia**	Ural M, 8.5 tonne GAZ 3308	
SML Isuzu	**India**	XM-Series	
IVECO/FPT	**Europe China, Africa**	Stralis Hi-Way Cursor 11 Euro-VI engine Genlyon	
CNHTC	**China, South America**	Sitrak T7 Improved HowoA7	

Source: Company Websites and Frost & Sullivan

Key Technology Trends

Key Global Technology Trends-2014

1	Proliferation of advanced powertrain technologies such as CNG/LNG propulsion systems, AMTs, VGTs, and advanced after treatment will lead to approximately 3-4 Percent fuel efficiency enhancement globally among new MD and HD trucks sold in 2014 over 2013 levels.
2	Prognostics and predictive analytics will create $80 million in direct revenues for OEMs and tier-1 suppliers, and roughly $200 million for all members of the CV eco-system in 2014 in North America and Europe. Penetration of track and trace applications to increase in both developed and developing markets.
3	Global platforms and global engine platforms will result in highest pace of standardization in global MD-HD truck market's history. Global HD engine displacement weighted mean will settle at 9.7L in 2014.
4	ABS and stability control systems to gain significant penetration in developing markets such as China, Russia, Brazil and India and some Next 11 nations, while developed markets to experience rising proliferation of collision mitigation systems featuring integration of disparate vision based, stability control, active braking, and vision based systems.
5	Driver shortage coupled with aging driver demographic profile (average age 45-50 years) is leading OEMs and tier 1 suppliers towards improving 'Health Wellness & Wellbeing' (HWW) factors in cabin styling. 2-3% increase in overall R&D spending expected through cabin design among NA and EU HCV OEMs within the next 2 to 5 years.
6	Fleet managers will continue showing high degree of interest in technologies that can help reduce operating expenses and total cost of ownership. This trend will permeate beyond NA and EU to BRIC markets.

Source: Frost & Sullivan

Global CV Powertrain Market—Comparative Analysis by Region, 2013/2014

Moderate Paced Engine Downsizing to Continue in NA and EU, While Natural Gas Adoption Will Rise in Both North America and China.

CV Outlook 2014: Powertrain Technology Analysis, Global, 2014

	Powertrain Technologies						
Region	North America	South America	Europe	China	India	Russia	Others
Diesel Share	Decreasing	Stable	Stable	Stable	Stable	Stable	Stable
NG Share		--			--	--	--
HEV Share		--			--	--	--
Engine Displacement	Downsizing	Stable	Downsizing	Upsizing	Upsizing	Stable	--
Emission Regulations	EPA 2010	Euro 5 (Brazil)	Euro 6	Euro 4	Euro 3	Euro 4	--

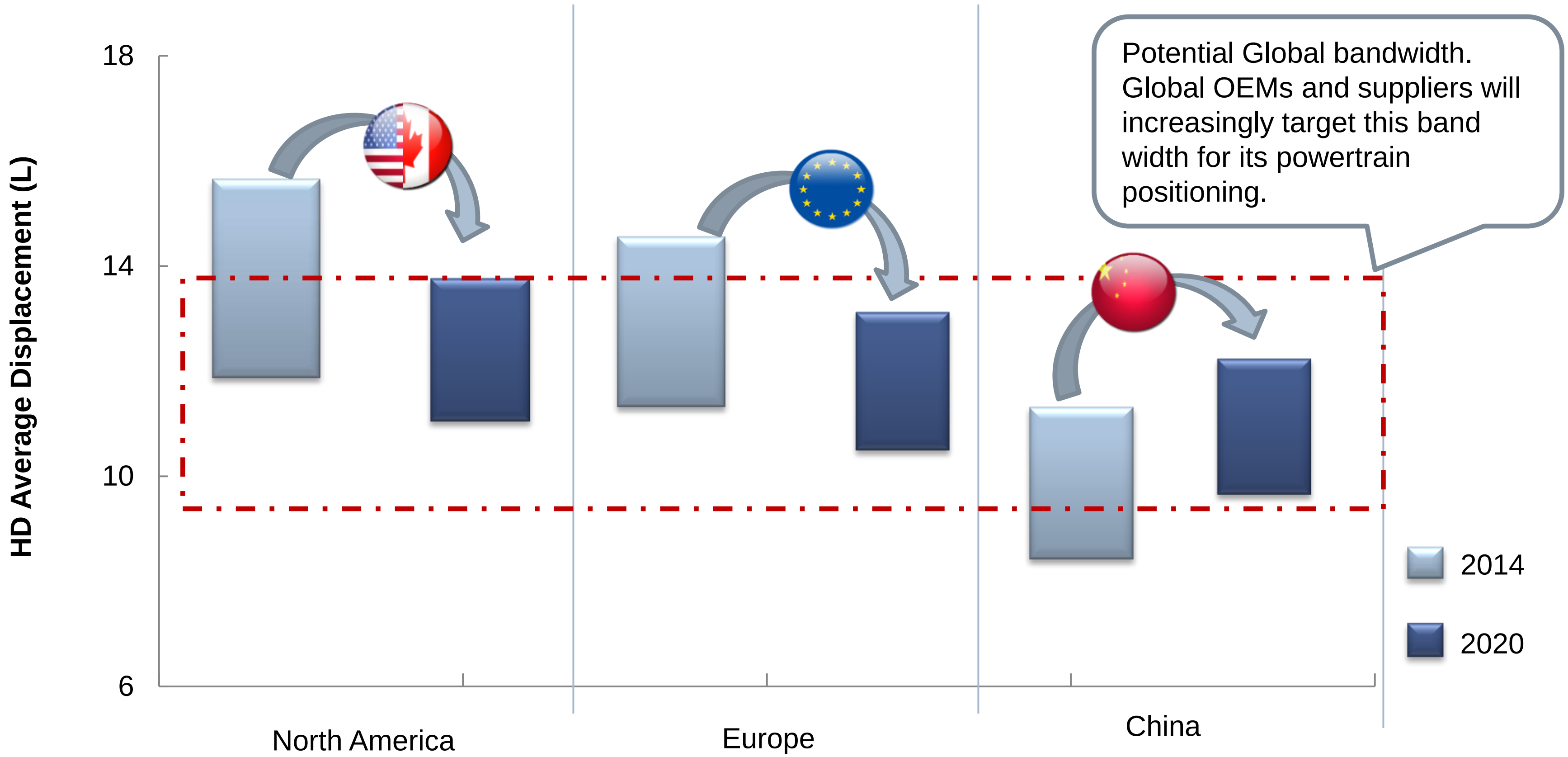
 High Growth  Moderate Growth

Source: Frost & Sullivan

Global Engine Displacement and Power Recalibration

Weighted Average Heavy-duty Truck Engine Displacement to Move Towards 11-12L Range (considering NA, EU and China) by 2020 Led by Opposing Forces of Downsizing in NA and EU and Upsizing in China.

CV Outlook 2014: HD Engine Displacement Bandwidths Calibration, Global, 2014 and 2020



While there is gradual downsizing trend in both North American and European HD truck engine markets (especially in the regional haul and vocational segments); emerging markets (in particular China as shown here) are expected to continue experiencing rising engine displacement growth with 11-12L engines moving towards global median.

Source: Frost & Sullivan

Cummins Global Engine Platform Development

G Series Platform Introduction in 2014 Will Highlight Cummins' Global Approach Towards Engine Platform Development; 11-12L G Series is Expected to be a Main Stay for Cummins Across Major CV Markets.

CV Outlook 2014: Engine Displacement Ranges for HD Trucks by Region, Global, 2014

	North America	South America	China	India
Industry Standard	11-15	9-12	8-12	6-9
Industry Trend	Downsizing	Stable	Upsizing	Upsizing
Cummins Current Offering	ISX 15, ISX 12, ISLG, ISX12G — 11-15	B, C Series and ISL 9 — 6-9	B, C, L, M, Z Series — 6-11	ISL Be, ISL Le, ISL Me — 5-9
Cummins G Series Platform	10.5 L (ISG 11) and 11.8L (ISG 12)			

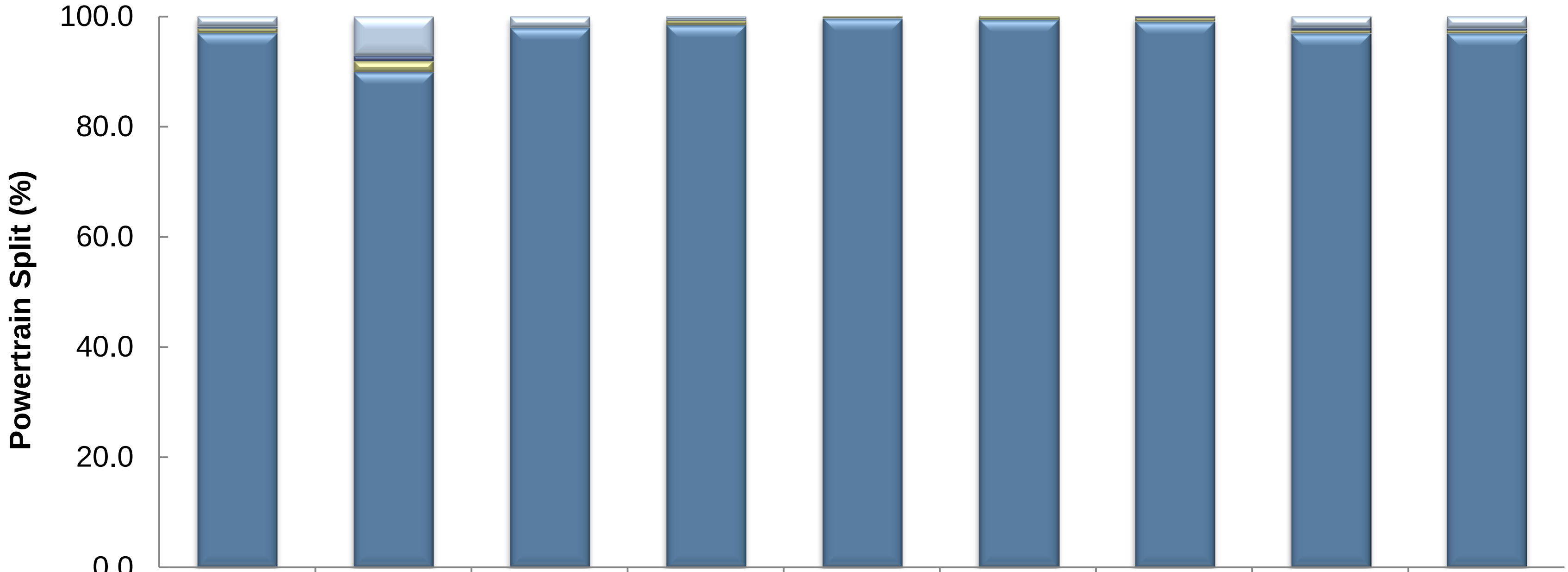
The NA version of the G series platform will be EPA 2017 compliant. In addition the G series will have an NG version soon. For the global market, the G series will be introduced in several versions which will be compliant with Euro 3, 4, 5 and 6 norms.

Source: Frost & Sullivan

Global MCV and HCV Market—Powertrain Technology Forecast

Diesel is Expected to Retain Dominant Leadership in the Powertrain Space; Natural Gas and Hybrid/Electric Technology are Expected to Experience Rising Proliferation in 2014.

CV Outlook 2014: Powertrain Technology Split by Region, Global, 2014



	Global	NA	SA	China	India	Russia	Europe	Next 11	RoW
Gasoline	1.8	7.0	2.0	0.5	0.0	0.0	0.0	2.0	2.1
HEV	0.3	1.0	0.0	0.2	0.0	0.0	0.2	0.5	0.4
NG	0.8	2.0	0.0	0.8	0.3	0.5	0.7	0.5	0.5
Diesel	97.1	90.0	98.0	98.5	99.7	99.5	99.1	97.0	97.0

Countries

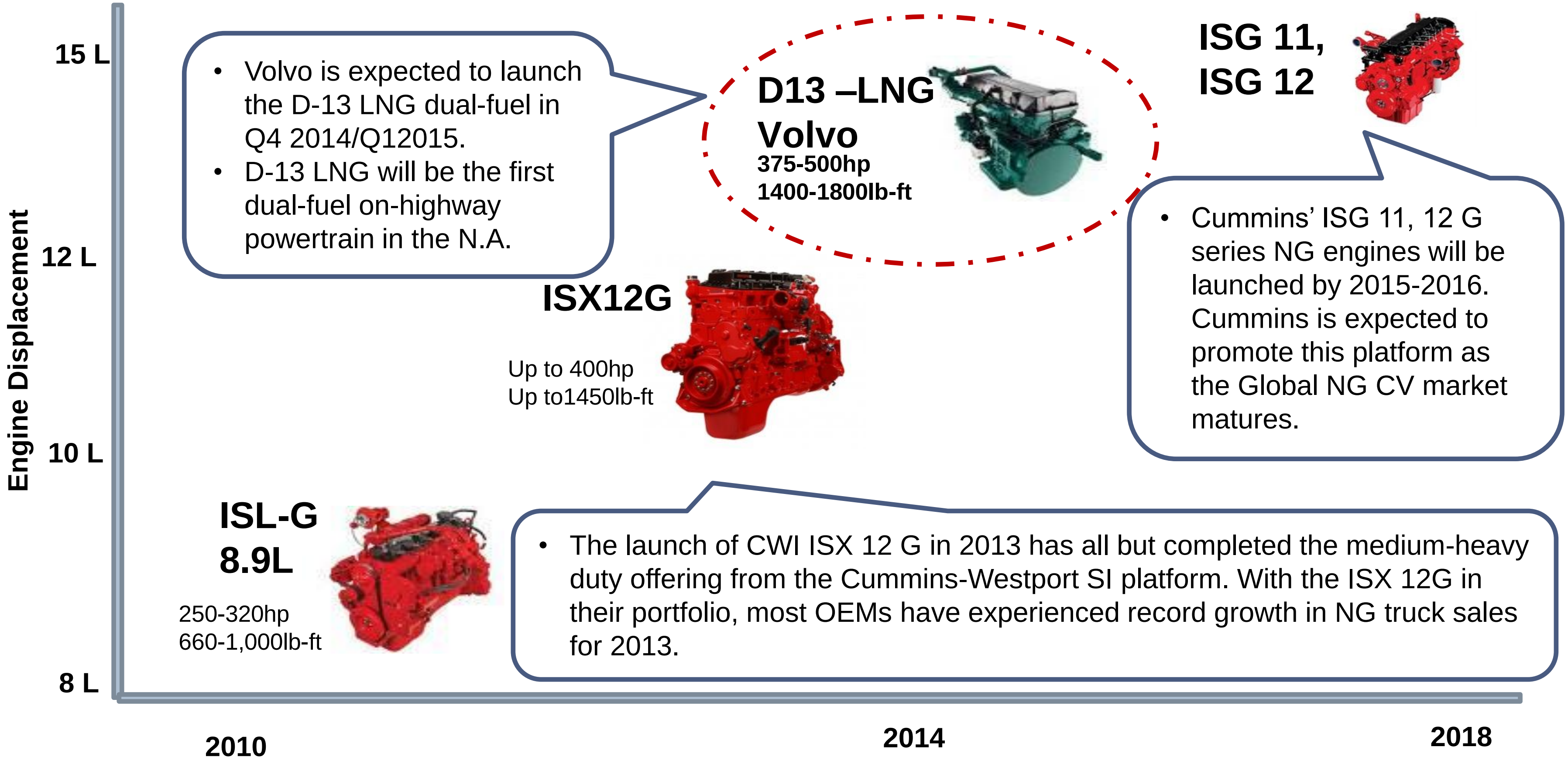
Next 11 include the following countries: Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, Turkey, South Korea, Vietnam, and Bangladesh.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Case Study—North American NG Truck Powertrain Roadmap

Growing Need for Heavy-duty NG trucks will Drive an Engine Upsizing Trend in the NG Powertrain Space; OEMs and Suppliers to Aggressively Target High Powered NG Engines.

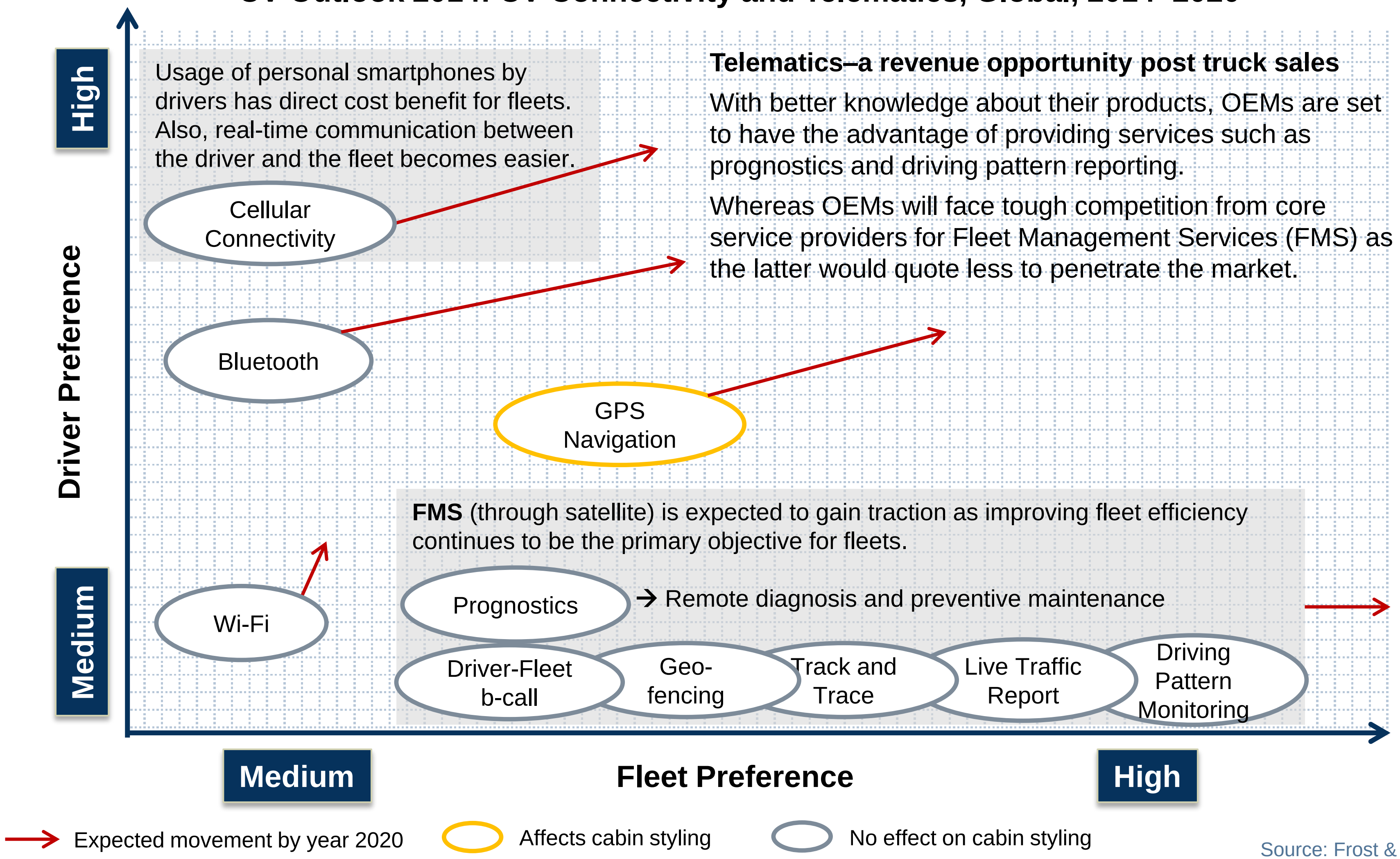
CV Outlook 2014: NG Powertrain Deployment, North America, 2010–2018



Source: Frost & Sullivan

Connectivity and Telematics Driver and Vehicle Performance Monitoring, and Regulation Compliance Monitoring Will Continue Attracting Fleets Towards Telematics in Developed Markets, While Track and Trace and Security Applications Will Draw developing Market Fleets Towards Telematics in 2014.

CV Outlook 2014: CV Connectivity and Telematics, Global, 2014–2020

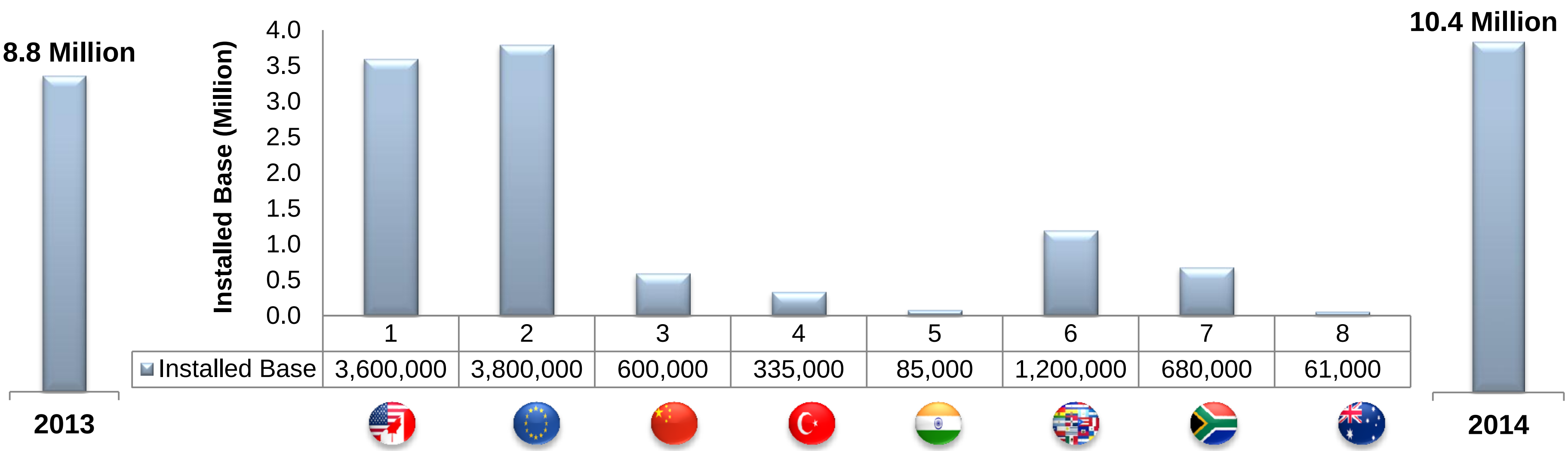


Source: Frost & Sullivan

FMS (Telematics) Installed Base Estimates by Region/Country—2014

Most Growth in Revenues Will be Concentrated in Europe and North America Driven by MRM Focused Applications. Larger Fleets in Developing Markets are Adopting FMS as Solution to Fluctuating Fuel Prices.

CV Outlook 2014: CV Telematics-installed Base Estimates by Region/Country, Global, 2013 and 2014



	1	2	3	4	5	6	7	8
Installed Base	3,600,000	3,800,000	600,000	335,000	85,000	1,200,000	680,000	61,000

Developing markets such as China, Turkey, India and Australia are being passively motivated by regulatory mandates.

NIS GLONASS marks its full scale operation, India's association with NIS GLONASS will create local opportunities. NIS GLONASS has signed various agreements with state governments, service providers and mobile telephony providers.

North American and European markets will continue the trend of consolidation. These markets are growing at a CAGRs of 15.5% and 17.1% respectively.

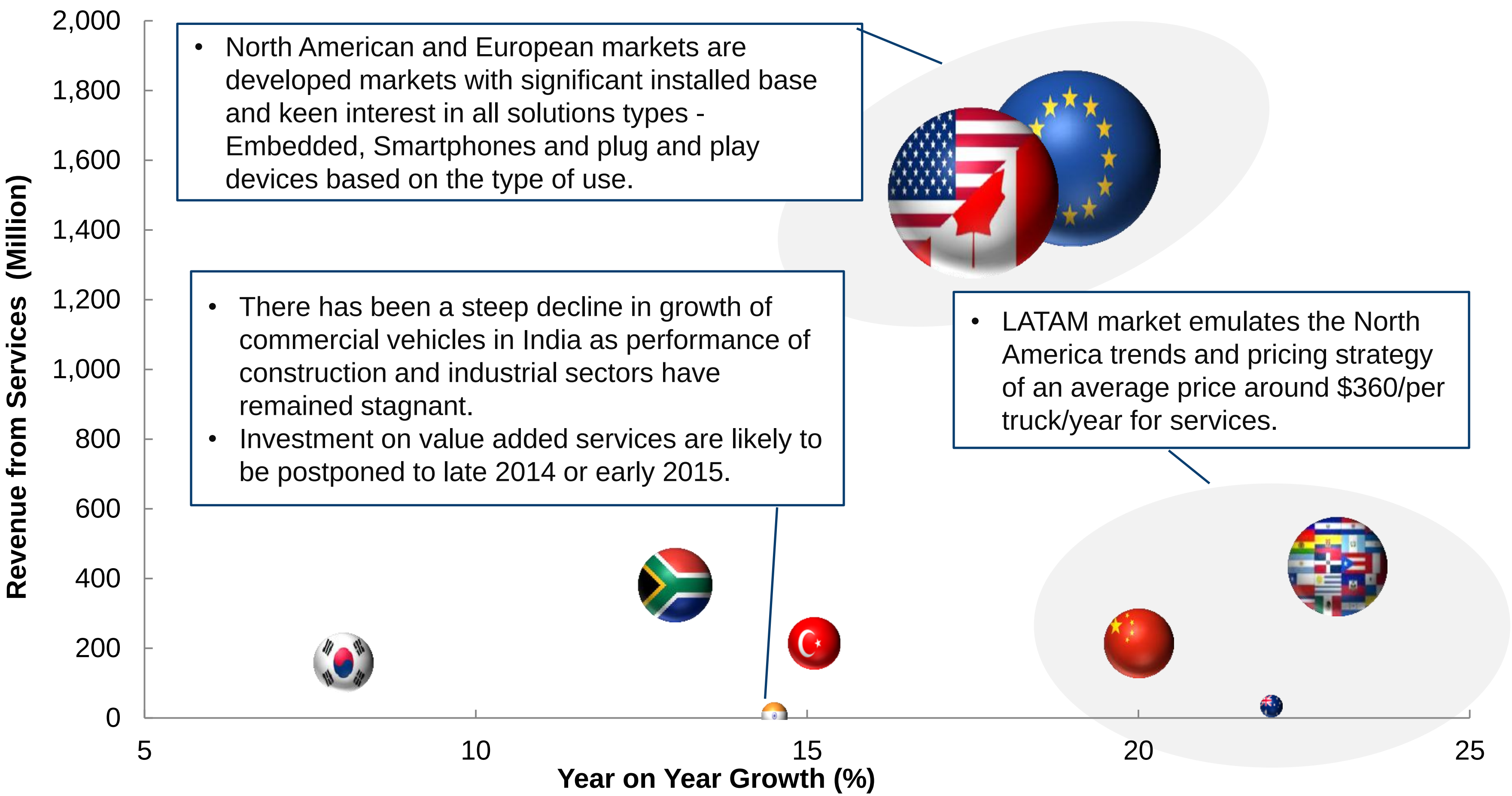
Fuel cost management and driver performance management will be leading demand drivers across all regions.

Vendors in North America such as Omnitracs, Telogis, Trimble and OEMs such as Volvo, Daimler and Navistar are working towards enabling business intelligence through analyzing the data captured by telematics systems.

Source: Frost & Sullivan

Regional Analysis—Telematics Australia, China and India are in the Introductory Phase with High Growth Opportunities whereas the North American and European Markets are Advancing Through Growth Phase Introducing Advanced Telematics Services.

CV Outlook 2014: CV Telematics—Regional Analysis, Global, 2014



Note: Bubble size represents installed base till 2014. Source: Frost & Sullivan

2014 Focus: Prognostics-Evolution of Prognostics

OEMs Such as Daimler and Volvo Will Focus on Offering Advanced Predictive Analytics in their Vehicles Could Strengthen Partnerships With Telematics Vendors to Relay Mission Critical Data.

CV Outlook 2014: Evolution of Prognostics, North America and Europe, 2013

		Definition	Value Chain Partners	Applications
2015	**Advanced Prognostics**	In advanced prognostics, the service is automated. There is limited or no human intervention when data are distributed across the value chain.	• OEMs • Service shops • Dealers • Telematics vendors • Analytics companies • Component suppliers	• Vehicle management (TPMS, vehicle maintenance) • Driver behavior • Safety applications
2010	**Basic Prognostics**	In basic prognostics, the data is communicated to limited value chain partners. The service is not completely automated and it requires human intervention.	• OEMs • Telematics vendors • Analytics companies • Component suppliers • Dealers	• Vehicle management (TPMS, vehicle maintenance) • Driver behavior • Safety applications
2000	**Diagnostics**	Diagnostics is the process of identifying a fault in a system or in a component.	• OEMs • Service shops • Dealers • Telematics vendors	• Vehicle management
1970	**Preventative Maintenance**	Preventive maintenance is the process of scheduled service to maintain a component or a system in adequate operation condition.	• OEMs • Service shops • Dealers	• Vehicle maintenance

Prognostics Evolution

Sophistication

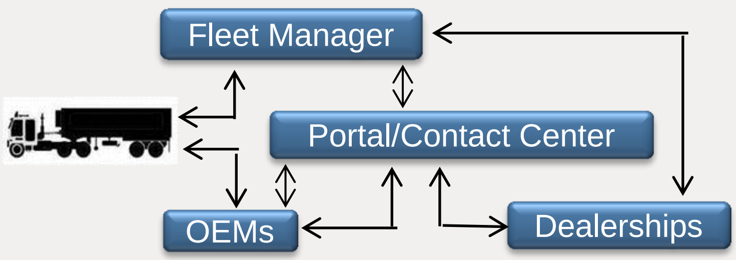
Source: Frost & Sullivan

OEM Business Model for Success in CV Prognostics Market in 2014

OEMs are Likely to Offer Basic Features FOC(Free of Cost) to Expand Market Presence; Advanced Applications and Add-ons will be Used to Increase Revenue Opportunities.

CV Outlook 2014: Prognostics Market-Business Model for OEMs, North America and Europe, 2013

Value Chain



Offering

- Potential software updates over the air
- Vehicle usage and analysis
- Warranty management
- Service-contract monitoring

Customers

- OEMs can potentially offer this solution at no cost on new vehicles in the initial phase to increase their presence.
- They can partner across the value chain and offer a holistic approach. For example, OEMs can partner with multiple telematics vendors to offer prognostics at advanced levels and still control the flow of proprietary information in revenue-sharing mode.

Capabilities

- Vehicle-centric business support such as vehicle management, service and maintenance planning, safety services, and driver safety
- Reduction of unnecessary repairs and breakdowns
- Fault-code readings and proactive alerts
- Reduction of turnaround time on maintenance
- Connection to all systems of the vehicle

Revenue

- Increased service sales
- Savings through better quality management of components
- Savings through reduced warranty costs
- Increased sales of soft products and services

New value-chain partners

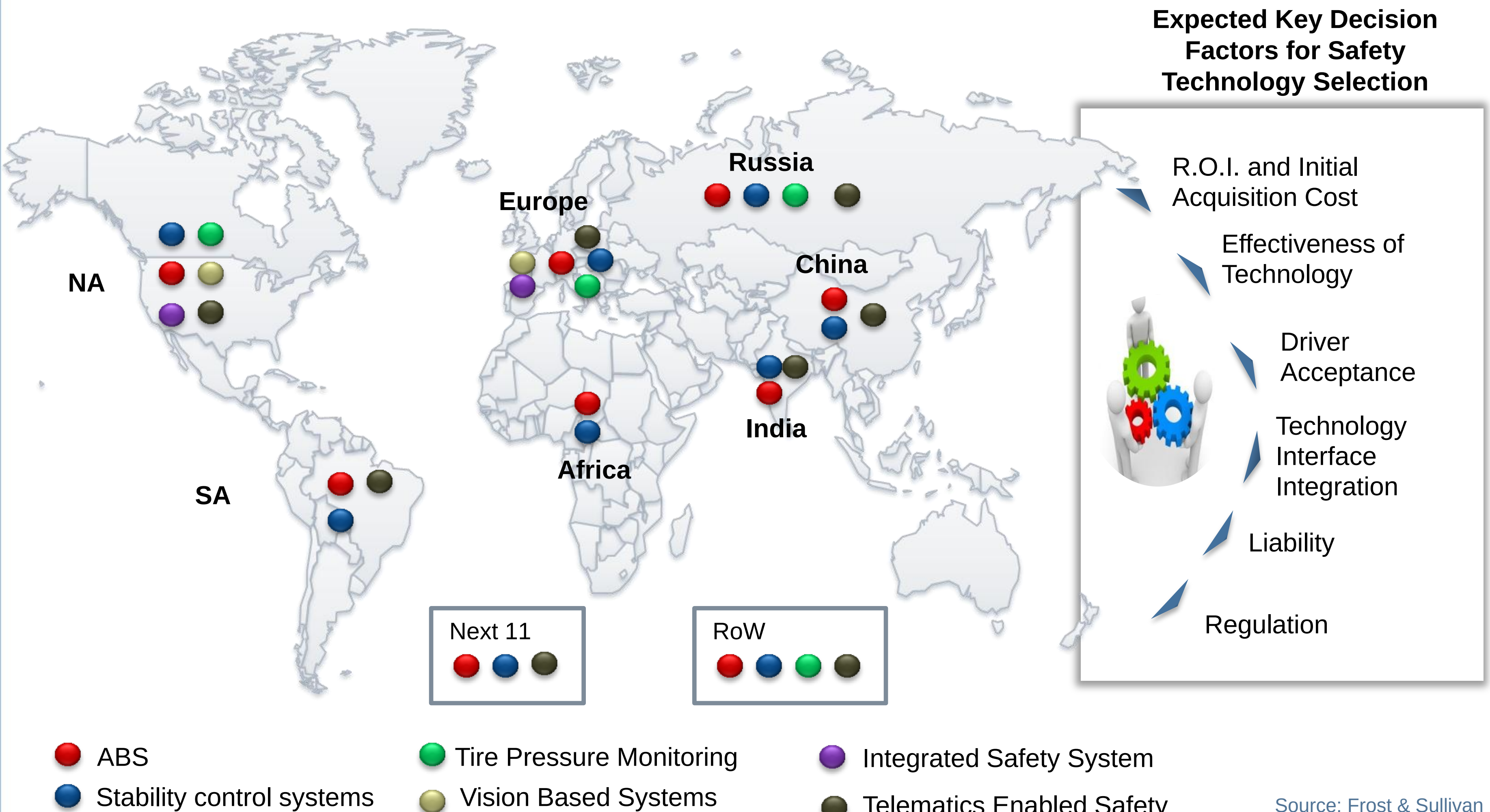
- Analytics companies such as Tower Watson and Aegis
- Fleet-maintenance platforms
- Component suppliers
- Aftermarket telematics vendors

Source: Frost & Sullivan

CV Safety Systems Overview-Global Hotspots

ABS, ESC, and Active Braking Technologies to Gain BRIC and Next 11 Adoption; While Mature Markets (e.g. NA, EU, etc.) to Increasingly Adopt Telematics Based Integrated Safety Systems.

CV Outlook 2014: Safety Technology Hot Spots, Global, 2014



Source: Frost & Sullivan

Common Multiplexed Architecture Across OEMs 2014-2020

Laying Out a Common Advanced Electrical and Electronics Platform Will Provide Clear Boundaries for Developing Future Safety, Telematics, Infotainment and HMIs Technologies in 2014.

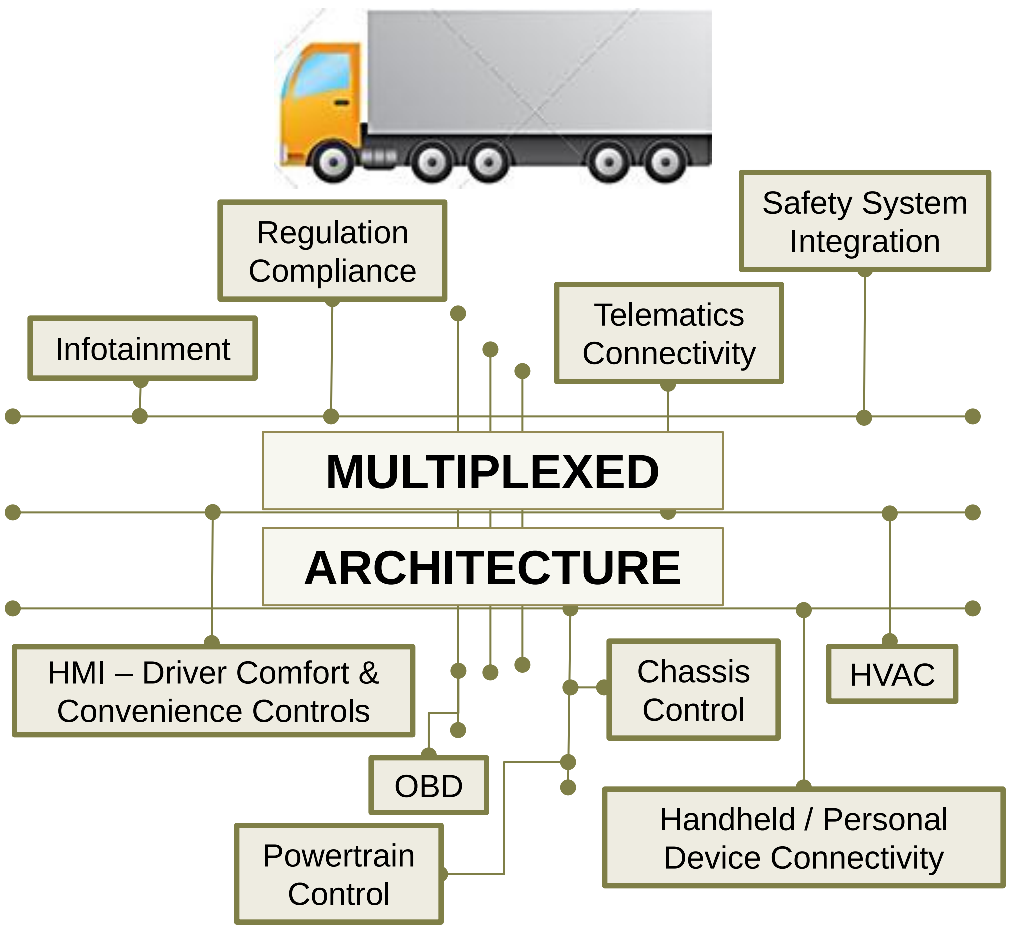
CV Outlook 2014: Common Multiplexed Architecture, Global, 2014

Need for Robust, Effective and Efficient Electronics, Communication and Networking Architecture

Development of architecture in compliance with SAE standards.

J1939, J1708, CAN, LIN etc - vehicle bus protocol used for communication and diagnostics among vehicle components.

IEC 60068, ISO 16750



Enables seamless communication between vehicle and devices.

Single standardized platform will streamline product development for OEMs and Teir1 suppliers.

Since, necessary infrastructure is available, new devices addition will not require discrete system integration and customization.

Key: OBD – On-Board Diagnostics; HVAC – Heating Ventilating and Air-Conditioning

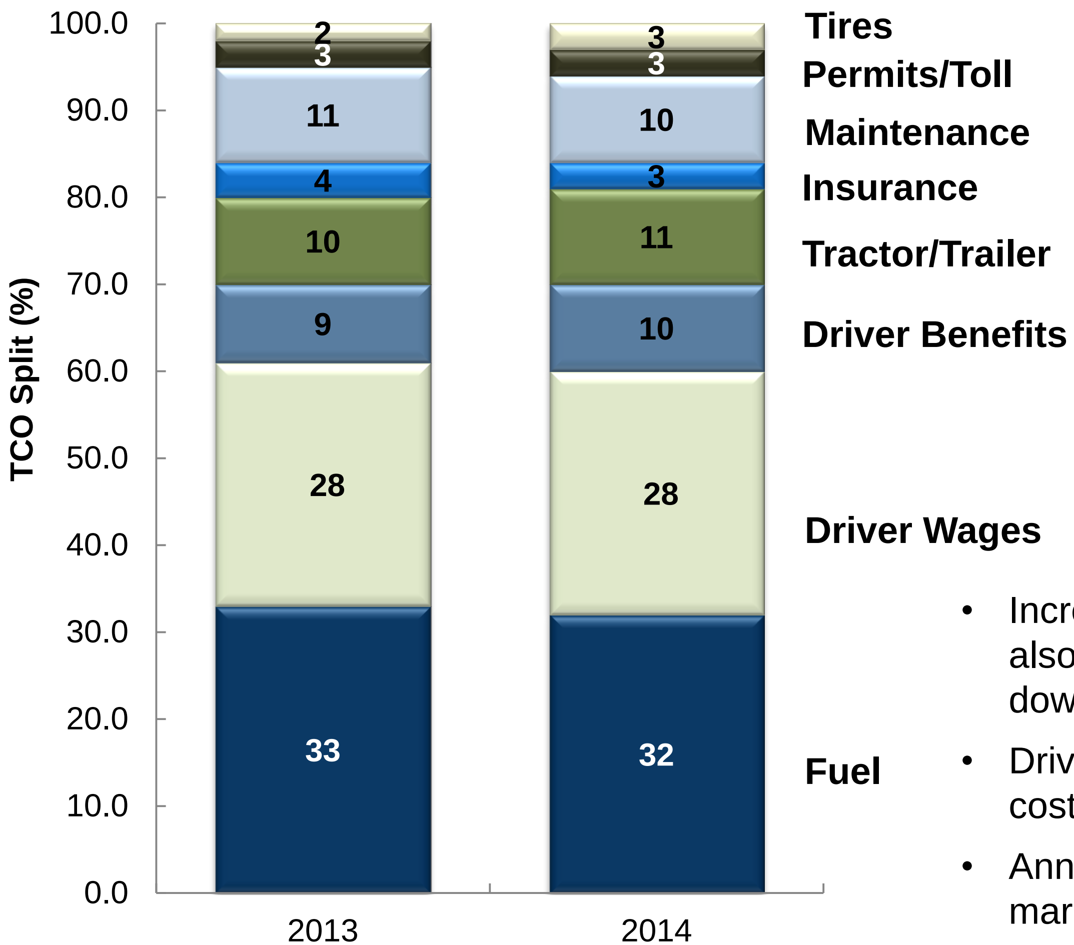
Source: Frost & Sullivan

Operating Costs for Long-Haul Fleets in North America and Western Europe

2014 Fleet Operations Overview-North America

Fleets Operating in NA should Expect an Average Annual Cost of $1.76 per Mile in 2014, as Driver Benefits and Equipment Acquisition Costs Mount.

CV Outlook 2014: Fleet Cost Overview, North America, 2013 and 2014



Upfront Tractor Trailer Cost

Type	2014
Tractor	$110,000 to $125,000
Trailer	$30,000 to $50,000
Total	**$140,000 to $175,000**

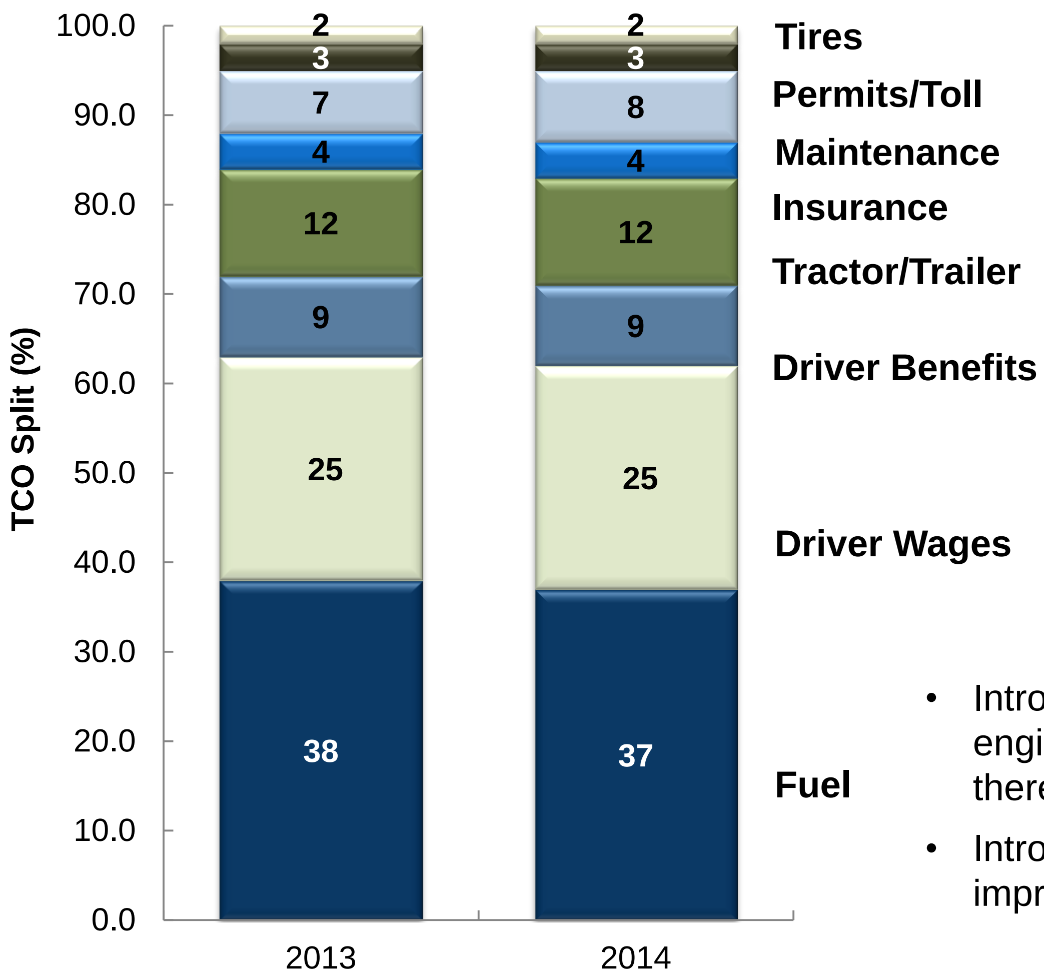
- Increased usage of fuel efficient engines and also cheaper fuels such as CNG/LNG will drive down fuel cost for fleets.
- Driver shortage likely to increase driver related costs for fleets.
- Annual average miles travelled to decline marginally in 2014.

Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

2014 Fleet Operation Overview—Europe

Fleets Operating in Europe should Expect an Average Annual Cost of $2.0 per Mile in 2014, a $0.10 Increase Over 2013 Levels.

CV Outlook 2014: Fleet Cost Overview, Europe, 2013 and 2014



Upfront Tractor Trailer Cost

Type	2014
Tractor	$105,000 to $130,000
Trailer	$40,000 to $70,000
Total	**$145,000 to $200,000**

- Introduction of new generation of fuel efficient engines and trucks to improve fleet efficiency thereby marginally decreasing fuel cost.
- Introduction of Euro 6 trucks to marginally improve maintenance cost.

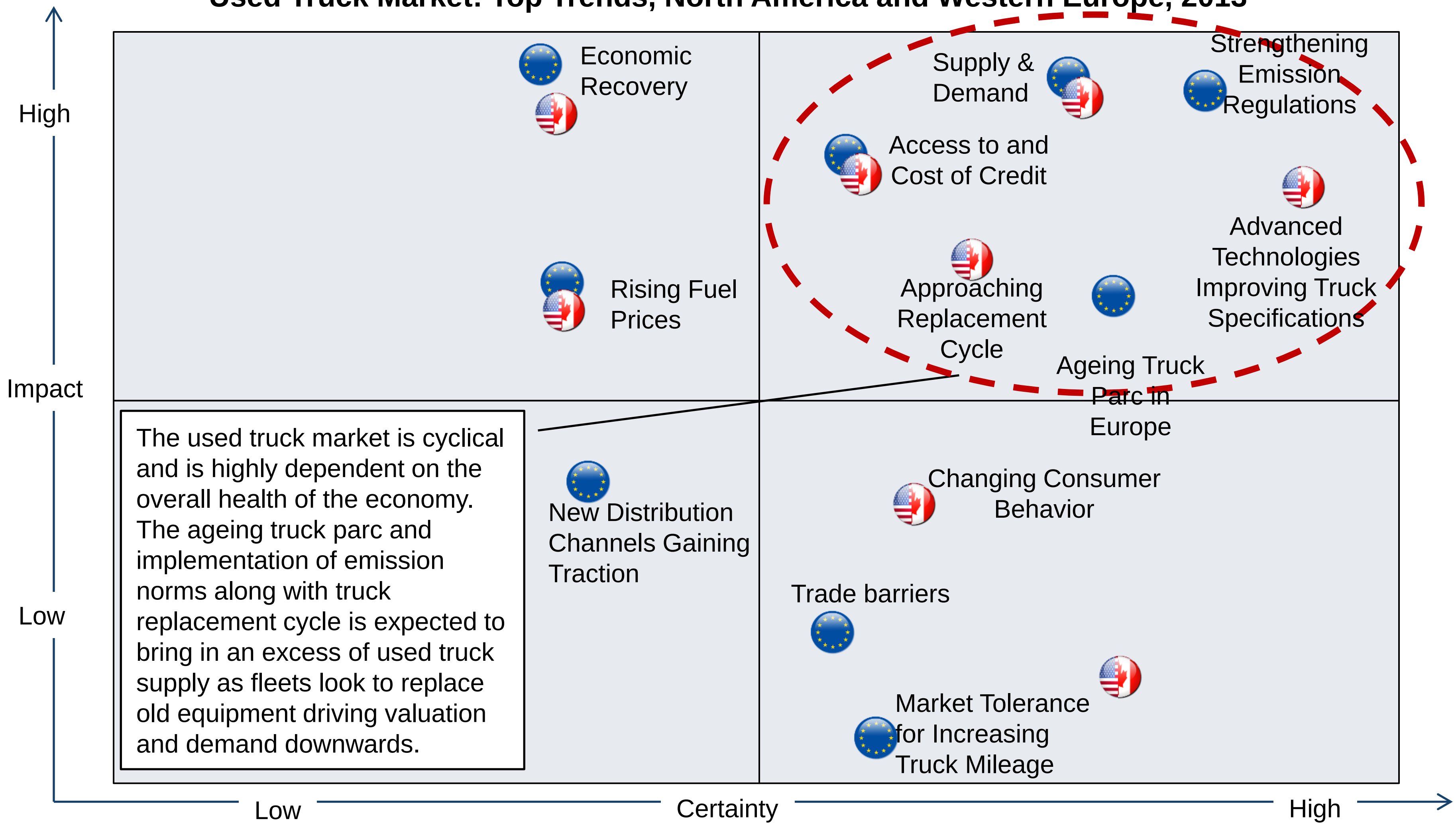
Note: All figures are rounded. The base year is 2013. Source: Frost & Sullivan

Used Truck Market Trends in North America and Western Europe

Top Trends Influencing Used Truck Valuation

Demand and Supply of Quality Used Trucks is Likely to be a Major Trend Impacting the Market Price Valuations of Used Trucks in Western Europe and North America.

Used Truck Market: Top Trends, North America and Western Europe, 2013

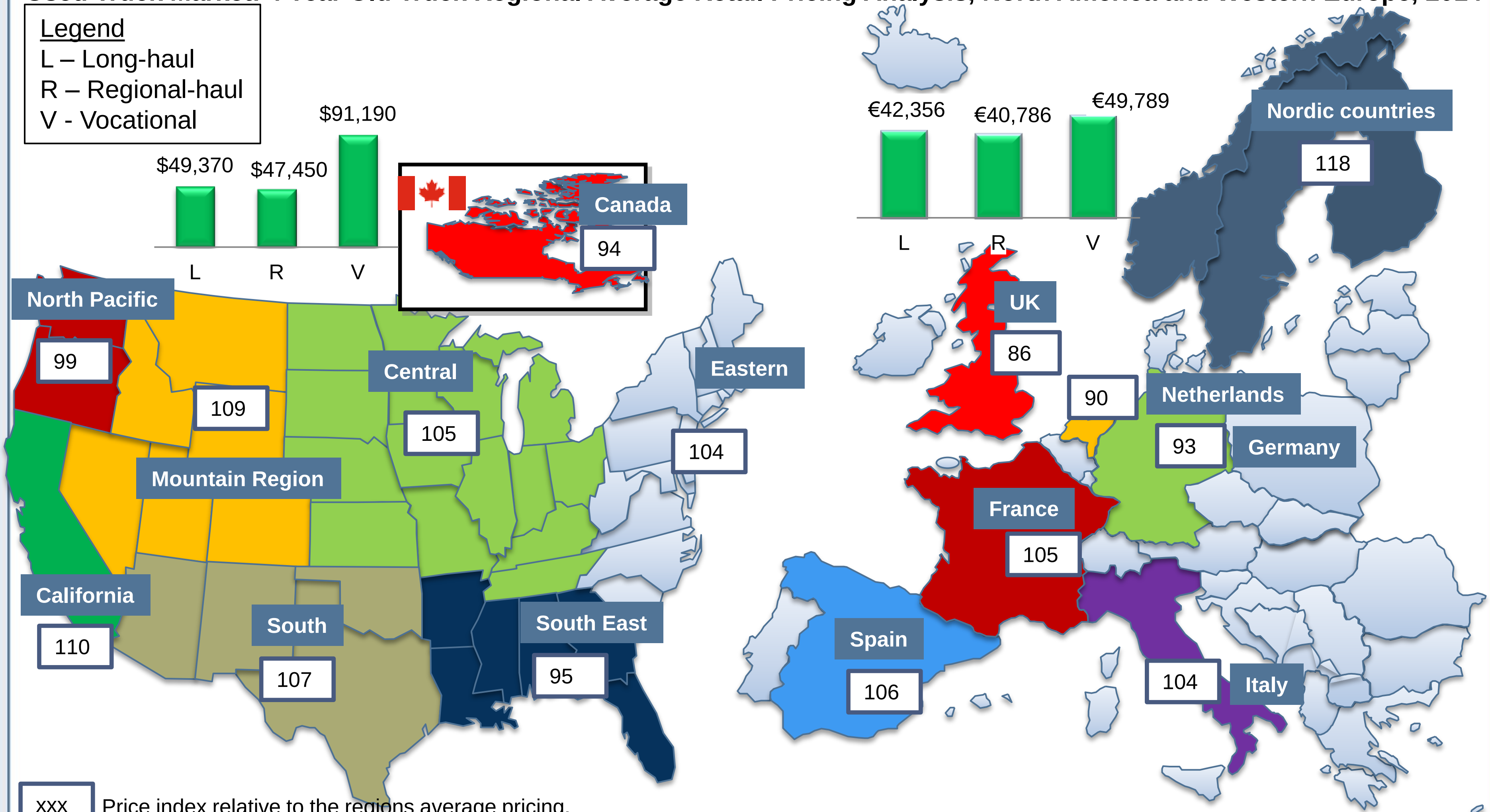


Source: Frost & Sullivan

Comparative Average Retail Pricing Analysis (4 Year Old Trucks)

California and the Mountain Region Command the Highest Prices Among Used Class 8 Trucks across North America; Whereas Nordic Countries Command the Highest Prices Among Heavy Duty Used Trucks in Western Europe.

Used Truck Market: 4 Year Old Truck Regional Average Retail Pricing Analysis, North America and Western Europe, 2014



Price index relative to the regions average pricing.

Note: Weighted average pricing is from a retail level across 2008 truck MYs and vocation types.

Source: Frost & Sullivan

Truck Retailing Trends

Evolving Digital Truck Retailing Trends in TRIAD Markets

Following Car OEMs such as BMW and Audi, Truck OEMs will Leverage Official Websites to Direct Potential Buyers to Dealerships Within their Immediate Area Carrying the Desired Truck.

Digital Within Existing Model

Unlike Europe, North American OEMs and dealers are pursuing digitization models through existing stores. Significant investments are being made to update store technology, training staff and digitally integrating various aspects of the used truck retailing process.

Greater Focus on Off-store Digitization

While some investment is being made in in-store tools such as tablets and kiosks, the key focus remains on the utilization and recalibration of off-store digital media such as websites, apps and social media.

Lead Generation Key Digitization Objective

Dealers are now using online and mobile platforms to sell vehicles. Rather, these media serve as the first touch point with the consumer. The key objective continues to be attracting the consumer to the dealership.

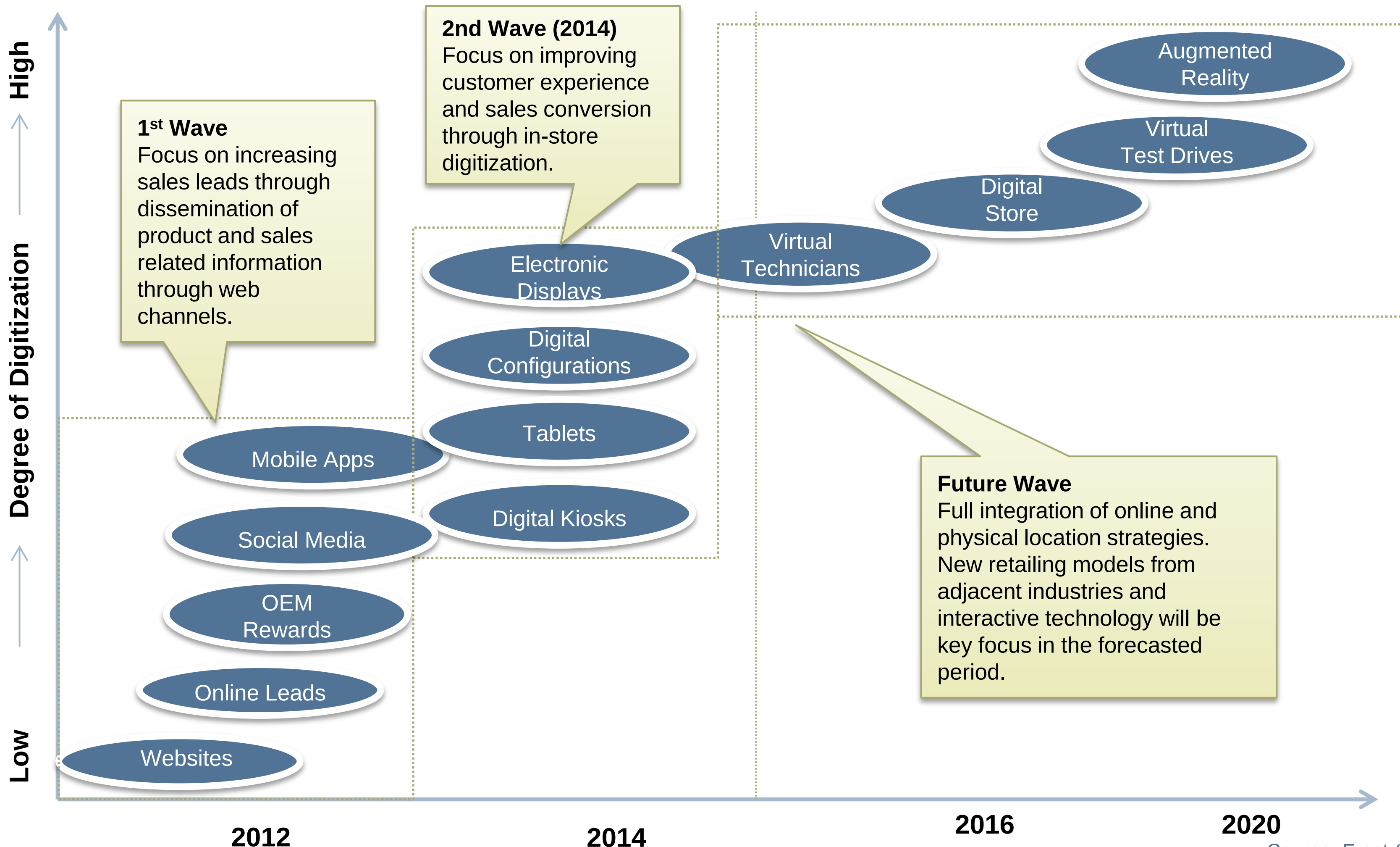
The evolutionary approach to digital retailing dominates in TRIAD Markets

Source: Frost & Sullivan

Degree of Digitization in Truck Retailing

Full Integration of Online and Physical Store Strategies Developing Unprecedented Evolution in Buyer Experience in the Class 8 New and Used Truck Market.

CV Outlook 2014: Degree of Digitization in Used Truck Retailing, North America, 2012–2020



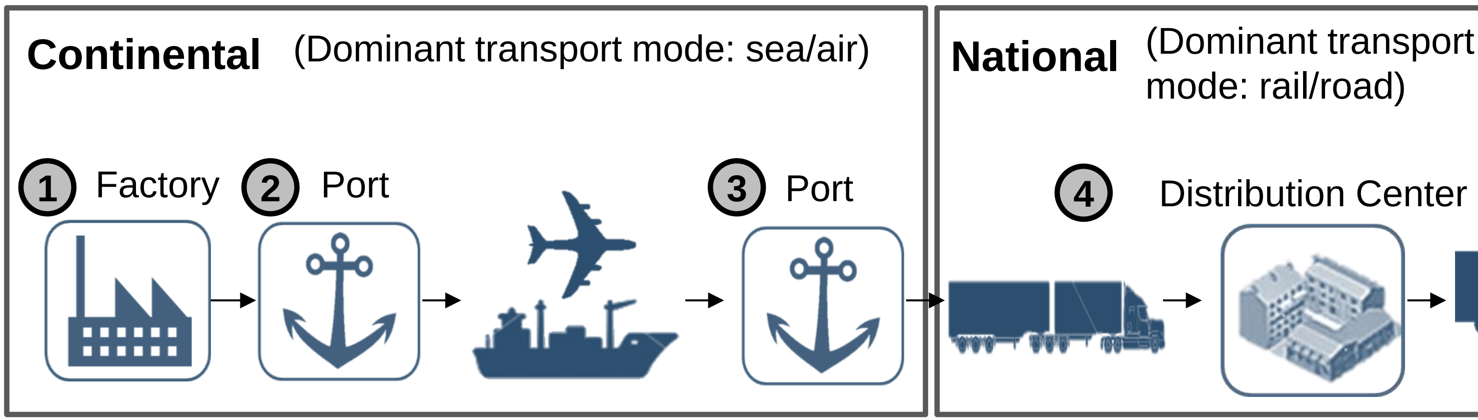
Source: Frost & Sullivan

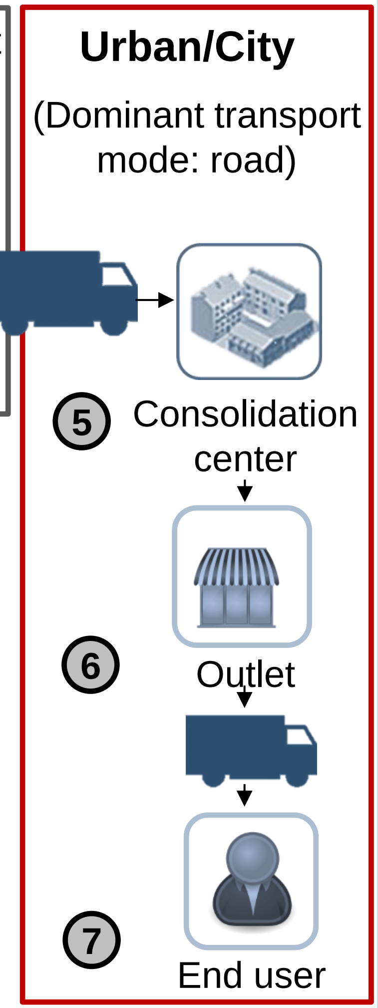
Logistics Industry Trends and Influence on City Truck Design

Logistics Supply Chain in 2014

Shippers are Increasingly Exploring Multi-modal Options for Improving Freight Efficiency While Online Shopping and Bricks-and-Clicks Sales are Pushing Time and Mission Critical Urban Deliveries to the Limit.

CV Outlook 2014: Transportation in the Supply Chain, Global, 2014





Key Characteristics of Transportation

- Transportation includes delivery of primarily finished goods to distribution/consolidation centers and last-mile deliveries to end users.
- Finished goods could mean finished products for retailers or raw materials and semi-manufactured goods for construction and other industries.
- Goods transport involves a wide range of stakeholders, both public and private, that act interdependently.

Source: Organisation for Economic Co-operation and Development, Frost & Sullivan

Logistics Business Trends in 2014

Green logistics practices, and Cold Supply Chain and Asset Tracking Technologies are Areas of Growth for the Logistics Industry.

Sustainability: Green Logistics

TCO based adoption of CNG/LNG and hybrid/electric vehicles, especially for urban and regional haul vocations, will reduce carbon footprint, enhance green image, and also reduce lifecycle costs for logistics industry. Green logistics poised to thrive in 2014 driven by both customer pull and market push.

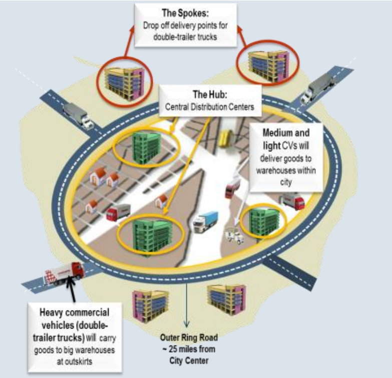
Connectivity: Logistics Efficiencies

Global logistics service will show greater degree of adoption of telematics technologies, especially for mobile resource productivity and supply chain visibility. Location based tracking, route optimization, and geofencing will emerge as most desired applications.

Cold Supply Chain

Product quality coupled with government mandates on food and drug safety are expected to drive the cold supply chain market. Tracking devices and sensors will gain prominence with this trend. OEMs such as Daimler are getting involved in tractor-reefer integration

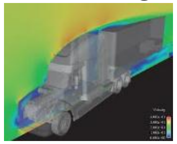
Multi-modality



Global logistics industry will increasingly embrace multi-modality with rail-road, and air-road transfers becoming more common. Hub and spoke logistics will also lead to modal transfers between long-haul to regional and long-haul to local trucks, a globally secular trend.

Source: Volvo; OECD; Frost & Sullivan

Impact of Urban Logistics on Commercial Vehicle Product Design in 2014

Research Focus 	Demand for Ultra Light Commercial vehicles (below 1 tonnes) and Mega Trucks. A breed of commercial trucks: City Trucks, featuring urban duty cycle/application potential will enter mainstream truck markets to support urban logistics and bricks-and-clicks sales.
Powertrain 	In certain LCV sizes, there could be a trend of upsizing of powertrain due to increase in load factor and need for more power - 3.5 ton delivery vehicles have been identified as an ideal ergonomic combination between load (volume) capacity and size (in terms of land surface occupation).
Telematics 	Multiple route capability; real-time traffic; gas prices and weather information; voice recognition for address input; traffic-optimized routing; intelligent navigation rerouting, parking management.
Technologies 	Truck Refrigeration; Driver Assistance Systems, Vehicle and Pedestrian Safety, Connectivity, Prognostics.
Alternative Fuel 	Demand for eLCVs below 1.5tonnes, Hybrid medium-duty trucks, and also LPG /CNG trucks will grow in demand.

Source: Frost & Sullivan

New City Truck Technologies for Urban Logistics—Smart Urban Fleet

Design of City Trucks in 2014 and Beyond Will Revolve Around Technology Improvement, Carbon Footprint Reduction, Weight Reduction, Fuel Efficiency, Eco Driving and Aerodynamics Improvement.

New Vehicle Technologies

- On-board **real-time telematics** (vehicle to grid communication, routing)
- **Smart sensors and access cards** for security and quality control
- **Noise reduction** technology, such as engine isolation
- **Lightweight** vehicles
- **Low loading floor** constructions
- **Safety and ADAS** technologies (driver distraction warning)
- **On-board Traffic Analyzing** tools
- **Geo-fencing**
- Chilled compartments
- **Advanced powertrains** (CNG/LNG, hybrid/electric, advanced diesel engines) and low CO_2 emissions

Next Generation of Driving Support

Before Delivery

On-board systems informs driver about the following conditions:

- Vehicle condition such s tire pressure, Oil condition
- Traffic updates
- Route guidance
- Delivery scheduling/deadlines

During Delivery

Through LBS and telematics, vehicle technology informs driver about the following conditions:

- Inputs to make driving more energy efficient
- Real-time updates on “on-the-fly deliveries”

After Delivery

Transport analytics systems inform drivers about the following conditions:

- Eco driving
- Vehicle and driver analytics

Source: Volvo, OECD and Frost & Sullivan

2014 Medium Heavy Truck Market Conclusions and Recommendations

Conclusions and Recommendations—2014

Markets

- North American and European markets to experience moderate growth rates, while China, Next 11 and RoW markets will offer higher than previous year growth momentum. India's position precarious and could be influenced by political changes. MD-HD truck sales to reach 2.87 Million with 63 Percent of that volume supported by HD truck sales.
- Mid-market standard line trucks based on global truck and engine platforms must be leveraged for sustainable profits.

Technologies

- Engine upsizing in developing markets juxtaposed against gradual powertrain downsizing in TRIAD markets leading to global engine median displacement moving higher. Natural gas to feature in 0.8 Percent of all new trucks sold in 2014. Advanced safety and telematics technologies to create over $9 Billion in revenues in the global OE market.
- Technologies that may shield fleets from fuel price volatility and can enhance mobile resource productivity will yield dividends both in 2014 and beyond. Autonomous driving.

Competition

- Global OEMs to intensify competition especially in the medium-duty truck segment in developing markets. In developed markets 2014 will be the year of volume growth amidst rising pricing competition. Globally, Volvo Group could maintain a lead of 3-5 Percentage point over Daimler to remain the largest global OEM. However, Daimler will unleash massive competitive force in 2014.
- Asian OEMs must attack Western OEMs where the willingness to defend is least i.e. Africa, APAC, etc., while TRIAD OEMs must attack mid-markets in BRIC.

Opportunities

- In 2014, volume growth opportunities will be provided by focus into Next 11, and BRIC markets. At least 2 OEMs could be targets for M&A activities enabling suitors volume, global market share, and market access opportunities. Margin growth opportunities will be derived opportunities in areas such as soft technologies, natural gas powertrain, AMTs, and HMI and safety technologies.
- Opportunities must be leveraged through products and technologies that can reduce TCO for fleets and owner operators while offering service based revenues.

Source: Frost & Sullivan

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Appendix

Table of Acronyms Used

CV	Commercial Vehicle	LATAM	Latin America
BRIC	Brazil, Russia, India, China	ECB	European Central Bank
MCV	Medium Commercial Vehicle	CSA	Compliance Safety Accountability
HCV	Heavy Commercial Vehicle	FMCSA	Federal Motor Carrier Safety Administration
RoW	Rest of World	HOS	Hours of Service
HEV	Hybrid and Electric Vehicle	GDP	Gross Domestic Production
CNG	Compressed Natural Gas	EOBR	Electronic On-board Recording
LNG	Liquefied Natural Gas	GHG	Green House Gas
NG	Natural Gas	PMI	Purchasing Manager Index
APAC	Asia-Pacific	CIS	Commonwealth Independent States
YoY	Year over Year	WTO	World Trade Organization
OEM	Original Equipment Manufacturer	EV	Electric Vehicle
HD	Heavy Duty	CNHTC	China National Heavy Truck Company
GVWR	Gross Vehicle Weight Rating	DFM	Dongfeng Motor
TCO	Total Cost of Operation	R&D	Research and Development
FMS	Fleet Management Solutions	GVWR	Gross vehicle weight rating
MT	Metric Ton	ITS	Intelligent Technology Systems
NA	North America	GPS	Global Positioning Systems
SA	South America	FMS	Fleet Management Services
EU	European Union	Benelux	Belgium, Nederland and Luxemburg
MB	Mercedes-Benz	MB	Mercedes-Benz

Source: Frost & Sullivan

Market Engineering Methodology

One of Frost & Sullivan's core deliverables is its Market Engineering studies. They are based on our proprietary Market Engineering Methodology. This approach, developed across 50 years of experience assessing global markets, applies engineering rigor to the often nebulous art of market forecasting and interpretation.

A detailed description of the methodology can be found here.

Source: Frost & Sullivan