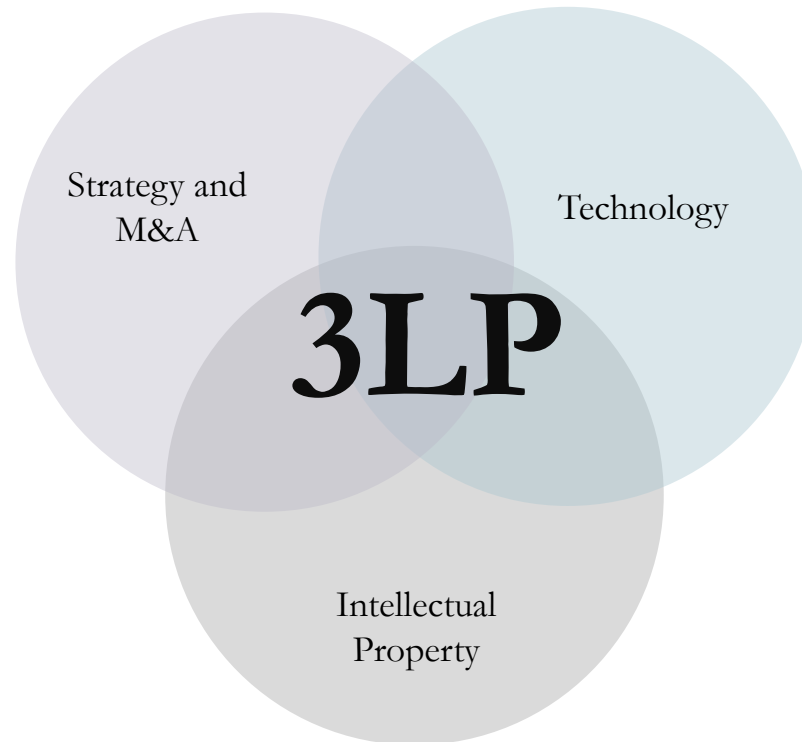


Automotive Technology and IP Outlook

April 2016



Strategy and M&A for Technology and IP

Boston | Silicon Valley

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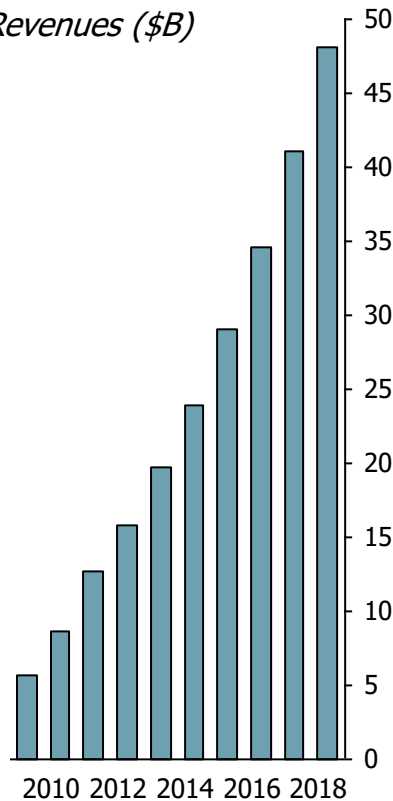
Telephone: (617) 248-0030

Technology is transforming the automotive industry

The Connected Car

The car as a wireless device, computer, and entertainment system

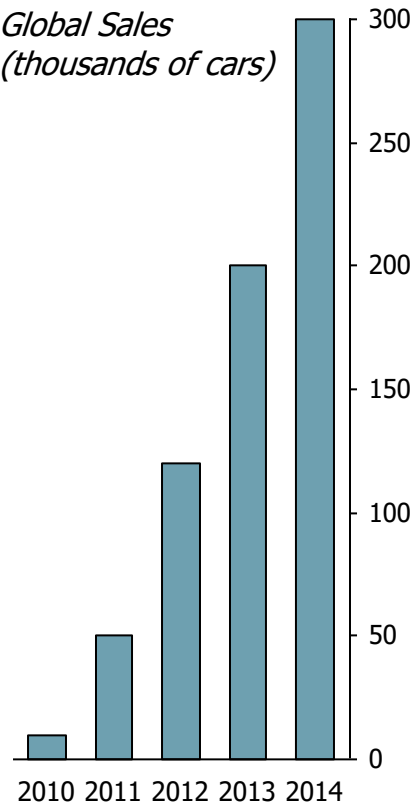
Connected Car Global Revenues (\$B)



The Electric Car

The car that is powered electrically

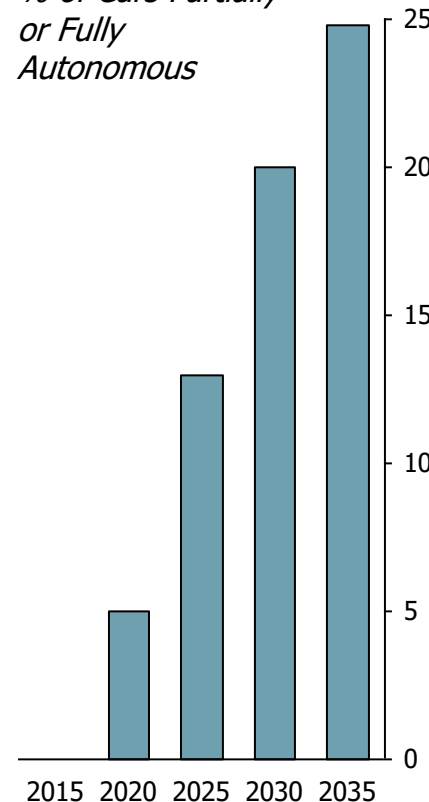
Electric Vehicle Global Sales (thousands of cars)



The Self-Driving Car

The car that drives autonomously

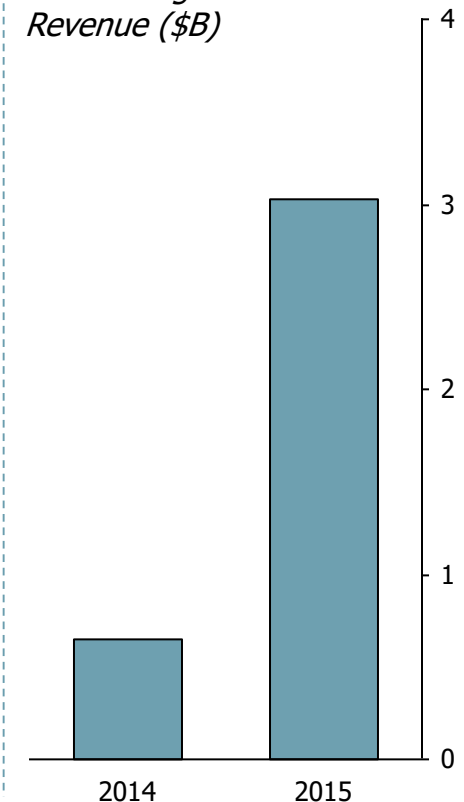
% of Cars Partially or Fully Autonomous



The Shared Car

The car as a service

Ridesharing Services Revenue (\$B)



Technologies from other industries are driving this change

Automotive technologies on the rise (examples)

5G wireless communications: used for connected car systems

LiDAR: sensory technology (e.g., gyroscopes) used for safety and autonomous vehicles

Lithium batteries: used for electric vehicles

What the auto industry is saying

"Visteon is investing in in-car technology... which will enable automakers to quickly transition to 5G without having to tear up the vehicle architecture."
-Martin Green, Telematics & Connected Car Technology Manager at Visteon (SAE, 2016)

"Many in the industry are concluding that you need a LiDAR sensor on each of the four corners of the vehicle, with a 120° sweep. The idea is to generate a point-cloud of information around the vehicle."
-Jeff Owens, CTO of Delphi (SAE, 2016)

"In this 'second phase' of vehicle electrification, there's an even greater focus on full-system development. My company is not just a battery cell supplier going forward, but part of holistic propulsion-system development."
-Denise Gray, CEO of LG Chem Power (SAE, 2016)

Where the technologies originated (not automotive)

Semiconductors
Telecommunications
Mobile Devices
Internet of Things

Aviation
Geology
Software
Sensors

Chemistry
Energy
Consumer Electronics

New players entering the space – not the usual suspects

Automotive incumbents

Automotive manufacturers



Automotive Suppliers



New entrants

Tech companies



Semiconductor companies



Electric vehicle companies



Ride sharing companies



We see 4 critical strategic technology/IP issues in automotive

Technology ownership battles

- 1 Whether incumbent auto companies want it or not, auto patent conflict is almost certainly ahead – impacting product launches and profit pools

Rise of non-practicing entity (“NPE”) litigation

- 2 Plan on getting sued by NPEs for patent infringement, but in the current environment it isn't quite as scary as you might think

Development of new technology standards

- 3 Standards and the associated patent pools will become even more critical, and if you don't handle them properly you may lose your competitive advantage

Emergence of China

- 4 Chinese companies are emerging in automotive, but they will struggle to enter Western markets if they don't acquire IP rights in the necessary geographies

What are the implications for automotive players?

Technology/IP issues

What to do about it

1 Technology ownership battles

- Automotive incumbents: Carefully file and acquire patents to prevent entrants from gaining traction; use IP for partnerships/supply chain relationships, lock in favorable cross licenses, and enforce selectively to slow entrants
- New entrants: You need the right patents ASAP to level the playing field – file, acquire patents, and partner for technology access

2 Rise of non-practicing entity (“NPE”) litigation

- All automotive players: Fight NPEs in court and at the PTO – take advantage of new laws allowing you to challenge their patents (e.g., file inter partes reviews); rather than viewing NPEs purely as threats, use them to your advantage – coopt them to get good deals on patents and/or partner with them

3 Development of new technology standards

- All automotive players: Get involved in standards bodies early to influence their direction; build an IP portfolio that allows you to benefit from technology proliferation; and monetize your standard essential patents either through patent pools or other means

4 Emergence of China

- Emerging Chinese EV companies: Beef up your IP portfolios ASAP – file & buy patents with global coverage
- Automotive incumbents: Leverage your significantly larger patent portfolios to cut favorable deals with patent-poor Chinese EV companies, raise their technology costs, or shut them out of the market

Technology ownership battles

Technology ownership battles

1 Whether incumbent auto companies want it or not, auto patent conflict is almost certainly ahead – impacting product launches and profit pools

Rise of non-practicing entity (“NPE”) litigation

2 Plan on getting sued by NPEs for patent infringement, but in the current environment it isn't quite as scary as you might think

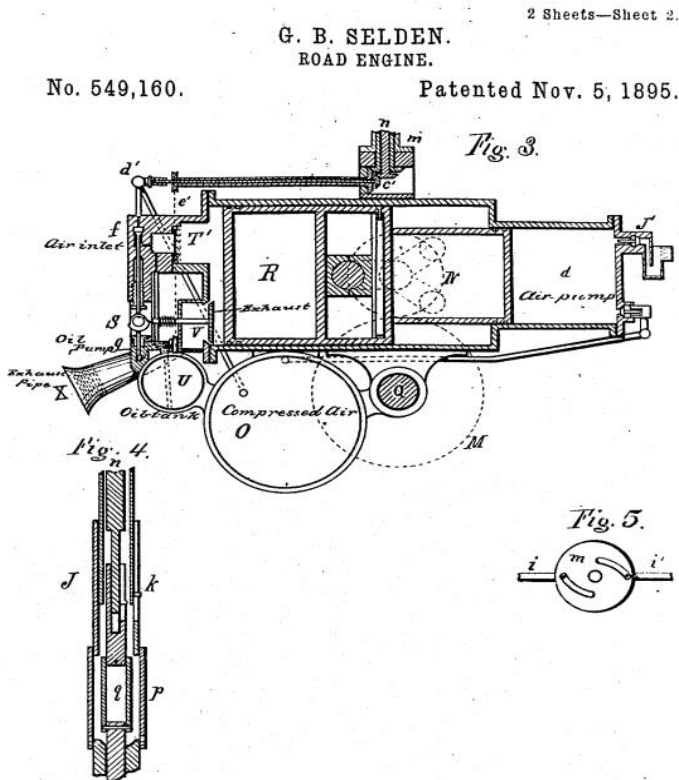
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Automotive patent wars aren't new – conflict in the early 1900s later drove cross-licensing stability for incumbents



1900

1899: Electric Vehicle Company purchased rights to George Selden's patent for a three cylinder, gas-powered motor vehicle

1900: The Electric Vehicle Company launched patent infringement lawsuits against automotive companies

1904

1903: Organization licensing this patent became the Association of Licensed Automobile Manufacturers ("ALAM"); members of ALAM given a license and charged a 1.25% royalty on cars produced

1903: Ford denied a license and ALAM sued Ford for patent infringement

1908

1909: Court ruled in favor of the Selden patent

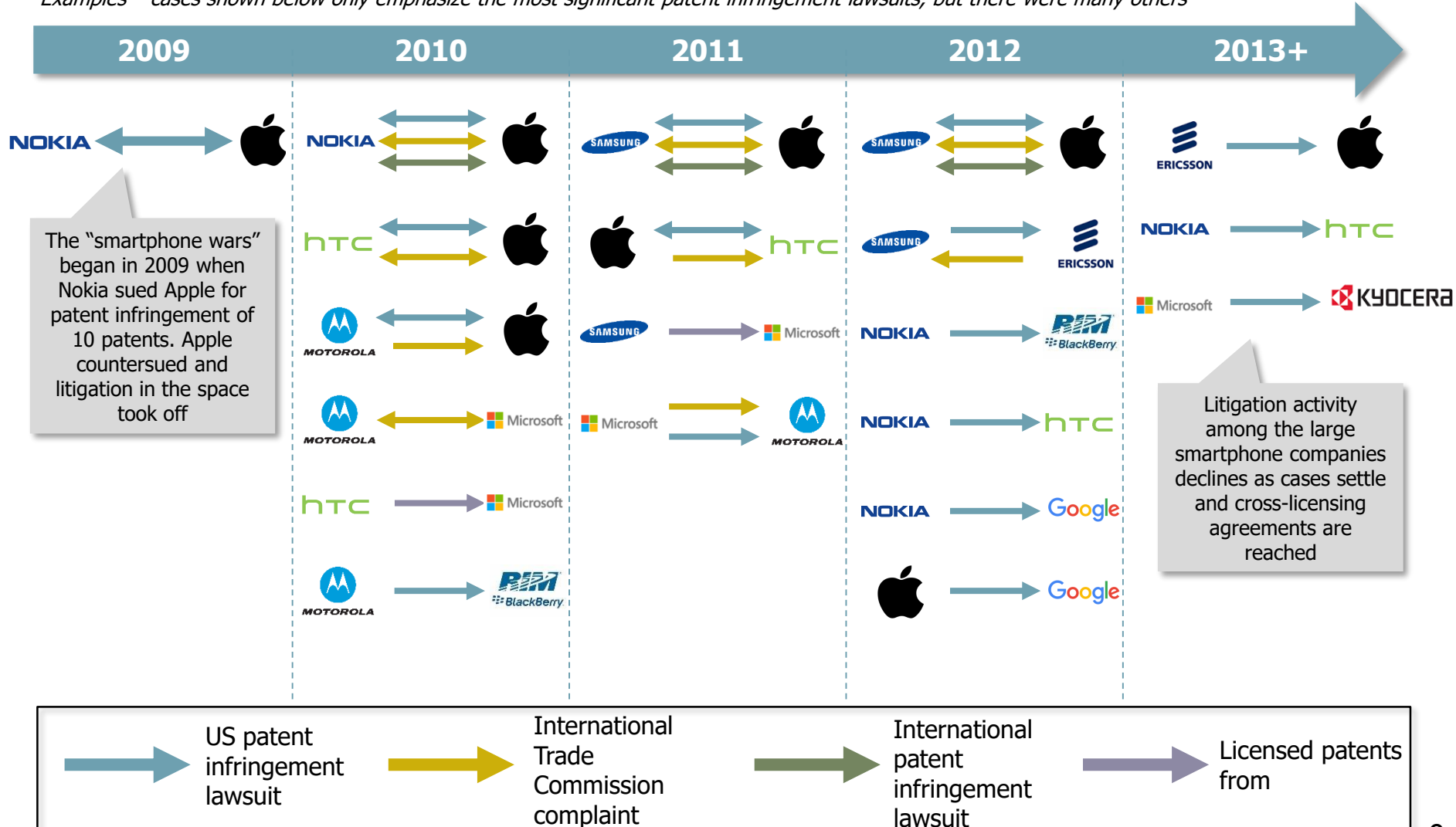
1912

1911: Court of appeals found that the patent is invalid, thereby defeating the patent, but after ALAM had profited from years of licensing the rest of the industry

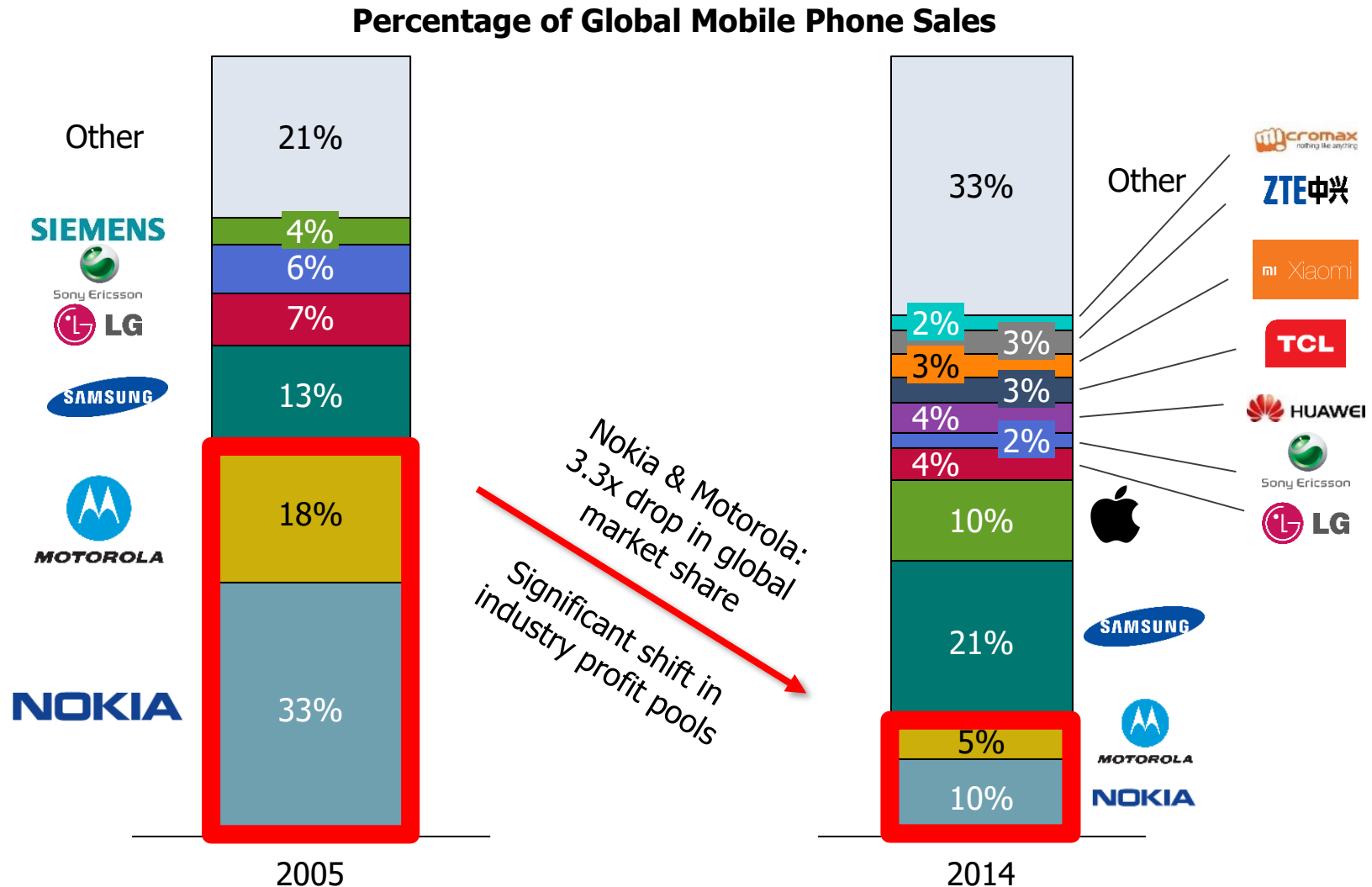
Following the Selden automotive patent wars, there was a period of "patent peace"

Telecom similarly experienced a period of stability, until disruption occurred with the advent of smartphones

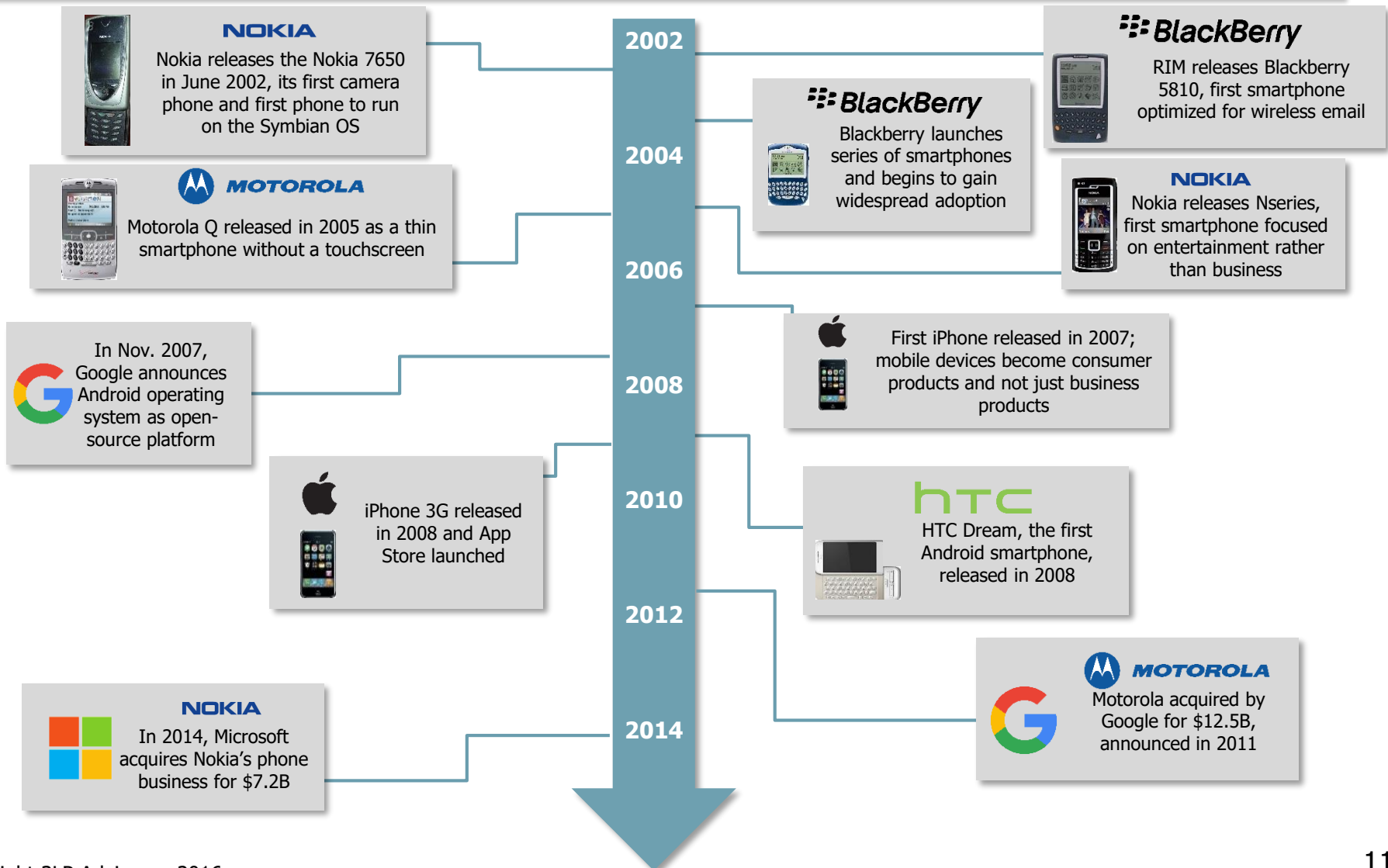
Examples – cases shown below only emphasize the most significant patent infringement lawsuits, but there were many others



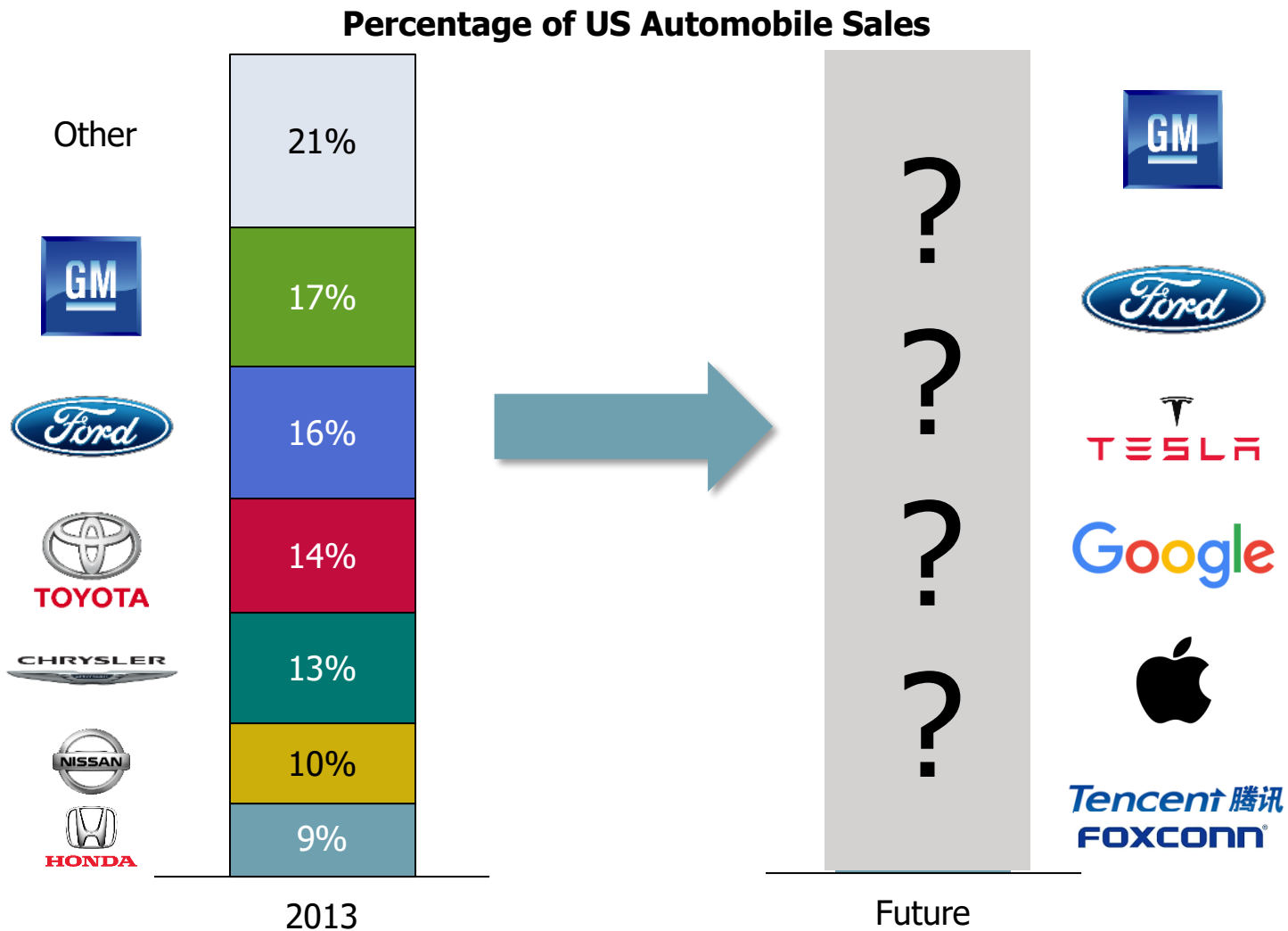
The smartphone patent wars were spawned by a shift in market leadership – incumbents were overtaken by new entrants



Most of the mobile device incumbents were overtaken



Will the same thing happen in automotive?



Sources: <http://www.statista.com/statistics/343162/market-share-of-major-car-manufacturers-in-the-united-states/>;

Smartphone entrants realized they needed patents – so they spent billions on IP acquisitions

<i>Companies Involved</i>	<i>Deal Type</i>	<i>Date</i>	<i>Deal Size</i>	<i>Description of Patent Acquisition</i>
Google; Motorola	Company acquisition	8/15/11	\$12.5B	Google acquired Motorola Mobility, largely motivated by Motorola's 17,000+ patents and 7,500+ applications
Rockstar Bidco (Apple, Microsoft RIM, Sony, EMC, Ericsson); Nortel	Patent acquisition	6/30/11	\$4.5B	Rockstar Bidco paid \$4.5B for Nortel's patent portfolio in a bankruptcy auction, outbidding Google in the process
Microsoft; AOL	Patent acquisition	4/9/12	\$1.1B	Microsoft paid \$1.1B to acquire 800+ patents and to license hundreds more from AOL; shortly thereafter, Microsoft sold a portion of the AOL patents to Facebook for \$550M
Google; IBM	Patent acquisition	9/14/11	Undisclosed	Google purchased 1,000+ patents from IBM to bolster its patent portfolio at the height of the smartphone patent wars

Qualcomm and Microsoft profited from smartphone wars by having the right patents in the right parts of the ecosystem



- Rose to industry leadership quickly – now among the perennial semiconductor giants like Intel
- Succeeded in large part due to its targeted and strategic use of patents, which it skillfully licensed to the mobile device ecosystem
- Generated \$51B in patent licensing revenue since 2006, of which \$44B is profit



- Has made leveraging its IP portfolio a strategic priority – more so than many other tech companies
- Made strategic patent acquisitions to augment its warchest of assets
- Generated \$3.4B in Android patent licensing in 2013; more than \$1B of which was reportedly paid by Samsung for its sales of mobile devices

Who will strategically use their patents in the new, high-tech automotive world?

Auto companies "playing nice"... but mobile phone makers tried that too, and patent wars broke out anyway

Company

Collaborative Approach/Sentiments

Automotive companies in 2014/15

TOYOTA



DAIMLER



TESLA

Toyota: 5,680 fuel cell patents made available for royalty-free use until 2020
"[Technology development would require] a concerted effort and unconventional collaboration between automakers, government regulators, academia and energy providers."
- Bob Carter, SVP of automotive operations, Toyota Motor Sales USA (2015)

Ford: Opens portfolio of electrified vehicle technology patents (2015)

Daimler: "We are looking at what has been happening in consumer electronics in the last few years...I don't know the solution yet; but sure, we don't want to go the same way."
Christian Hahner, head of IP and technology management, Daimler (2015)

Hyundai: "At Hyundai, we're quite open with our assets – that is, we are willing to license a patent based on needs with a competitor, provided it can help our industry as well as our customers."
Seung Cheol Lim, IP planning and strategy, Hyundai Motor Company (2015)

Tesla: "[We] will not initiate patent lawsuits against anyone who, in good faith, wants to use our technology." (2014)

Mobile device leaders in 2006

NOKIA



MOTOROLA

Nokia: "Harri Mannisto, Director, Multimedia Experiences at Nokia, noted that commercial mobile TV services were on the verge of launching in several markets across the world. 'In order for mobile TV to be a true success, we need interoperable mobile devices and systems which deliver the best experience for consumers.'" (2006)

Motorola: "'Operators around the world are evaluating broadcast mobile TV as a compelling new service to offer their subscribers -- and interoperability will play a key role in bringing these services to market faster,'" said Rob Bero, director of broadcast technologies, Motorola." (2006)

Sources:

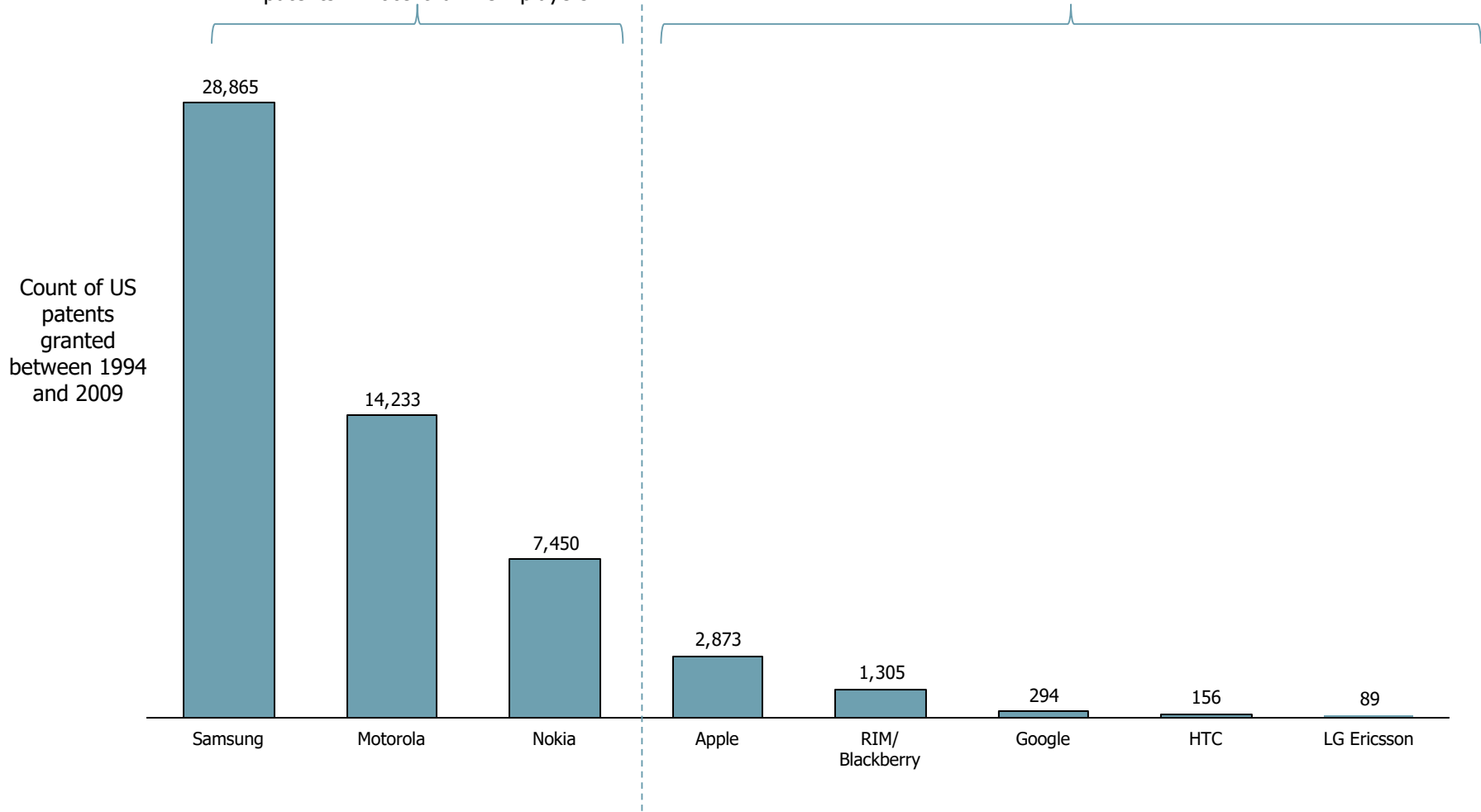
Select quotations from Intellectual Asset Magazine, "In the driving seat", September/October 2015; <http://newsroom.toyota.co.jp/en/detail/4663648>
<http://www.forbes.com/sites/briansolomon/2014/06/12/tesla-goes-open-source-elon-musk-releases-patents-to-good-faith-use/#4a05432f18e4> ; <http://company.nokia.com/en/news/press-releases/2006/09/11/motorola-and-nokia-to-cooperate-on-mobile-tv-interoperability>; Intellectual Asset Magazine, "In the driving seat", September/October 2015

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The state of play in 2009 for smartphones – big patent discrepancy between incumbents and new entrants

Smartphone incumbents held many more patents in 2009 than new players

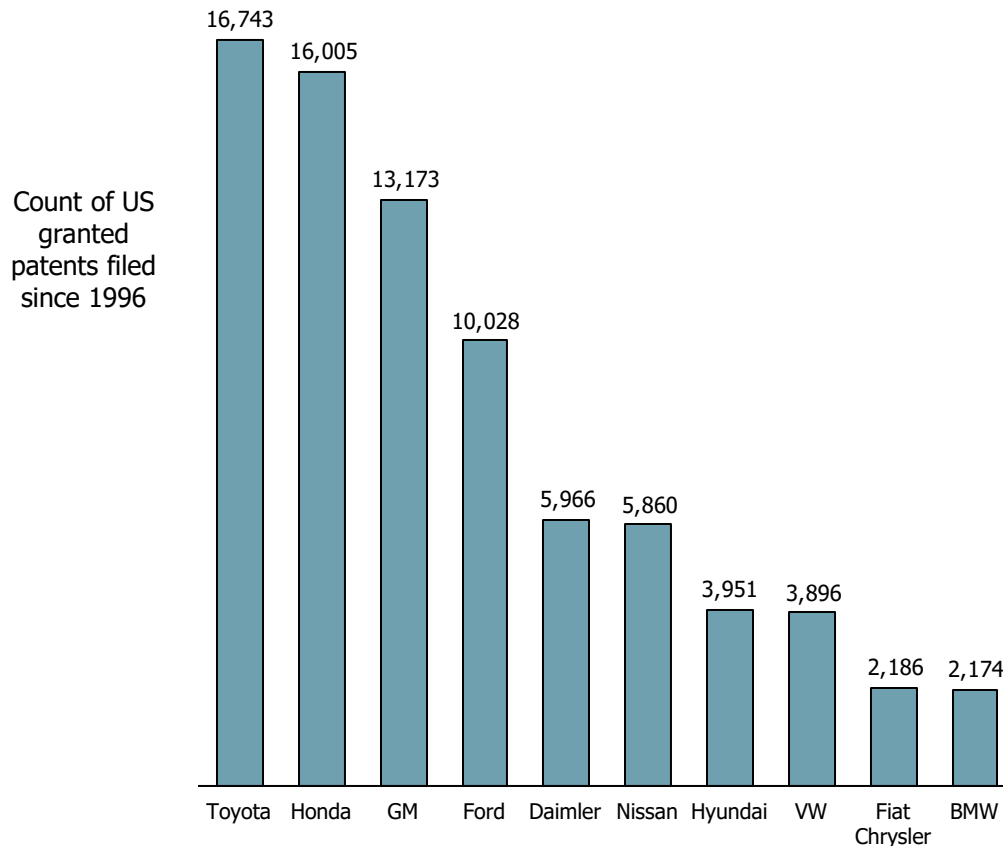
New entrants lacked patents in 2009



Look familiar? The current state of play in automotive IP

Automotive incumbents have substantial US patent portfolios

Emerging electric vehicle players need to beef up the size of their portfolios to have a chance



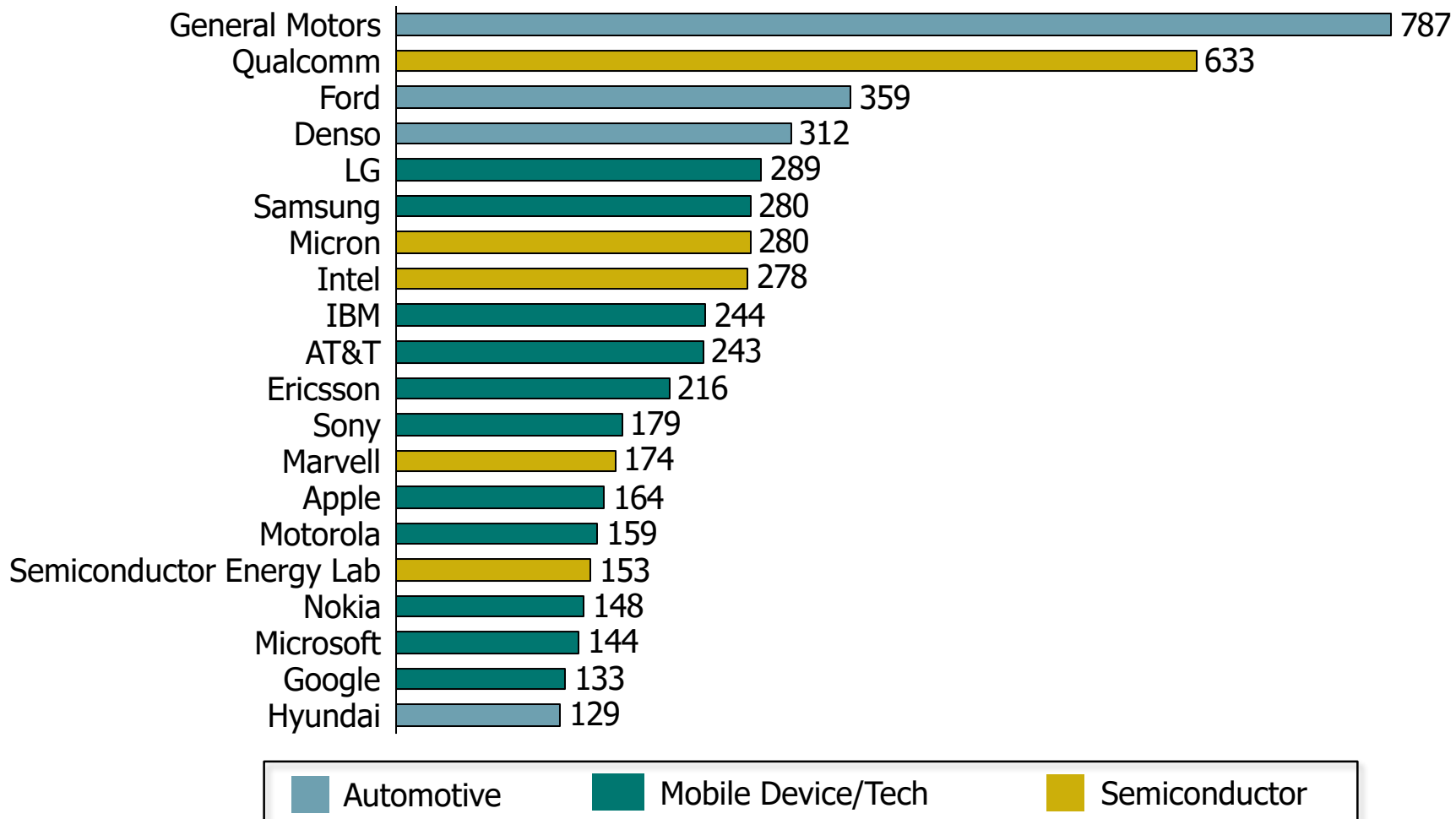
These companies need to aggressively file and acquire patents

244	50	23	1	0	0	0	0	0
Tesla	Atieva	Fisker (Karma)	Faraday Future	NextEV	LeEco	Via Motors	Future Mobility (Tencent/Foxconn)	CH-Auto

Note: Patent counts estimated using Thomson Innovation. Includes granted US patents only and does not include pending applications or non-US equivalents

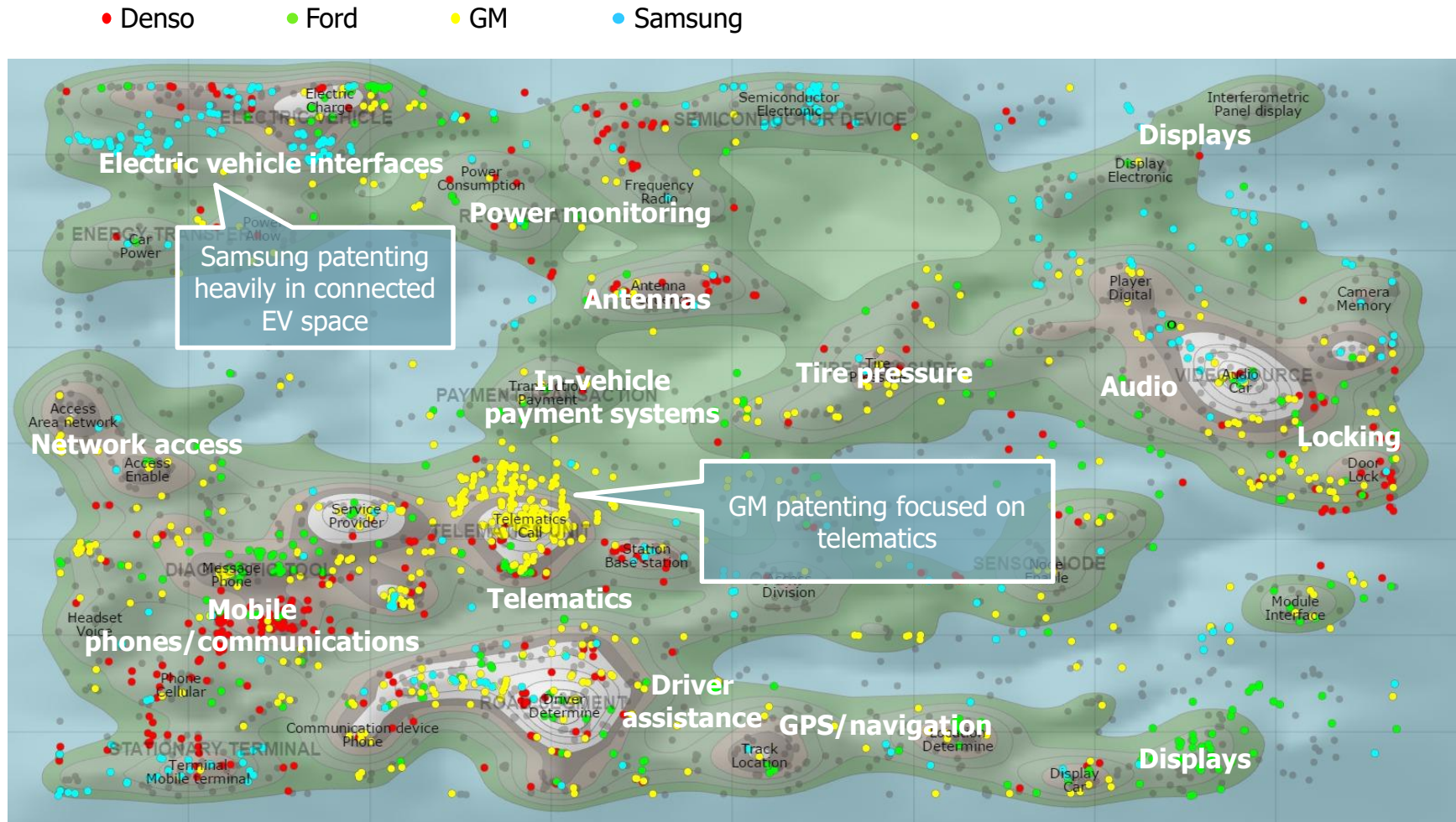
The leading connected car patent holders come from the automotive, semiconductor, and mobile device industries

Connected Car Patent Holdings (US granted patents + pending applications)



Search using Thomson Innovation: All-DWPI field text contains: (wifi OR wireless OR bluetooth) AND (car OR vehicle OR automobile), priority year 1996 or later, US apps and grants. Returned 19,153 distinct application numbers. Exemplary companies shown above
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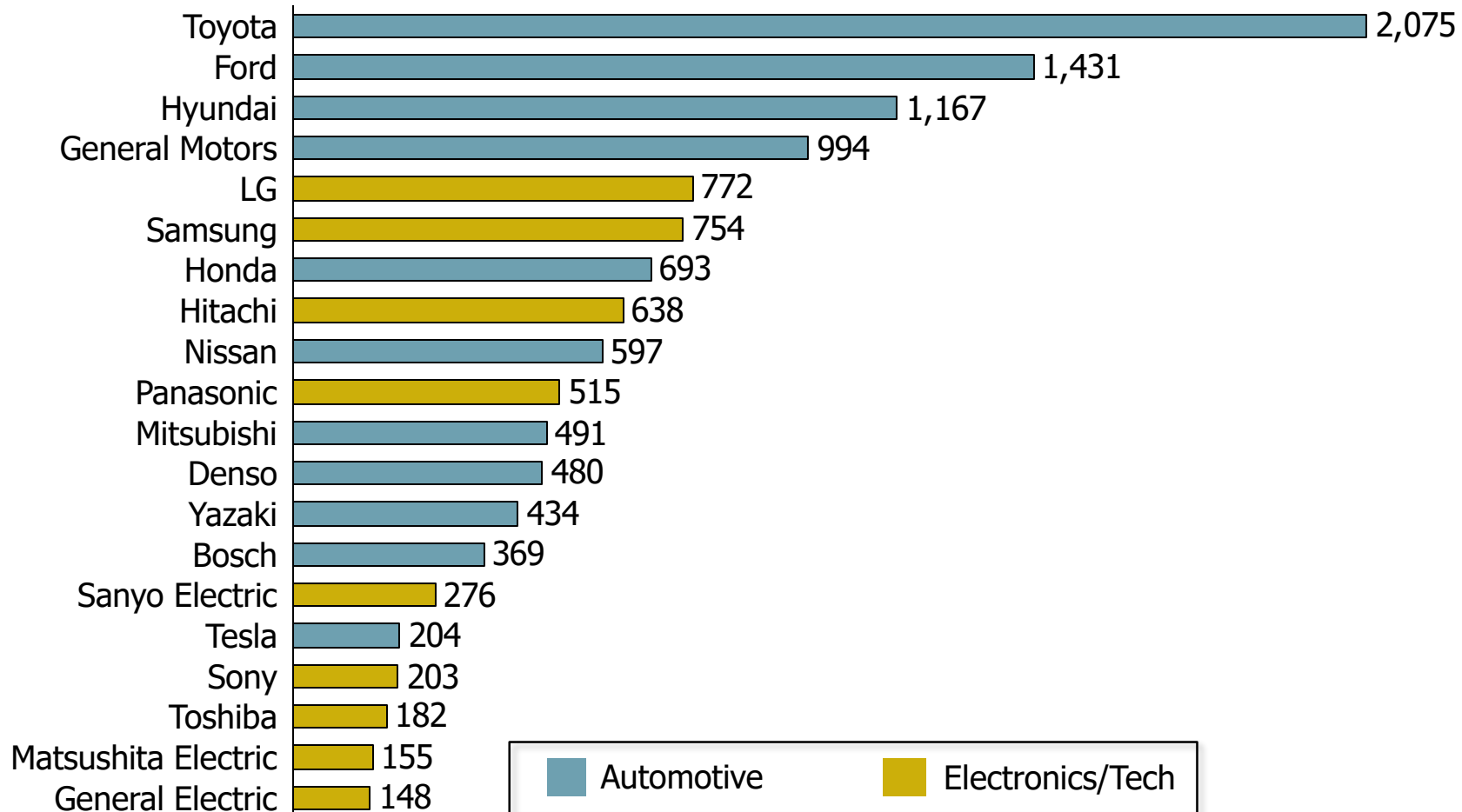
Mobile comms, GPS, telematics, and power monitoring are examples of connected car technologies being patented



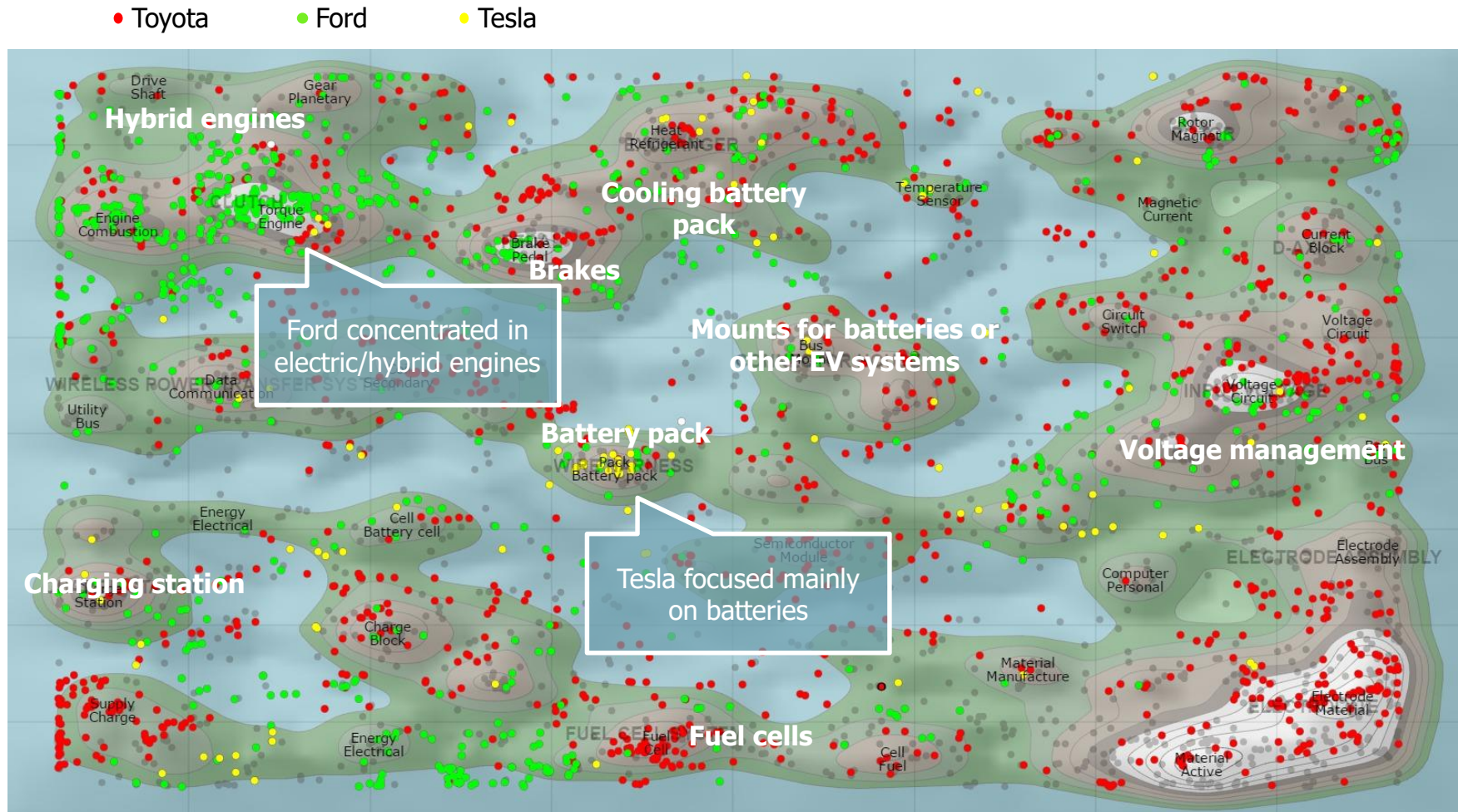
Thomson Innovation "Themescape" map above (originally developed by 3LP founding partner, Kevin Rivette) clusters patents by the similarity of words in the patents. Mounds represent high concentrations of patents. Colored dots represent patents held by the companies specified above. The patents represented include 19,153 documents related to connected car, using the search described on the previous page.

Electronics companies – not just automotive companies – hold electric vehicle patents

Electric Vehicle Patent Holdings (US granted patents + pending applications)



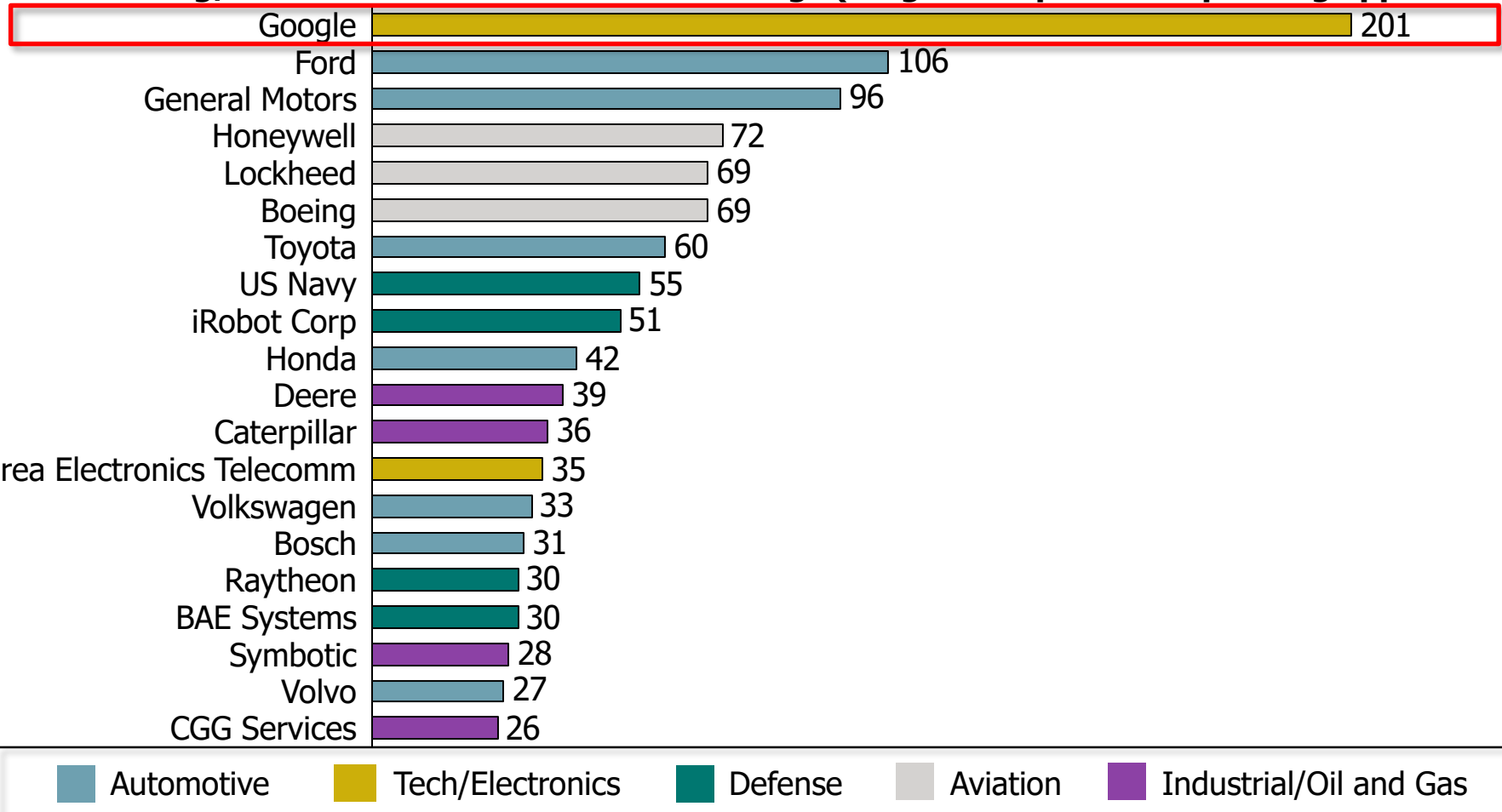
Toyota and Ford dominate Tesla in electric vehicle patenting



Thomson Innovation "Themescape" map above (originally developed by 3LP founding partner, Kevin Rivette) clusters patents by the similarity of words in the patents. Mounds represent high concentrations of patents. Colored dots represent patents held by the companies specified above. The patents represented include 23,877 documents related to electric vehicles, using the search described on the previous page.

Google learned its lesson from the smartphone wars – now it is filing patents like crazy in auto

Self-driving/Autonomous Vehicle Patent Holdings (US granted patents + pending applications)

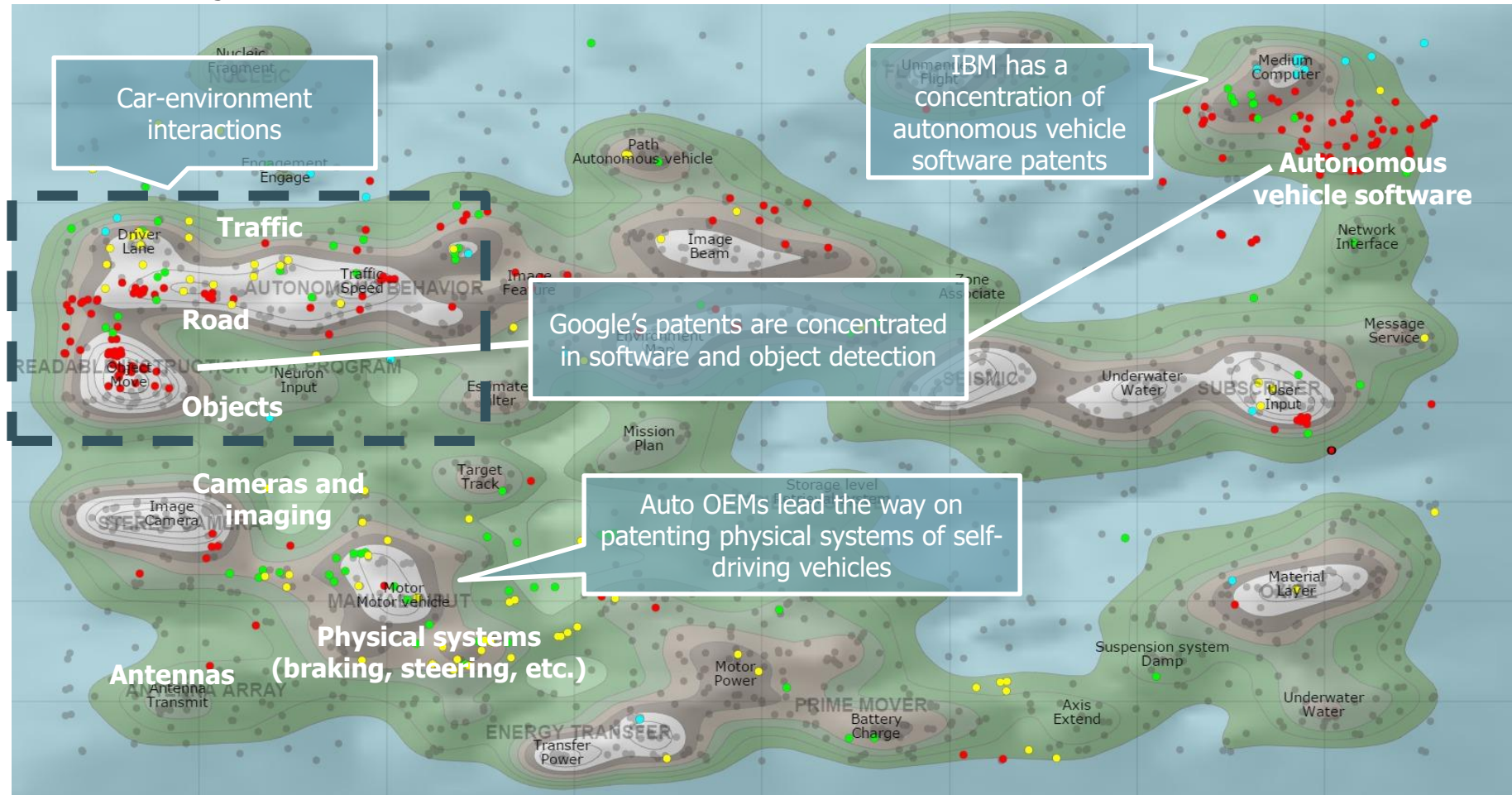


Search using Thomson Innovation: All-DWPI field text contains: (autonomous OR self-driving OR "self driving" OR driverless) AND (vehicle OR vehicles OR car OR cars OR automobile OR automobiles), priority year 1996 or later, US apps and grants. Returned 3,774 distinct application numbers.

Exemplary companies shown above
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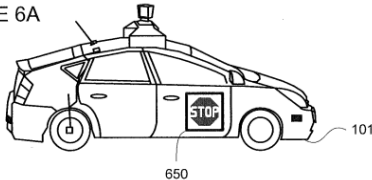
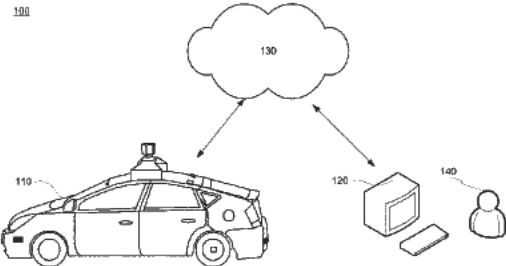
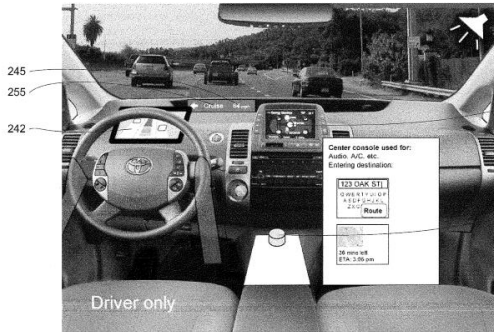
Google's patenting in autonomous driving is focusing on software and object detection

● Google ● Ford ● GM ● IBM

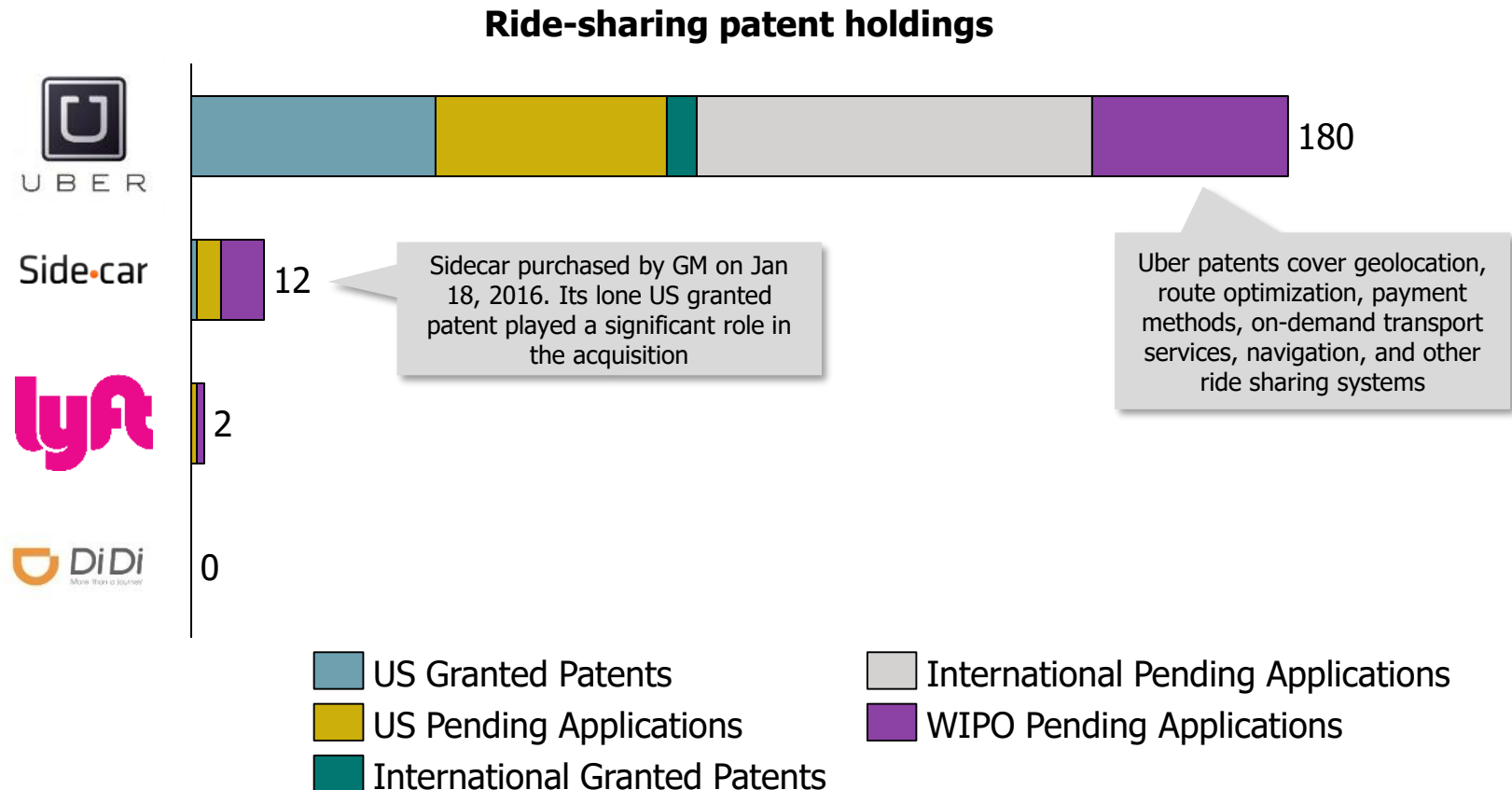


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Examples of Google's autonomous vehicle patents

Patent #	Title	Description	Filing year	Figure
9196164 (issued)	Pedestrian notifications	Notifying a pedestrian of the intent of a self-driving vehicle	2012	FIGURE 6A 
9123152 (issued)	Map reports from vehicles in the field	Collecting image data to create a map for a vehicle	2012	
9132840 (issued)	User interface for displaying internal state of autonomous driving system	Method for selecting images for display on display apparatus of vehicle	2010	 FIGURE 2

Uber dominates ride sharing patenting



Will Uber leverage its IP position to advance its business objectives?

Other tech cos are focusing on partnerships in automotive



- Amazon and Ford are working together on a connected car-smart home interface
- Amazon's Echo and Alexa home automation services could connect with a connected car
- For example, a user could tell Alexa to start and warm the user's vehicle
- Example shown at CES in 2016:
"The command 'Alexa, ask my Ford for the charge status of my C-Max' spoken to the cylindrical tower was met with a robotic response communicating the current battery level of the plug-in hybrid and the estimated range."

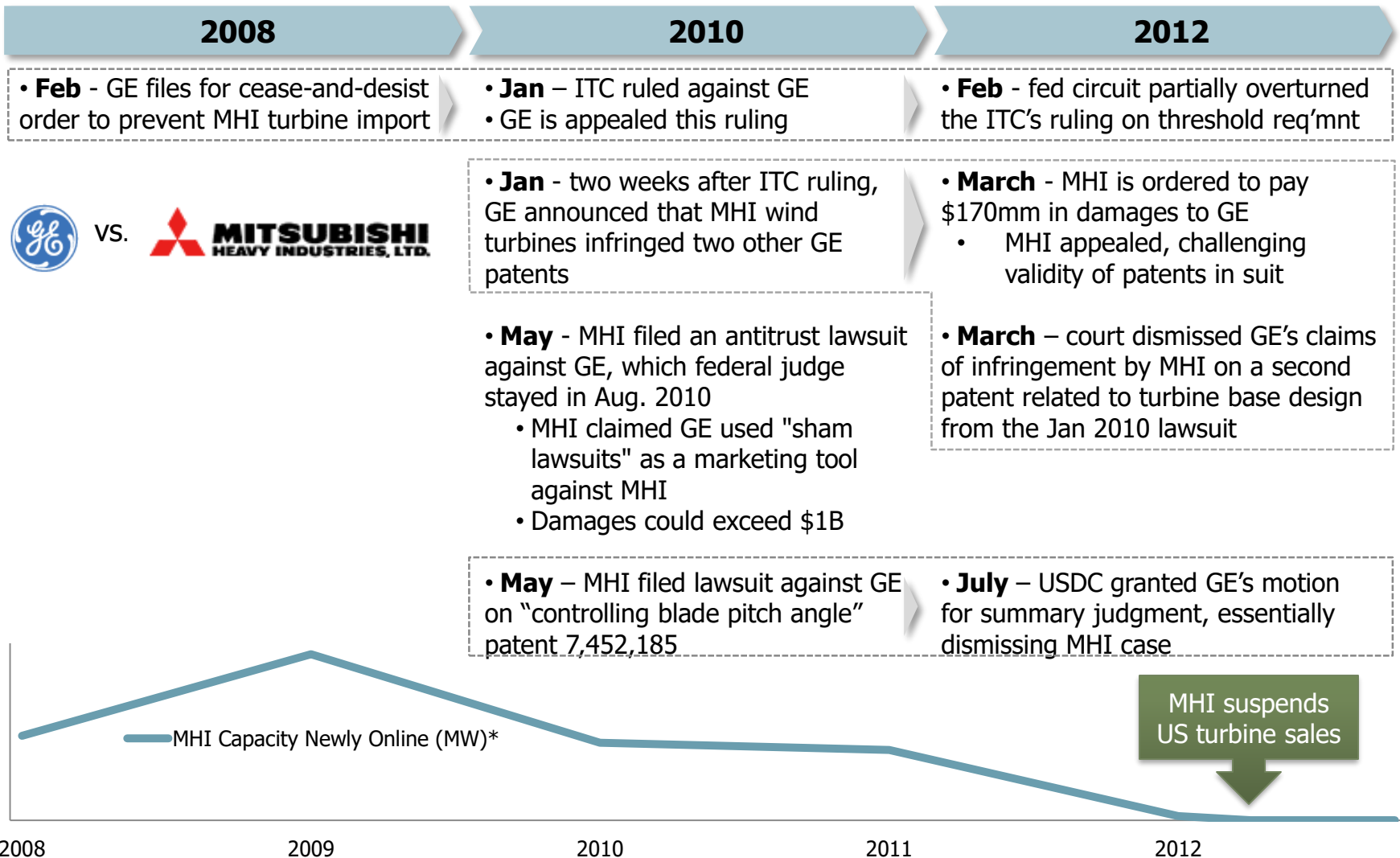


- Microsoft has partnered with automakers Toyota, Ford, Volvo, Nissan, and others, as well as connected car specialist Harman
- In a blog post, Microsoft executive vice president for business development said:
"In the near future, the car will be connected to the Internet, as well as to other cars, your mobile phone and your home computer. The car becomes a companion and an assistant to your digital life. And so our strategy is to be the ultimate platform for all intelligent cars."
- Microsoft is attempting to find safe ways to integrate Office 365 to the road



- In 2016, Hyundai announced a partnership with Cisco for connected car services
- The deal received senior-level attention: Hyundai Vice Chairman Chung Eui-sun met Cisco Chief Executive Chuck Robbins, where they came to an agreement to co-develop vehicle technology
- The partnership also aims to make communication between car systems more effective with potential autonomous car applications
- Hyundai has stated it wants its cars to be "high-performing computers on wheels"

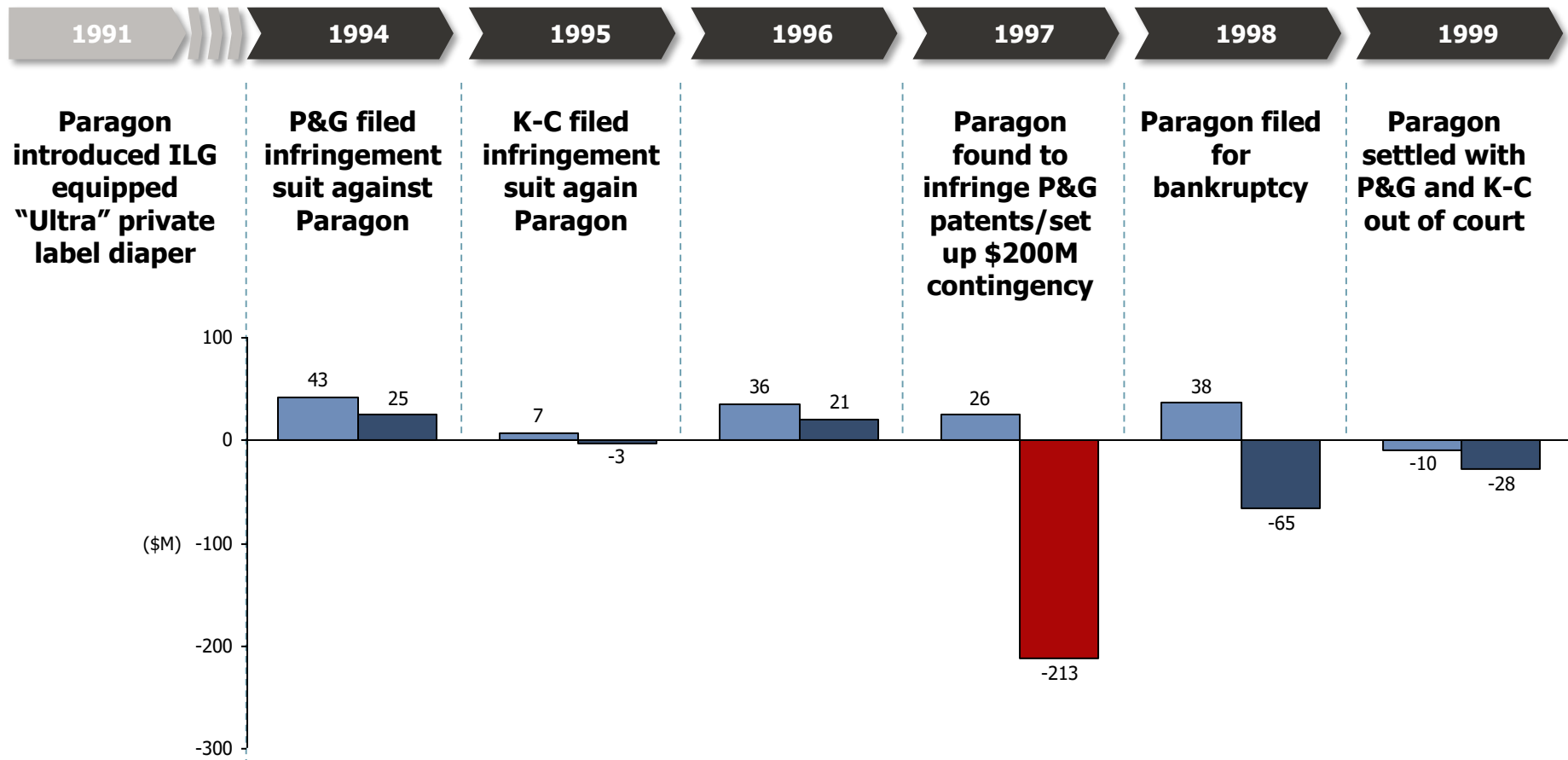
Use IP to your advantage – a history lesson from GE, which forced MHI out of the US wind turbine market using its patents



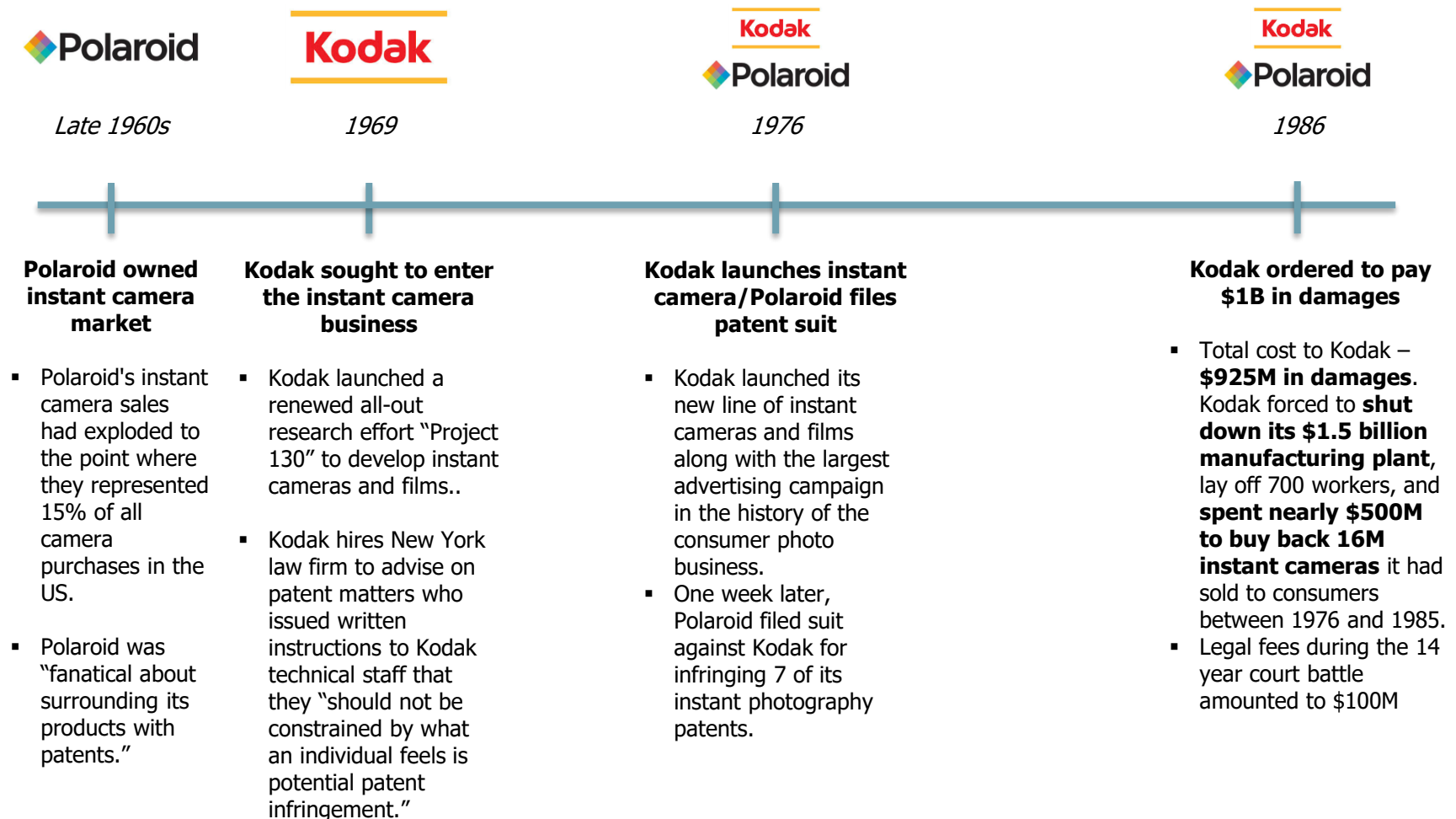
P&G and Kimberly Clark used their patents to force new entrant Paragon out of the diaper market

Paragon Trade Brands P&L Metrics

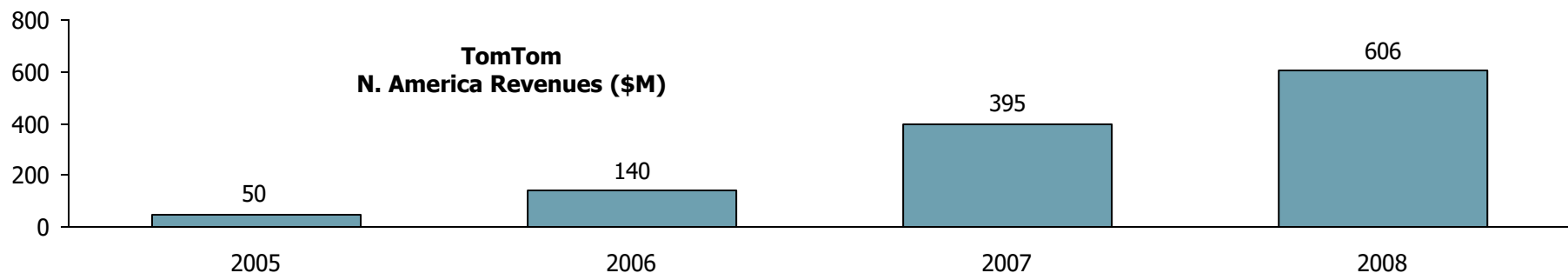
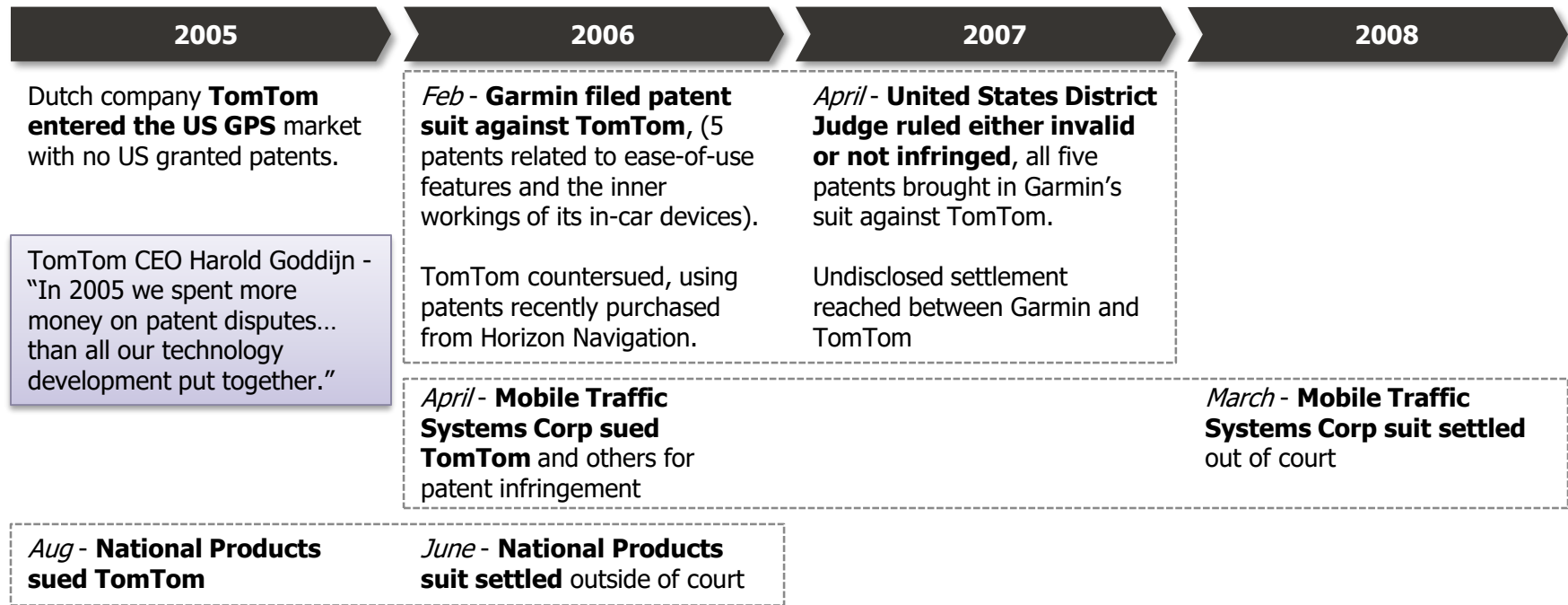
Operating Income (\$M) Net Income (\$M)



Kodak's attempt to enter the instant camera business was thwarted by poor IP strategy

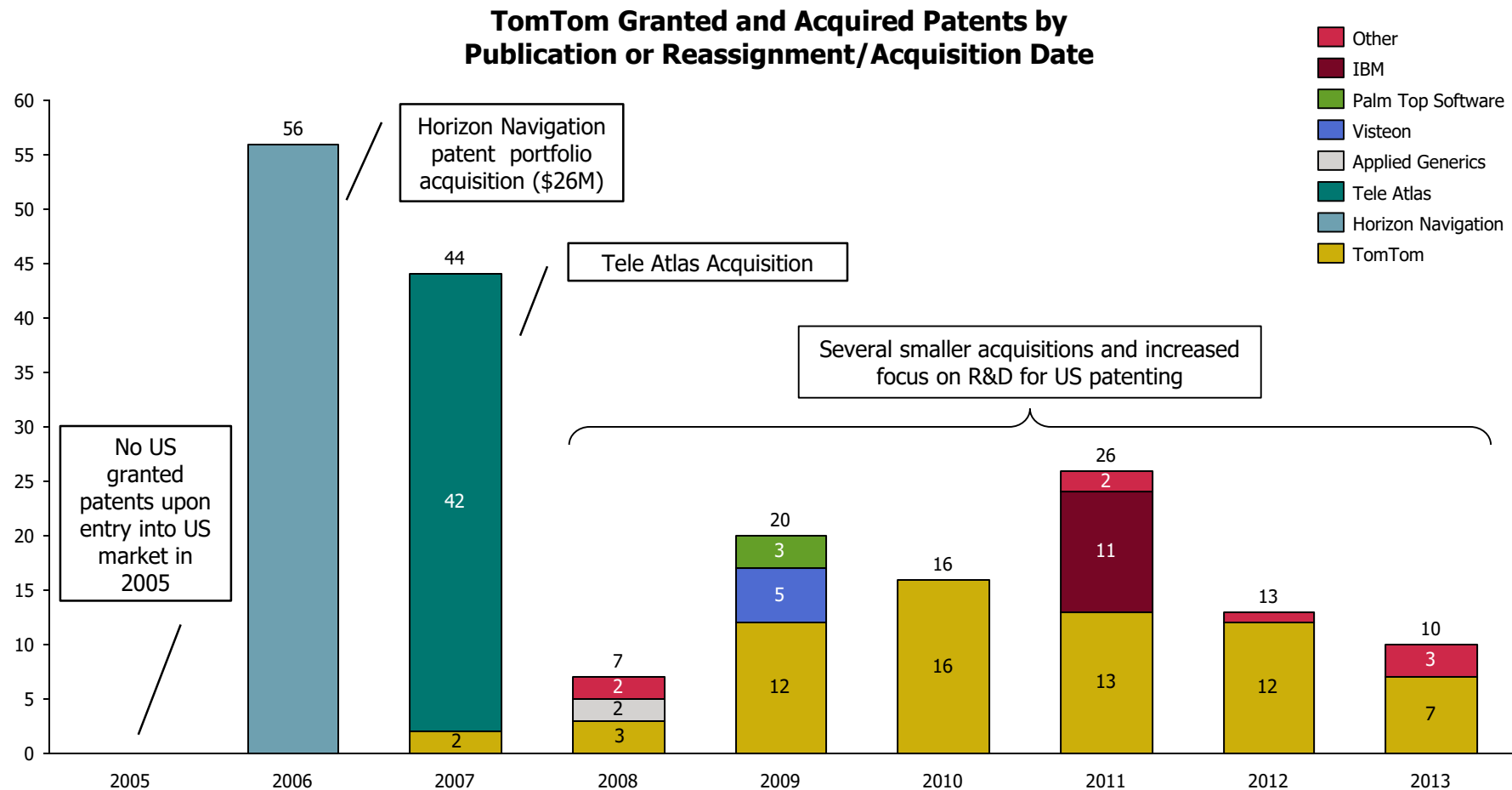


TomTom's US market entry was met with a slew of patent lawsuits, but they successfully fought off the attacks



Source: <http://http://www.prnewswire.com/news-releases/garmin-receives-ruling-in-wisconsin-patent-litigation-58810187.html>, PACER, CapIQ

TomTom's success was built on an aggressive defense and a patent acquisition strategy that enabled them to go on offense



Source: Thomson Innovation, 3LP Analysis

*Notes: Acquisition was announced June 2007, though at least three of the Horizon patents used in a countersuit against Garmin changed ownership to TomTom in mid 2006.

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As an automotive incumbent, what's my next move?

Call to action

- It's nice that you want to avoid patent wars, but they are inevitable – don't bury your head in sand
- Don't assume that new market entrants can't eat away at your market share – just ask Motorola and Nokia
- The time to act is now – before new entrants gain momentum – and you can be like Qualcomm and Microsoft which have generated billions in patent royalties from smartphone manufacturers



Action agenda

- Make sure you have the right patent assets
 - Figure out where you should be filing your patents based on where the industry is heading
 - Identify high-value patent portfolios and acquire the relevant ones
- Leverage your patent position to encourage favorable partnerships and supply chain relationships
 - Induce partnerships by demonstrating the relative strength of your IP
 - Lock in favorable royalty rates now before it's too late, and benefit from the revenue streams
- File patent infringement lawsuits against competitors that are unwilling to negotiate
 - Demonstrate to new entrants' investors that they have serious IP risks and disturb their ability to raise money
 - Limit competitors' ability to fully access their supply chains

As a new automotive entrant, what's my next move?

Call to action

- Apple and Blackberry/RIM have demonstrated that it's possible to take an industry by storm
- But the incumbent auto companies have many more patents than you do
- Don't assume that they won't use their IP to disrupt your business and attempt to keep you out of the market



Action agenda

- Make sure you're aggressively filing patents
 - The technologies that you file on need to be thought through carefully
 - Your filings need to be in the appropriate jurisdictions around the world
- Acquire substantial patent portfolios from others in the industry
 - It's going to be hard to level the playing field just by filing your own patents, so you should be proactively buying assets
- Once your IP position is more equal to that of incumbents, cut balanced and favorable deals with them
 - Form partnerships with better terms
 - Negotiate favorable cross-licensing deals

Rise of non-practicing entity (“NPE”) litigation

Technology ownership battles

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Rise of non-practicing entity (“NPE”) litigation

- 2 Plan on getting sued by NPEs for patent infringement, but in the current environment it isn't quite as scary as you might think

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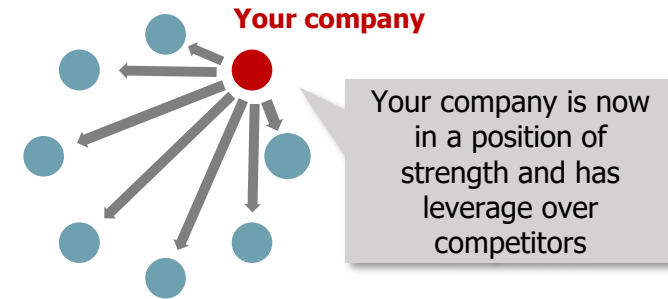
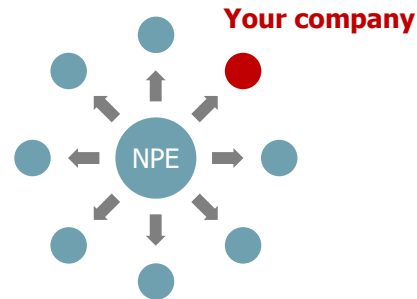
What is a non-practicing entity (“NPE”)?

- **The definition depends on who you ask**
 - Some use “NPE” and “patent troll” interchangeably
 - Others don’t view NPEs as negatively and instead view them as patent value enablers
- **An NPE, broadly defined, is any group that enforces patent rights, but barely, if at all, practices the patented invention. Examples include:**
 - Assertion-focused entities that acquire patents, enforce them on behalf of the original owner, and often share the proceeds with the original owner (i.e., outsourced patent licensing)
 - Universities that have filed patents to protect their inventions
 - Innovative companies that are struggling to break into a product market, but have invested in patent protection and believe their patents are being infringed
 - R&D shops that don’t have the wherewithal or desire to commercialize the technology
 - Large corporations with patented inventions non-core to their primary business, but want to generate revenue from those patent assets
- **NPEs attempt to generate patent licensing revenue from alleged infringers of their patents – often through litigation**
 - Without litigation, licensing discussions can be slow and licensees have little incentive to pay for a license
 - NPEs typically file patent infringement lawsuits in an effort to induce expeditious settlements and royalty payments

Rather than viewing NPEs purely as litigation threats, auto companies should use them to their advantage

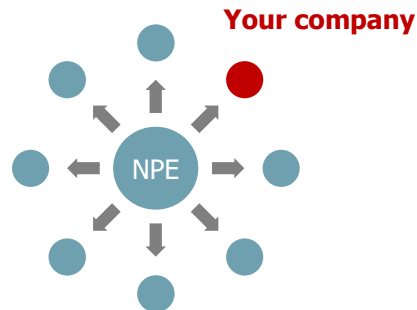
Strategy 1:

Acquire patents at fire-sale prices from NPEs that are desperate to sell patent portfolios in exchange for quick cash



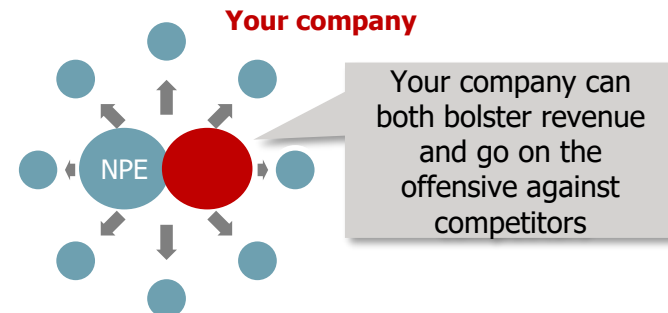
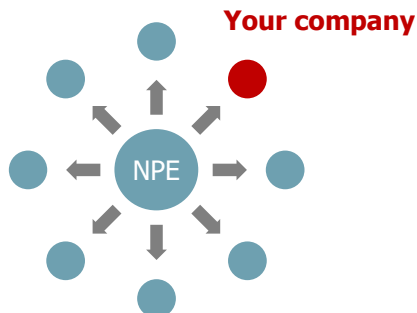
Strategy 2:

Settle with NPEs early and at favorable rates; give yourself a cost advantage relative to competitors who will have to pay more



Strategy 3:

Partner with savvy NPEs to monetize your own patent assets



NPEs have made headlines – high profile cases

<i>NPE</i>	<i>Accused infringer</i>	<i>Size of settlement or jury verdict</i>	<i>Settlement or jury verdict date</i>	<i>Settlement reached?</i>
		\$750M	2/17/16	Settled
		\$533M	2/24/15	Not settled
		\$368M	11/7/12	Not settled
		\$234M	10/19/15	Not settled
		\$173M	10/17/13	Not settled

NPEs are explicitly talking about auto as a growth area...



"We are pleased to have acquired the rights to this portfolio as it demonstrates our growing strength and opportunity in the automotive sector"

- Paul Ryan, former CEO, 5/2/2013 in a press release announcing an auto patent portfolio acquisition



"This is our first acquisition in the automotive market, a market in which we see significant opportunity."

- Jim Skippen, CEO, 4/1/2014 in a press release announcing an auto patent portfolio acquisition

INTELLECTUAL VENTURES®

"It's an important time in the transportation industry as the consumer depends on technology to stay connected with their professional and social networks. This dependency is driving consumer electronics, connectivity, and information technologies rapidly to converge in automotive and other transportation industries. Automotive companies are finding the need to maintain access to a wide array of relevant patents, not traditionally available in the automotive space."

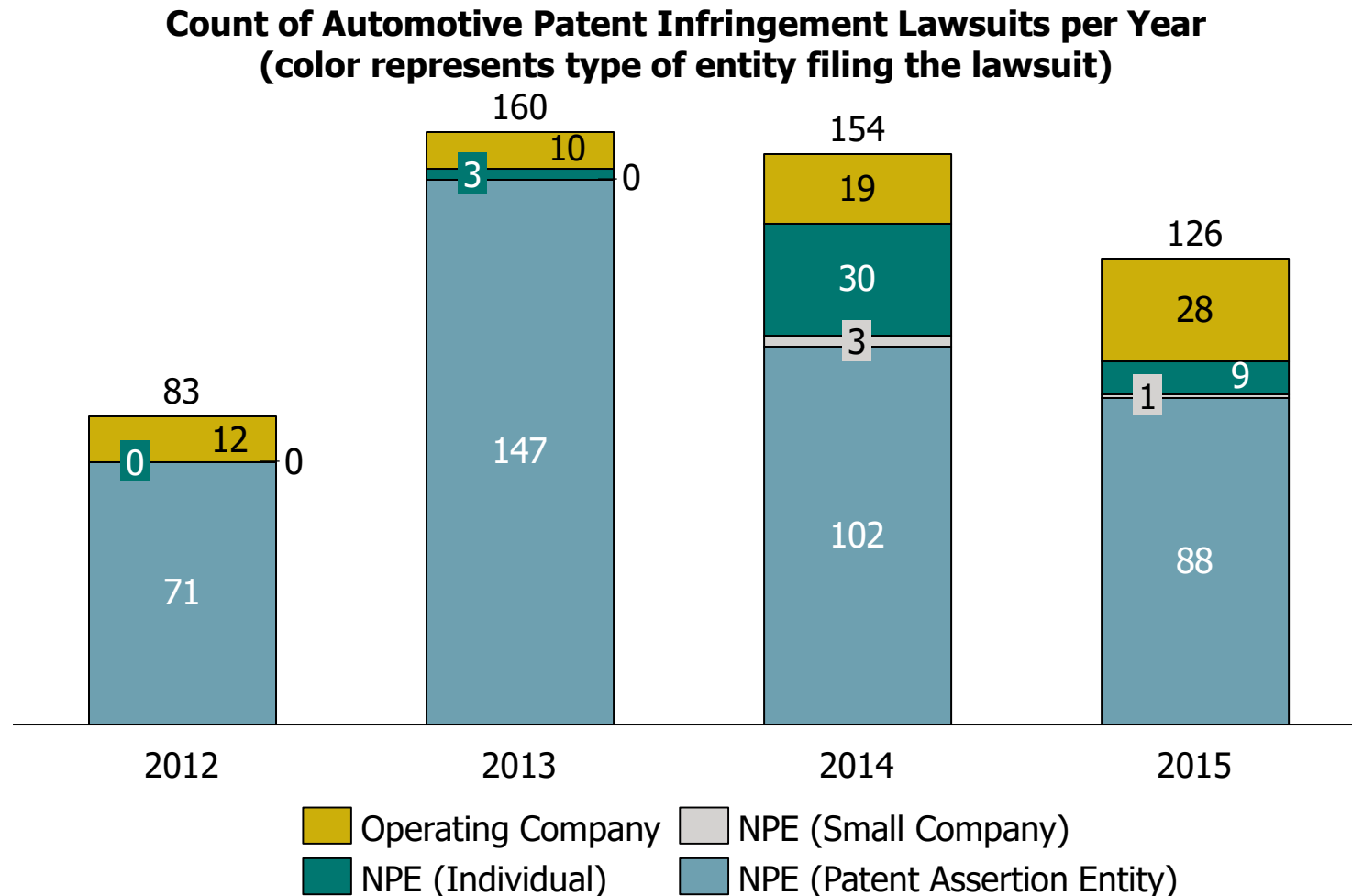
- Adriane Brown, President and COO, 2/27/15 in a press release announcing a licensing deal with Ford

...they're making the patent acquisitions to prove it...

<i>NPE</i>	<i>Date</i>	<i>Automotive Patent Purchases</i>
	Apr. 2014	A Wi-LAN subsidiary acquired an automotive patent portfolio, according to Wi-LAN's CEO: "This is our first acquisition in the automotive market, a market in which we see significant opportunity."
	Dec. 2013	Marathon subsidiary Signal IP acquired car safety patents from Delphi in late 2013 and used them to sue BMW, Fiat, Honda, Jaguar-Land Rover, Kia, Mazda, Mercedes-Benz, Mitsubishi, Nissan, Porsche, Subaru, Volkswagen, Volvo, and Ford in April 2014
	Mar. 2013	Acacia acquired an undisclosed number of display patents from Rambus. Acacia has asserted the portfolio against many automobile manufacturers
	Feb. 2012	Acacia acquired 300+ patents from Automotive Technology Industries in February 2012 and created subsidiary American Vehicular Sciences to assert them

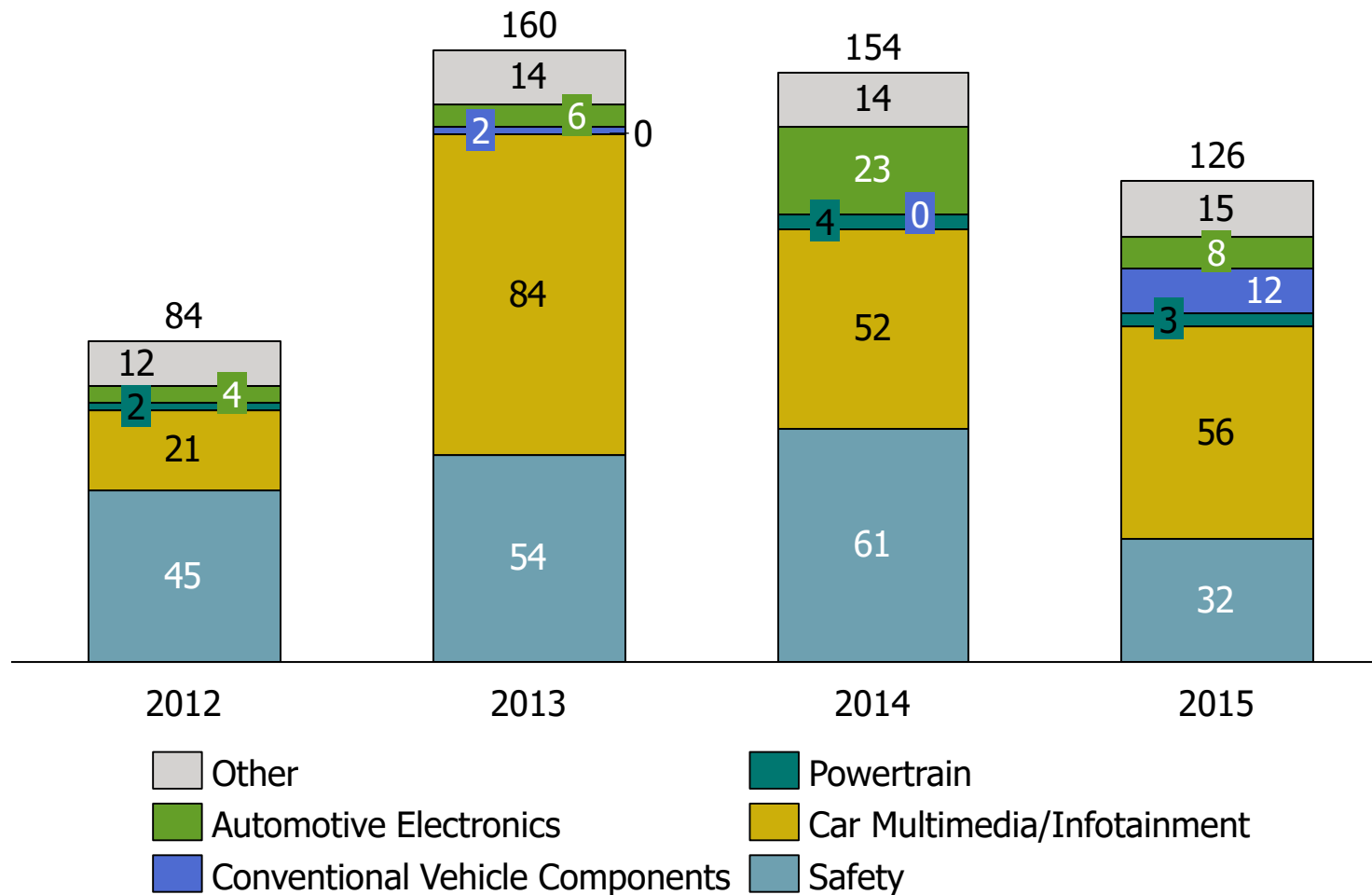
Sources: <http://www.iam-media.com/blog/detail.aspx?g=170d2b6b-c633-47a8-8679-336fb70e678e>
<http://www.reuters.com/article/idUS105628+14-Feb-2012+BW20120214>
<http://www.businesswire.com/news/home/20130307005239/en/Rambus-Transfers-Display-Patents-Acacia-Research-Subsidiary#.U7Bs7pRX-ua>
<http://www.reuters.com/article/idUSnCCN84kYVD+1c7+MKW20140401>

...and they're responsible for the majority of patent infringement lawsuits filed in the automotive space



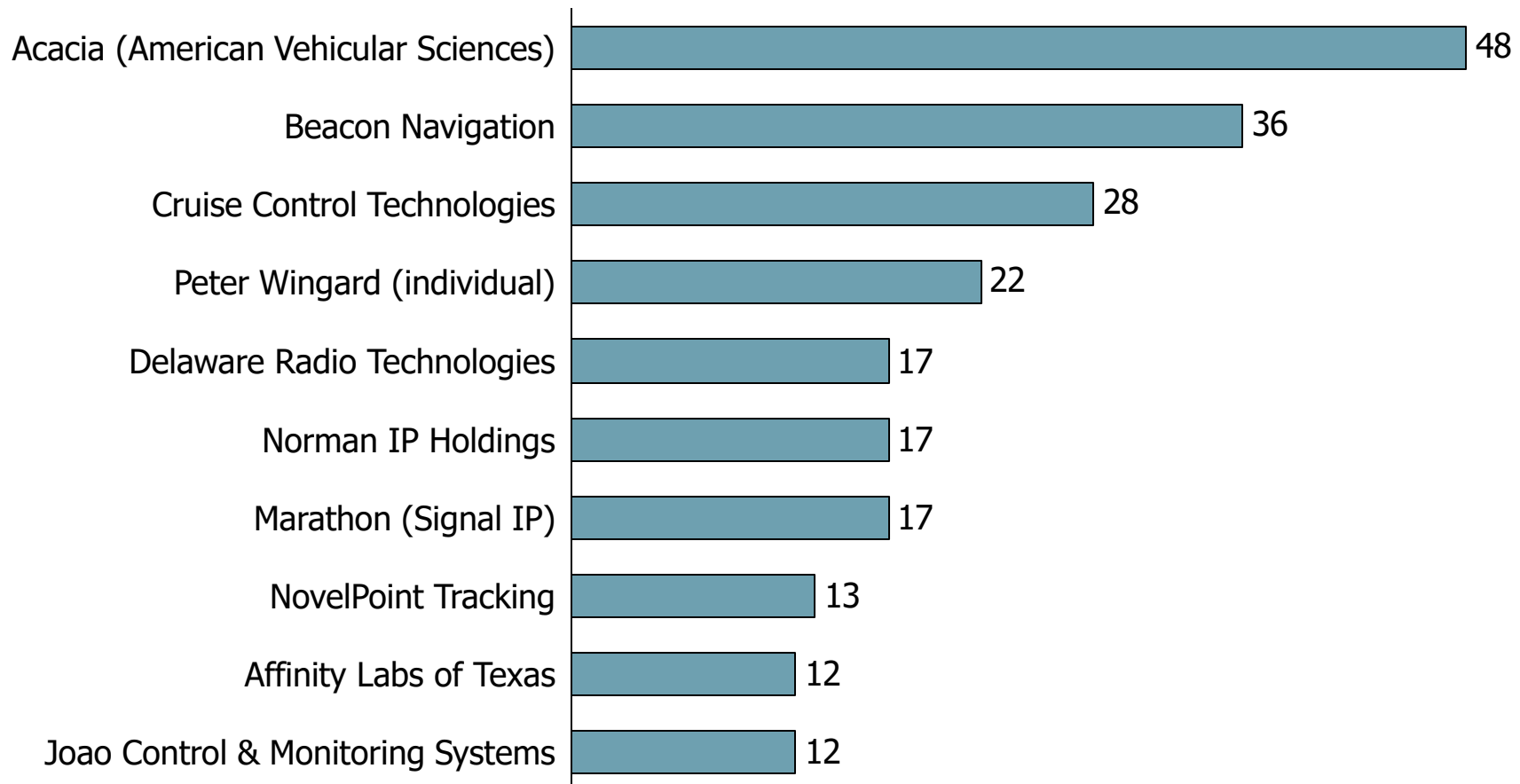
They are suing primarily on safety and car multimedia IP

Automotive NPE Litigation by Technology Area



Which NPEs have been the most litigious in automotive?

Count of Lawsuits Filed by Exemplary NPEs in the Automotive Space, Jan 2012 - Jun 2015



However, NPEs aren't as scary as you think

Third parties can challenge a patent's validity/enforceability

- The America Invents Act (2011) created proceedings such as inter partes reviews ("IPRs"), which allow third parties to challenge a patent's validity
- If the challenger wins, the patents is invalidated (i.e., the ability to enforce the patent is revoked)

Many granted software patents are no longer enforceable

- The US Supreme Court's *Alice v. CLS Bank* (2014) decision allows third parties to challenge the enforceability of existing, granted software patents
- Post-*Alice*, third parties are often successful in killing software patents that the Patent Office previously allowed under different rules

It's difficult to block an infringer's product

- A four-factor test must be met to block an infringer's product (district court)
- At the International Trade Commission, a "domestic industry" requirement must be met in order to block an infringer's product

Jury verdicts can be overturned

- Even if a federal jury finds infringement/damages, the ruling doesn't necessarily stick
- District court judges, appellate court judges, and Supreme Court judges can overrule the decision – and it's happened a number of times recently

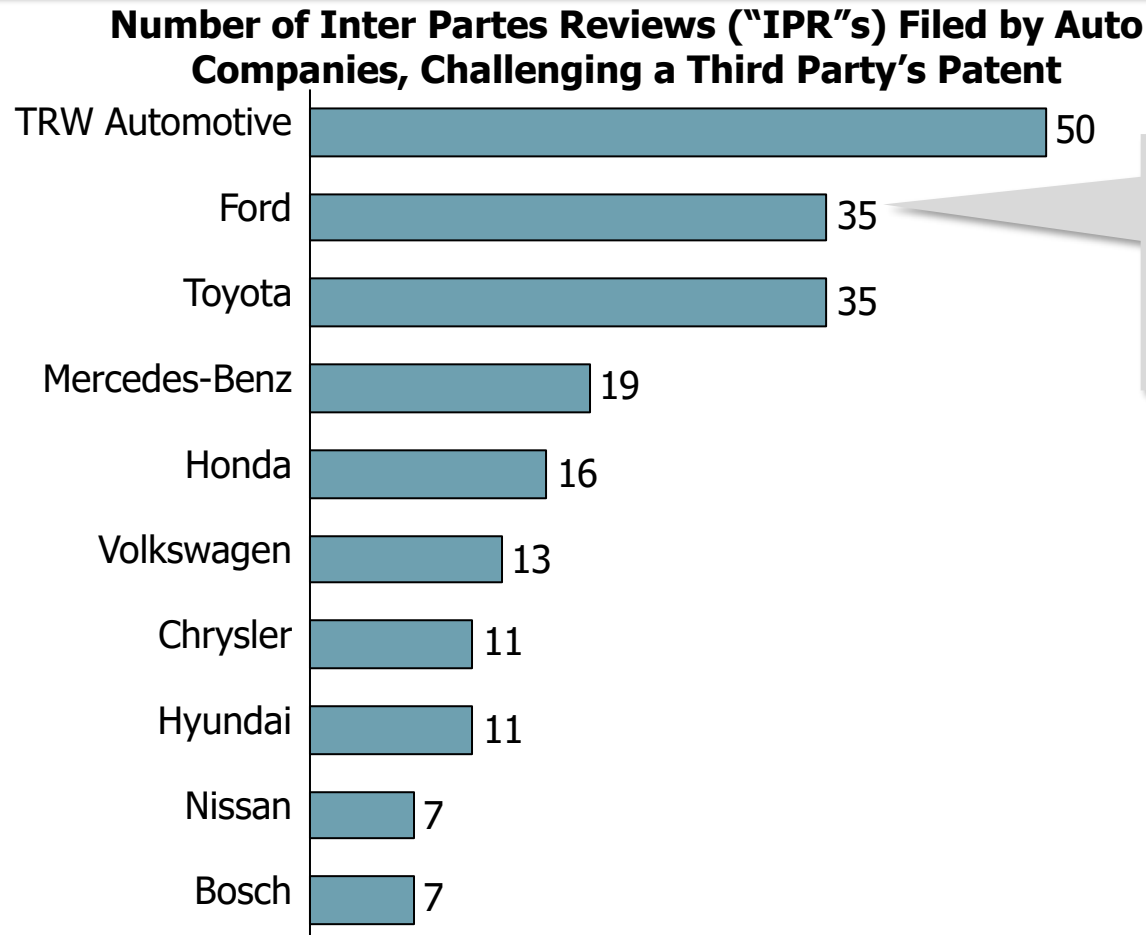
Judges have overturned some of the headline NPE jury verdicts

X = Jury verdict overturned by judge

<i>NPE</i>	<i>Accused infringer</i>	<i>Size of settlement or jury verdict</i>	<i>Settlement or jury verdict date</i>	<i>Settlement reached?</i>
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		\$234M	10/19/15	Not settled
		\$173M	10/17/13	Not settled

Note: VirnetX's jury verdict was wiped out, but a new trial was ordered in which it won a new, \$625M jury verdict. That verdict is now being appealed
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Auto companies are taking advantage of the new rules



For example, Ford has filed IPRs against Paice LLC, an automotive NPE inventor of hybrid vehicle technology which experienced success before IPRs existed

IPRs are an effective tool to nullify NPEs' patents, and at the very least can be used to delay patent infringement lawsuits and drive up NPEs' costs

Auto companies are also taking defensive measures



- RPX is a defensive patent aggregator that protects members against NPEs
- In February 2015, Ford became first automotive company to sign up with RPX
- RPX announced a contract with an unnamed second automotive member in Q4 2015



- Ford signed a license with IV in February 2016
- Deal provides Ford a license to IV's 40,000 IP assets as well as future assets acquired during the license term



- Google's License-on-Transfer network formed as a defensive coalition to counter unreasonable patent litigation
- Ford, Mazda, Hyundai, and Kia are automotive members



- Patent holding company that defends members against NPE litigation
- AST's 29 members include Ford and Honda as well as tech companies such as Sony, Intel, IBM, and Microsoft



- Google-backed defensive patent service that monitors and defends against NPE litigation
- Established a special "automotive zone" in June 2015, which currently has 20+ members

Some NPEs are moving out of the business

<i>NPE</i>	<i>Announcement date</i>	<i>Business shift away from IP licensing</i>
 Unwired Planet™	April 2016	Unwired planet is selling its IP licensing business to Optis UP Holdings for \$40M in cash
 MARATHON	March 2016	Marathon Patent Group is launching an IP commercialization platform, intending to create product company spin-offs rather than relying solely on IP licensing; its first platform is with 3D Nanocolor Corp.
 PENDRELL	March 2016	Pendrell's CEO Lee Mikles stated that the company is "shifting its primary focus to business opportunities that provide more reliable cash flow" than IP licensing
 DSS	February 2016	DSS is reorganizing to provide more support to its Packaging and Printed Products, Digital Solutions, and Plastics divisions in order to grow its non-IP licensing business areas
VRINGO	October 2015	Once an exclusively IP licensing business, Vringo acquired two product companies: fliCharge, a wire-free charging technology company, and Group Mobile, a supplier of rugged computers, mobile devices and accessories
 ITUS CORPORATION	June 2015	Patent licensing company ITUS (formerly Copytele) formed a new subsidiary, Anixa, for the purpose of developing and marketing non-invasive, early cancer screening tests

However, beware of NPE enforcement in Europe because of its patent-friendly court system (Germany in particular)

<i>NPE</i>	<i>Defendant(s)</i>	<i>Outcome in German Court</i>
	Deutsche Telekom/HTC	Acacia granted injunction by German court on 11/27/15, banning HTC smartphones from being sold in the country
	ZTE	Vringo won an injunction in Germany (and in other jurisdictions around the world), but ultimately agreed to a global settlement with ZTE for \$21.5M on 12/5/15
	Stryker	Stryker found to infringe and injunction against infringing medical devices enforced in December 2014
	Facebook, Yahoo, Tumblr, Instagram, Pinterest, Twitter	Yahoo and Pinterest found to infringe in 2016; injunction issued

Furthermore, The Unified Patent Court (potentially up and running in 2017) would allow NPEs to win injunctions against infringing products across all of Europe in one fell swoop

**Attention:
Senior Executives**

As an automotive player, what's my next move?

Call to action

- The NPEs are here and they have a target on the back of the automotive industry
- Legal and regulatory changes are making life more difficult for NPEs
- NPEs are looking for any way they can to monetize their assets

- 
-
- Defend yourselves by taking advantage of legal and regulatory changes
 - File inter partes review petitions against NPEs' patents, force them to spend money defending them, and delay lawsuits for as long as possible
 - Introduce *Alice* challenges against patents that are related to software and attempt to invalidate them
 - Coopt NPEs
 - Acquire strong patents from NPEs that are looking to unload assets and quickly raise some cash, and negotiate to buy at distressed prices
 - Settle early at favorable rates (most favored nation or better) and raise the relative costs for competitors
 - Partner with NPEs to monetize your own patent assets

Action agenda

Development of new technology standards

Technology ownership battles

- 1 Whether incumbent auto companies want it or not, auto patent conflict is almost certainly ahead – impacting product launches and profit pools

Rise of non-practicing entity (“NPE”) litigation

- 2 Plan on getting sued by NPEs for patent infringement, but in the current environment it isn't quite as scary as you might think

Development of new technology standards

- 3 Standards and the associated patent pools will become even more critical, and if you don't handle them properly you may lose your competitive advantage

Emergence of China

- 4 Chinese companies are emerging in automotive, but they will struggle to enter Western markets if they don't acquire IP rights in the necessary geographies

What is a standards body? What is a patent pool?

Standards body

- A body responsible for setting an industry-wide standard for practicing a technology
- Some standards are government mandated and others are set by industry players
- Examples include: IEEE standards for wireless communication, ATSC for broadcasting, and HEVC for video compression

Patent pool

- Patents that cover inventions used by the standard are necessarily used (infringed) by any party that uses the standard
- Patents declared “essential” to the standard must be licensed to infringers on fair, reasonable, and non-discriminatory terms (“FRAND”)
- Standard essential patent owners sometimes hand these patents to a “pool”, which acts as an outsourced patent licensing arm

Emerging automotive standards require multi-layered strategy

Key question: what should remain proprietary?

	Description	Possible automotive examples
 Standards necessary	Standardization of certain features essential to development of a product category	Physical connections (e.g., battery charging infrastructure), virtual connections (e.g., autonomous vehicle communication protocols), OBD/OBD-II
Strategic use of standards	Selectively seek standardization – and thereby commoditization – of portions of the technology stack or product architecture, e.g., • Drive down cost of specific BOM items • Level playing field in areas not expected to be an advantage	Going forward, priorities depend on strategy and position in the value chain. For some auto OEMs, standardization of battery systems or entertainment systems would be advantageous, while others should seek to keep these proprietary Historically, less tech standardization in auto, but some, e.g., tire pressure monitoring systems (TPMS) and consumables
 Avoid standardization – protect advantage	Core differentiating technologies need to be proprietary and protected	User interface (“look and feel”) Advanced drivetrains

There are already a number of auto-focused standards groups



- Founded in 1905, the Society of Automotive Engineers is now working to develop connected car standards
- Published more than 1,600 standards recommendations for nearly every system in roadgoing vehicles
- Beginning to develop standards for connected cars on vehicle to infrastructure (V2I) and vehicle to vehicle (V2V) communication



- Nonprofit industry alliance founded in 2009
- Aims to drive adoption of open-source In-Vehicle Infotainment (IVI) software
- Cars with GENIVI solutions are currently on the road in North America, South America, Europe, and Asia

Open Automotive Alliance

- Founded by Audi, GM, Google, Honda, Hyundai, and NVIDIA in January 2014
- Goal is to bring the Android platform to cars
- Android Auto has already been developed and is present in cars on the road

SAE, for example, has many categories of tech standards



- Automotive standards have been around essentially as long as automobiles themselves; SAE founded in 1905
- SAE has over 10,000 standards in its database
- Its standards help ensure safety, quality, and interoperability

A small sample of SAE automotive standard categories

- | | | |
|--------------------------------|--------------------------|----------------------------|
| ▪ Environment | ▪ Power and Propulsion | ▪ On-board Energy Sources |
| ▪ Human Factors and Ergonomics | ▪ Safety | ▪ Engine Cooling Systems |
| ▪ Maintenance and Aftermarket | ▪ Transportation Systems | ▪ Lubricants |
| ▪ Manufacturing | ▪ Chassis | ▪ Fuel Systems |
| ▪ Engines | ▪ Performance Tests | ▪ Connecters and Terminals |

Some automotive players are getting involved in "connected car" standards bodies



Open Automotive Alliance

CARCONNECTIVITY
consortium

Manufacturers

BMW, Nissan, Daimler, Renault, Volvo, Honda, Hyundai, Jaguar, John Deere

Audi, Chrysler, Ford, GM, Honda, Hyundai, Kia, Mazda, VW, Volvo, Mitsubishi

GM, Honda, Hyundai, Mazda, Mercedes-Benz, Toyota, VW

Suppliers

Bosch, Continental, Delphi, Denso, Ericsson

Denso, Continental, Delphi

Bosch, Continental, Delphi, Denso,

Semiconductor/tech

Intel, Qualcomm, Micron, NVIDIA, ARM, Texas Instruments

Google, LG, NVIDIA, Panasonic

Blackberry, HTC, Huawei, LG, Microsoft, Samsung, Sony

Connected car specialists

Mentor Automotive, Harman, Visteon, Desay SV

Parrot Automotive, CloudCar, Harman, Visteon

Harman, Visteon

What might be the critical technology standards in auto?

Automotive technology trend

The Connected Car:

The car as a wireless device, computer, and entertainment system



Potentially important technologies

- Car/mobile phone interfaces
- In-car wifi and internet standards
- Smart home integration (i.e. Ford and Amazon's Alexa)
- V2X and 5G communication

The Electric car

The car that is powered electrically



- Universal charging stations
- Battery/charger interfaces, communicating with charging station
- Battery communication with connected car

The Self-Driving Car

The car that drives autonomously



- Autonomous vehicles communicating with each other (V2V)
- Communicating with outside entities and infrastructure (V2I)
- LiDAR

The Shared Car

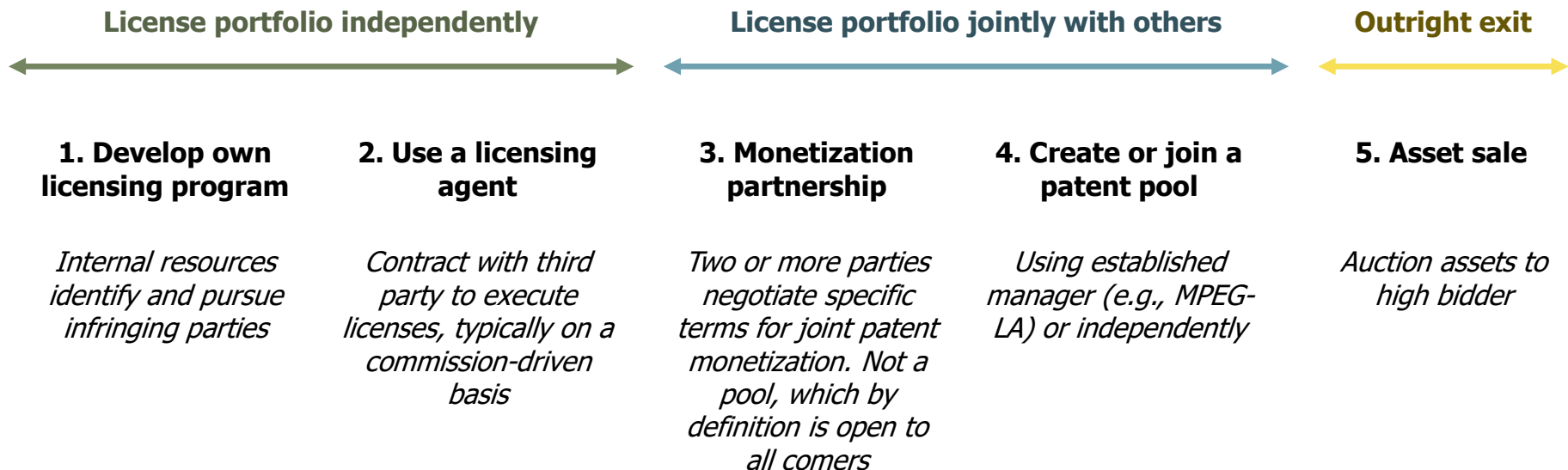
The car as a service



- Car-as-service universal interface with mobile phone/smart home
- Map and navigational standards across cars used for ride-sharing
- Combination with autonomous vehicles

There are a number of options to monetize standard essential patents (“SEPs”)

Example options – not comprehensive



No single “right answer” to cover all circumstances – situation-dependent

Patent pools have generated significant returns for investors

Pool	Years	Technology	Model description	Patent pool revenue	
				Cumulative	Annual*
MPEG-2 (MPEG LA)	1997-2019	Video compression	Used proprietary revenue data; estimates available from public sources	\$18.1B	\$1,100M
AAC (Via)	2000-?	Audio compression	- Financial analysis of Via Licensing - Device modeling	\$13.5B	\$880M
HEVC (MPEG LA)	2015-2030	Video compression	Used proprietary internal model of HEVC-addressable devices	\$6.7B (projection only)	\$550M (projection only)
MPEG-4 (MPEG LA)	2001-2017	A/V compression	Applied rate card to historic and forecast sales of relevant CE devices	\$4.5B	\$510M
ATSC	2004-2021	OTA broadcast standard	Modeled ATSC device sales across TVs, STBs, and other applications	\$3.1B	\$220M

Warning: watch out for standards body commitments



- Nokia, previously a mobile phone leader, committed some of its early and fundamental wireless communication patents to the European Telecommunications Standards Institute (ETSI)
- Nokia then advocated an industry-wide commitment that royalty rates for 3G technology should not exceed 5% cumulatively
- Their hope was that these rates would allow for technology proliferation, and that they could win by having the best supply chain
- What they didn't anticipate was that mobile device companies would figure out better supply chains
- And making matters worse, they were then unable to fully leverage their patents to thwart competitors' growth because of the 5% royalty cap they endorsed

Committing patents to a standards body can generate royalties, but it can also limit your ability to enforce your patents and keep competitors out

**Attention:
Senior Executives**

As an automotive player, what's my next move?

Call to action

- Technologies that were historically central to the computer and consumer electronics industries are now being integrated into cars
- There will be a need for many new types of technology standards for the automotive industry as it evolves technologically
- With the emergence of new standards will be the need for patent pools (as we've seen in the electronics industry)



Action agenda

- Get involved with standards bodies early on
 - Influence the direction of the technology to benefit your business
 - Shape the adoption of new technology
- Build an IP portfolio that allows you to benefit from standards
 - Carefully file patents around the anticipated direction of the technology standards
 - Acquire patents from other companies that relate to key technology areas
- Monetize your standard essential patents – either through patent pools or other methods
 - Form/join a patent pool and negotiate favorable economics based on the strength of your IP
 - License bilaterally (alone or through an agent) or even consider a sale of non-core IP

Emergence of China

Technology ownership battles

- 1 Whether incumbent auto companies want it or not, auto patent conflict is almost certainly ahead – impacting product launches and profit pools

Rise of non-practicing entity (“NPE”) litigation

- 2 Plan on getting sued by NPEs for patent infringement, but in the current environment it isn't quite as scary as you might think

Development of new technology standards

- 3 Standards and the associated patent pools will become even more critical, and if you don't handle them properly you may lose your competitive advantage

Emergence of China

- 4 Chinese companies are emerging in automotive, but they will struggle to enter Western markets if they don't acquire IP rights in the necessary geographies

Pollution is a serious problem in China, so the nation is focused on reducing CO2 emissions via electric vehicles

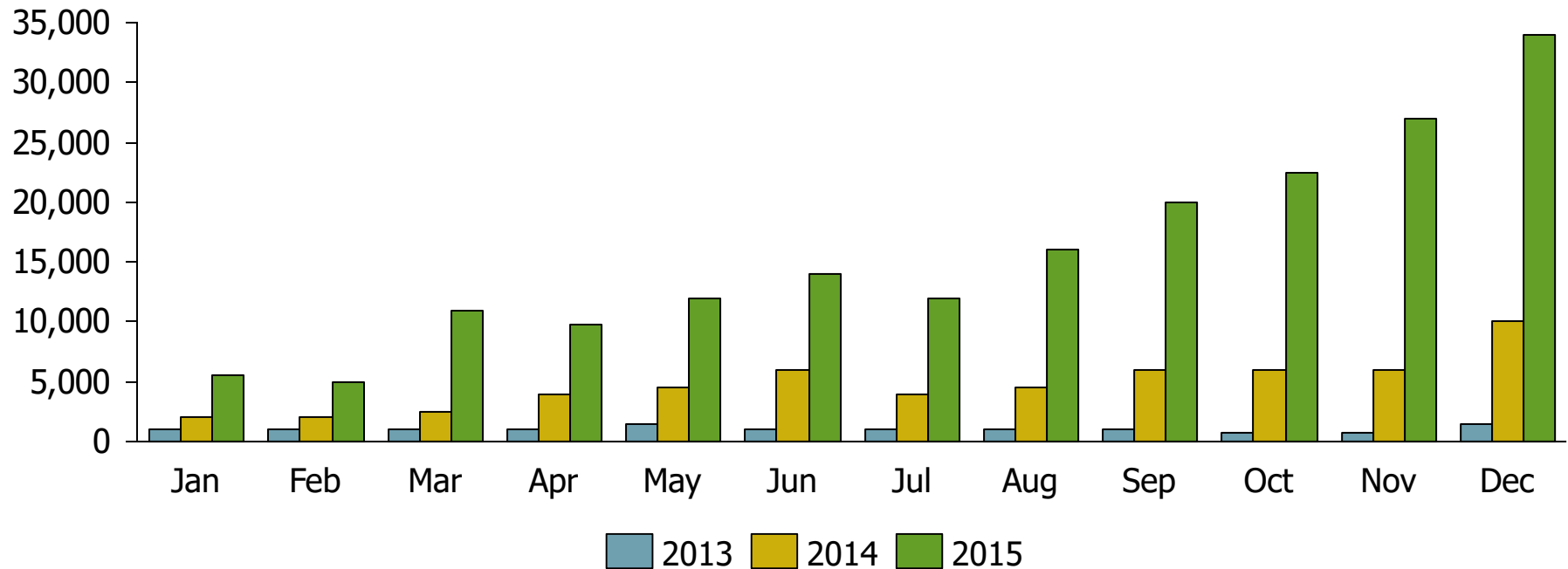
- The Chinese government has allocated nearly \$16B for charging facilities and other electric vehicle infrastructure
- China cut taxes on domestic purchases of “NEVs” by 50% in 2015 (“NEV” stands for New Energy Vehicles – both battery electric and plug-in hybrid vehicles)
- Any NEV purchased for commercial use is completely exempt from normal vehicle and vessel taxes
- Manufacturers of NEVs also receive generous subsidies



Beijing, China engulfed in smog

As a result of the measures to control emissions, EV sales are dramatically increasing in China

Chinese Plug-in Vehicle Sales by Month, 2012-2015



2015 saw ~188,700 NEVs sold in China, a roughly 223% year-on-year increase over sales in 2014

Many electric vehicle companies are coming from China

CH-Auto



- Electric car design firm aiming to put its first cars into production in late 2016
- Founded by former Beijing Jeep executive Lu Qun

NextEV



- Headquartered in China and backed by many prominent Chinese entrepreneurs
- Led by CEO Padmasree Warrior, former CTO of Cisco

Atieva



- Founded in 2007 by former Tesla VP
- Taken over by Chinese state-owned carmaker BAIC in December 2015

Future Mobility



- Started in 2016 with heavy backing from Tencent and Foxconn
- Hired away several of BMW's electric vehicle executives to join the team

Faraday Future and LeEco



- Founded by Chinese internet billionaire Jia Yueting in 2014
- Main bankroller LeEco, also owned by Jia Yueting, recently unveiled a separate electric car initiative

Karma Automotive



- Formerly Fisker Automotive, relaunching as Karma in 2016 after going into bankruptcy in 2013, originally founded in 2008
- Manufactures luxury hybrid and full-electric sedans

Tesla



- Founded in 2003, IPO in 2010
- Production is currently in the US, but company may build a factory in China if demand is high enough

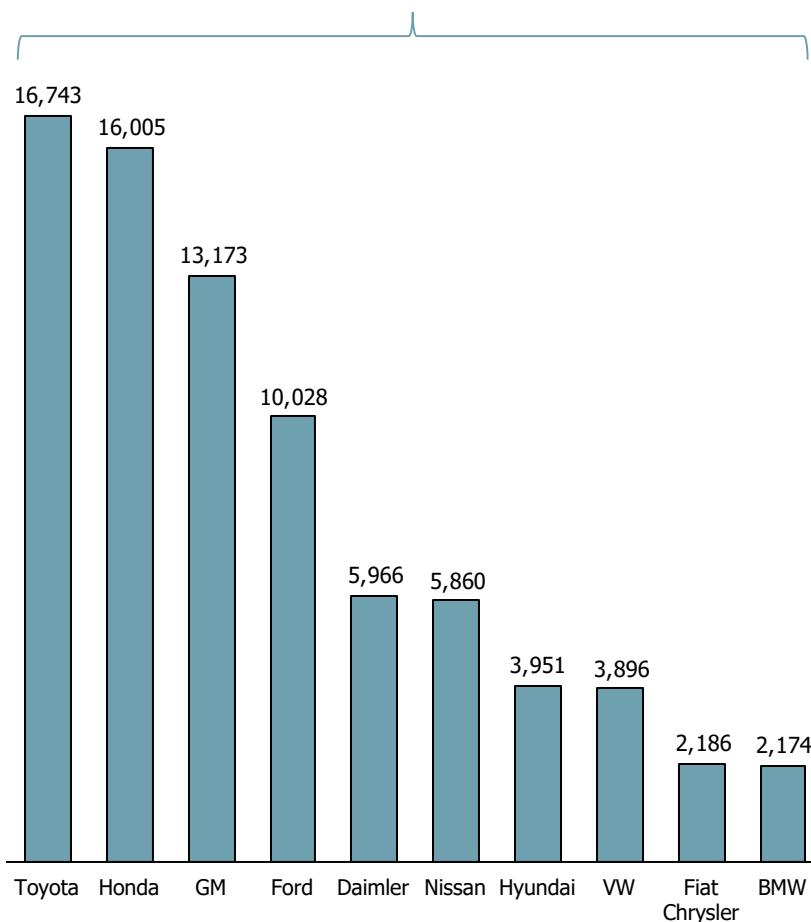
Via Motors



- Spun off from engineering firm Raser Technologies in 2010
- Manufactures electrified trucks, vans, and other work vehicles
- Up-fits other OEM's factory-new vehicles, currently just GM

Chinese EV companies need to augment their patent estates – particularly if they want to enter the US market

Automotive incumbents have substantial US patent portfolios



Emerging electric vehicle players need to beef up the size of their portfolios to have a chance

These companies need to aggressively file and acquire patents

244	50	23	1	0	0	0	0	0
Tesla	Atieva	Fisker (Karma)	Faraday Future	NextEV	LeEco	Via Motors	Future Mobility (Tencent/Foxconn)	CH-Auto

Note: Patent counts estimated using Thomson Innovation. Includes granted US patents only and does not include pending applications or non-US equivalents

Why should Chinese companies buy patents? A recent, cautionary tale from Ninebot



- Ninebot's hoverboard products faced an ITC patent infringement complaint filed by Segway
- In order to avoid an exclusion order, Ninebot acquired Segway
- On March 16, 2016, the ITC issued a general exclusion order prohibiting the import of products infringing Segway/Ninebot's hoverboard patent

Ninebot went from prey to predator by strategically acquiring Segway (and its IP), and in the process it gained a strategic edge over competitors

International expansion requires the right patent protection; just ask Xiaomi, an emerging Chinese smartphone maker



2014

Blocked in India



- After expanding into India, Xiaomi was accused by Ericsson of infringing its patented technologies
- In December 2014, the Delhi High Court **blocked all sales** of Xiaomi devices

2015

Sued in the U.S.

BLUE SPIKE



- Xiaomi was sued on December 9, 2015 by Blue Spike over upcoming smartphones
- The lawsuit adversely impacted Xiaomi's expansion plans into the United States

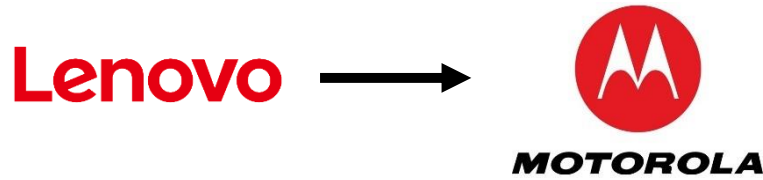
2016

Purchased patents



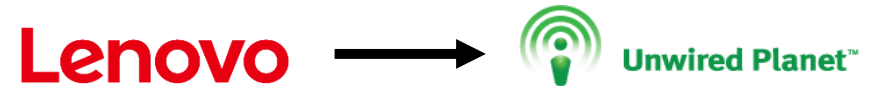
- Xiaomi **purchased 332 patents** from Intel on February 4, 2016
- The acquisition demonstrates Xiaomi's focus on expanding its worldwide patent portfolio in response to being sued for patent infringement

Chinese-based Lenovo understood the need for IP when it entered the smartphone market



Motorola Mobility Acquisition

- On January 29, 2014, Lenovo acquired Motorola Mobility from Google
- \$2.91B deal
- Google maintains ownership of majority of the Motorola Mobility patent portfolio, but Lenovo receives a license to all IP
- Lenovo also receives over 2,000 patents from the deal



Unwired Planet Patent Acquisition

- On March 21, 2014, Lenovo acquired a wireless patent portfolio from Unwired Planet
- \$100M deal
- Deal consists of 21 patent families related to 3G and LTE
- Lenovo also gets license to Unwired Planet's full portfolio of 2,500 issued and pending patents

But it's not just about acquiring patent assets, it's also about the associated cross-licenses – Lenovo gets it

The Lenovo logo is displayed in a bold, red, sans-serif font.The IBM logo is displayed in its characteristic blue eight-stripe horizontal bar pattern.

- In 2004, Lenovo purchased IBM's PC group for \$1.75B
- In order to effectively expand out of China, Lenovo needed IP protection in the geographies it was expanding into
- IBM had already established cross-licenses with the major PC competitors, enabling Lenovo to operate freely in the space after the acquisition

By acquiring the cross-licenses that IBM had already established with PC competitors, Lenovo was able to enter the PC market with less concern about being sued

Everyone should be stocking up on Chinese patents

Specialized, low-cost, and fast courts

- Cost <1/10 the cost of US litigation
- Specialized IP courts
- Judges use technical advisors
- Short time from filing to trial (<1 year)

Increasingly advantageous for patentees

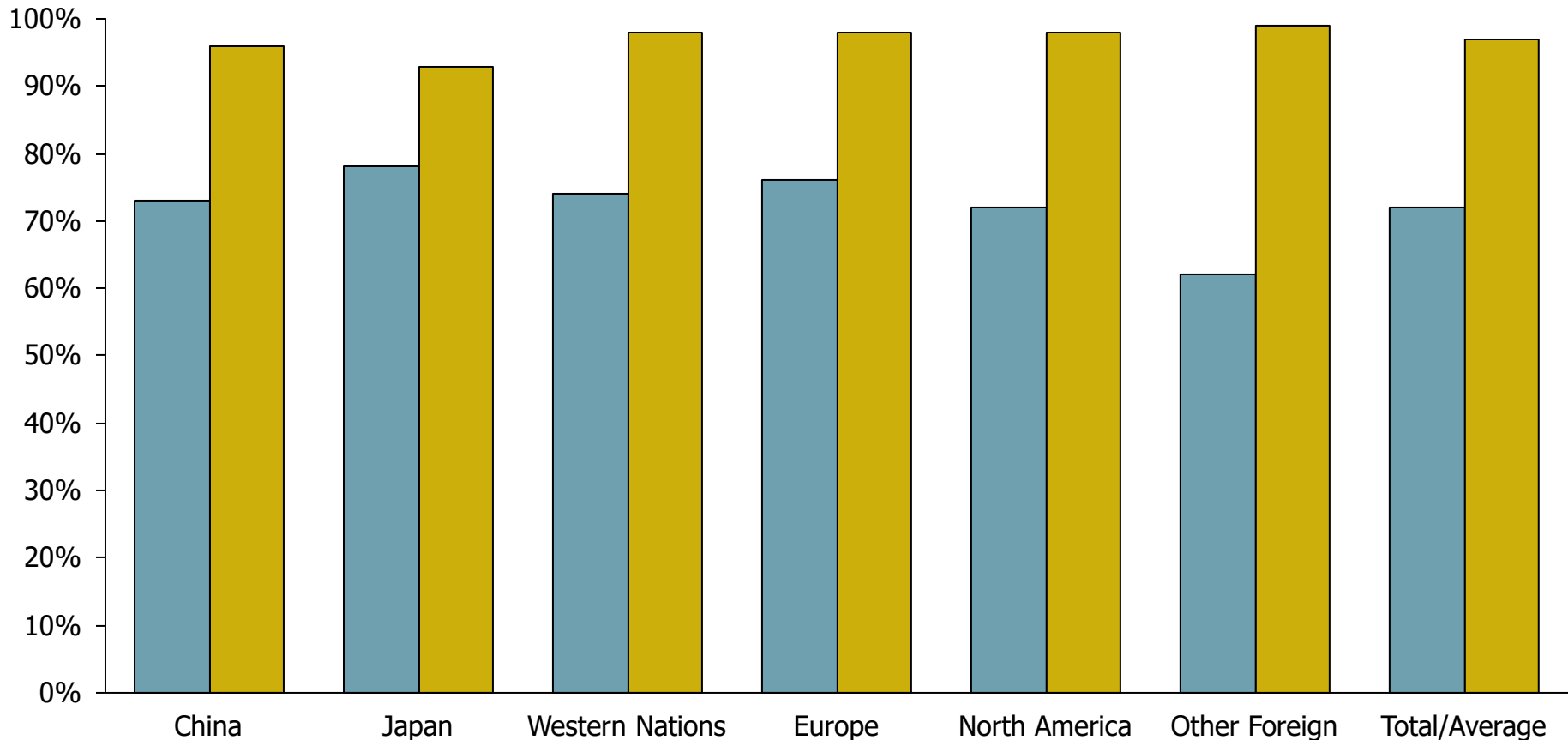
- High win rate (up to 75%)
- Foreign patentees win more than domestic patentees
- Validity challenges rarer than in the US and often not completed until after judgement and injunction are issued

Injunctions are awarded

- Injunctions are virtually guaranteed (95%)
- A litigation win can effectively hamper an infringer's sales around the world because what is not sold in China is often made there

Patent holders are winning and getting injunctions in China – and it's not just China-based companies

Patent holder success/injunction rates in Chinese courts*



*when defendant is a Chinese company

Source: Erick Robinson Law360 article "China Increasing Patent Rights As US Goes The Other Way", October 22, 2015
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■ Win Rate for Patent Holders as Plaintiffs
■ Injunction Rate for Winning Patent Holders

Will other Asian nations become new important IP battlegrounds as labor moves there?

Vietnam



- Vietnam is increasingly becoming a top outsourcing location as Chinese labor costs rise
- The Vietnamese government has been heavily involved in encouraging Vietnam's growth as an outsourcing destination

Indonesia



- Indonesia is a strong candidate to take up Asian manufacturing with Chinese labor costs rising
- Large population (250 million)
- Less political strife and uncertainty than Vietnam and Thailand

Thailand



- The Thai government is making strides to go after more "high value" manufacturing
- Foreign direct investment in Thailand is growing both amongst western nations and fellow ASEAN nations

**Attention:
Senior Executives**

As an emerging Chinese EV company, what's my next move?

Call to action

- Pollution is causing China to emphasizing electric vehicles, and new automotive companies are emerging
- Relative to incumbent automotive players, these new companies lack IP
- China's patent system is getting stronger



Action agenda

- Beef up your IP portfolios ASAP
 - You're trying to go to market quickly, so buy patents in bulk from others in the industry
 - Simultaneously, strategically file patents
- Think globally
 - Ensure that you have IP protection in China, where patent enforcement is becoming stronger
 - Additionally, secure protection in the US, Europe, and emerging Asian countries that are increasing manufacturing prowess (e.g., Vietnam, Indonesia, and Thailand)

**Attention:
Senior Executives**

As an automotive incumbent, what's my next move?

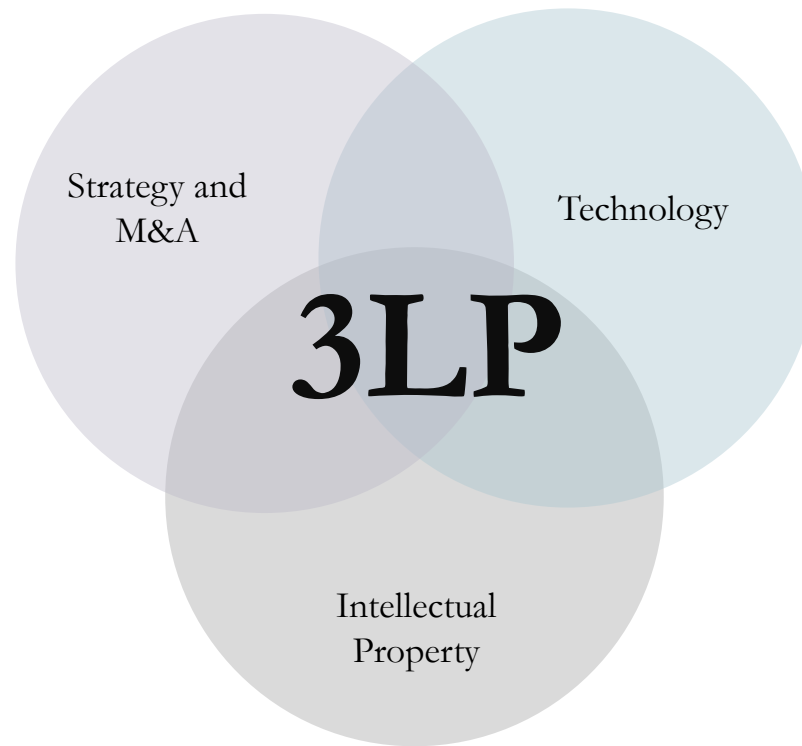
Call to action

- Chinese EV companies are picking up steam
- They could develop strong positions in China and even outside of China
- But they don't have much IP



Action agenda

- Leverage your existing IP position
 - Strike licensing deals with the emerging Chinese EV companies so you can profit as they grow
 - File patent infringement lawsuits against emerging Chinese EV companies to keep them out of markets
 - Induce technology partnerships with emerging Chinese EV companies as appropriate
 - Considering selling non-core IP assets to emerging players that might be allies
- Buy patents before your Chinese EV competitors do – don't allow them to level the playing field
 - Proactively seek out assets and maintain your IP edge over the new entrants



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Introduction to 3LP: Leadership Team

Kevin Rivette, JD

Founding Partner
Founded 3LP in 2008

- Former Vice President (IP Strategy) at IBM and former Chairman of the USPTO oversight committee
- Former board member at Tessera (Nasdaq: TSRA) and SRC Computers; current board member of MiMedia
- Former senior advisor to BCG on IP matters; founder/CEO of Aurigin Systems, an IP analytics software firm
- Media expert in IP for Bloomberg TV, The New York Times, Businessweek, and others
- Named to the National Law Journal's inaugural list of IP "Trailblazers and Pioneers" in 2014
- Named to IP Hall of Fame in 2007; author: Rembrandts in the Attic; registered patent attorney

Ralph Eckardt, MBA

Founding Partner
Founded 3LP in 2008

- Launched and led BCG's IP Strategy practice
- Included on IAM's list of World's Leading IP Strategists since its inception
- Extensive experience in technology and IP strategy projects across a wide variety of technologies and markets
- Author of *The Invisible Edge* – Awarded Best Strategy Book of 2009
- Principal inventor, N-Compass IP analysis tool
- MBA, MIT Sloan School of Management, Former CPA, 18+ yrs professional service experience

David Morland, MBA

Partner
Joined 3LP in 2008

- Formerly Project Leader at BCG, leads IP transaction advisory at 3LP
- 3LP focus areas: IP monetization strategy, technology and IP diligence, advising buyers & sellers of IP assets
- Frequent speaker on IP transaction market and publicly-traded IP companies
- Formerly BD at Cubist Pharmaceuticals and Strategic Marketing at Symantec Corporation
- *BA/BE*, Dartmouth College; *MBA*, Harvard

Andy Filler, JD

Partner and General Counsel
Joined 3LP in 2014

- Voted #2 corporate IP attorney in Silicon Valley in 2011 by the Silicon Valley Business Journal
- Current member of the Board of Governors at the University of San Francisco Law School
- Formerly General Counsel and VP of IP at Nanosys, Inc.; Chief IP counsel at Caliper Technologies
- Senior Associate at Weil, Gotshal & Manges
- *BS Mech. Engineering* from Cornell; JD, *magna cum laude*, University of San Francisco Law School

Mark Gober

Senior Director
Joined 3LP in 2010

- UBS Investment Bank, Financial Institutions Group in New York: M&A, capital raising, and restructuring
- 3LP focus areas: technology monetization strategies, patent transactions, and publicly-traded IP companies
- Quoted in Bloomberg Business and *The Patent Investor* (a subscription newsletter) on tech/IP matters
- Author of Intellectual Asset Magazine's feature article "PIPCO investing in a brave new world" (Dec. 2015)
- *B.A.*, Princeton University, *magna cum laude*; Princeton varsity tennis captain

A rich heritage of technology strategy, IP analytics, and high-tech M&A

Roots in the premier names in strategy, technology, and intellectual property

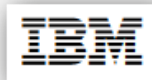
Breaking the mold

Demonstrated success

1999 – 2007

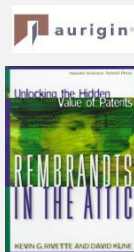
Prestigious heritage

- 3LP's founders ran The Boston Consulting Group's IP strategy practice
- Advised prominent companies with vast IP portfolios
- After 2 years at BCG, Kevin departed to run IP strategy for IBM, the world's largest patent holder



There at the beginning

- 3LP founder Kevin Rivette built IP analytics firm Aurigin (now part of Thomson tool suite)
- First to digitize US patent database in structured form
- In 1999, Kevin wrote the seminal IP strategy book Rembrandts in the Attic



2007 – 2008

3LP

Founded in 2008

- 3LP's founding partners left BCG and IBM and reunited to explore client success opportunities
- First engagement was running an IP acquisition fund for Tessera Technologies (TSRA), which contributed to the successful renewal of key licensees

Limits to the "BCG" model

- BCG focused on consulting for large companies
- Inflexible model: unable to execute transactions or advise on a success fee or equity basis
- Difficult to work with smaller companies
- Too many conflicts of interest

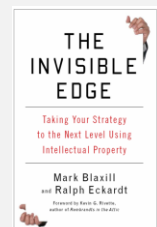
2008 – present

Steady growth

- Worked for 25+ clients since its founding
- Advised participants in transactions that are cumulatively valued in the hundreds of millions of dollars
- Industry leaders such as Intel, Xerox, Mars Inc., and Seagate
- Emerging technology companies including Unity Semi., Nanosys, and many others

Ongoing thought leadership

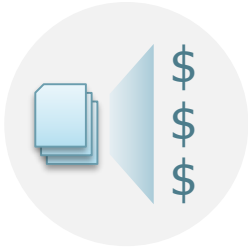
- 3LP founder Ralph Eckardt co-authored The Invisible Edge
- Named the best strategy book of 2009 by "strategy+business" magazine
- 3LP partners are frequent speakers on topics related to IP markets and strategy



Our businesses

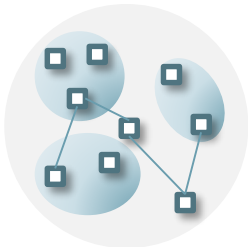
Strategy

Technology strategy



- Competitive Landscaping**
- Technology Assessment**
- Partnership Analysis**

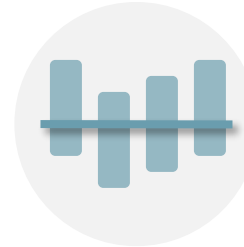
IP strategy



- Monetization Strategy**
- Corporate-level IP Strategy**
- IP Portfolio Development**

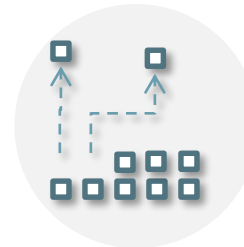
M&A for Technology and IP

Transaction execution



- Divestitures**
- Acquisition Programs**
- Licensing**

Transaction support



- Due Diligence**
- Valuation**
- IR/PR Support**

Our clients

3LP works with large and small companies in a variety of industries (not just “high tech”)

Example client profiles	Typical predicaments encountered by 3LP clients
<u>Fortune 500 companies</u> (technology-driven businesses, not just “high tech”)	▪ What is the value of our core and non-core IP assets? ▪ What is the best way to monetize those assets? ▪ How should we prioritize our investments in technology and IP development? ▪ What should we do if we are entering a new market and incumbents have IP?
<u>Emerging technology companies</u> (e.g., venture-backed start-ups)	▪ How can we leverage our technology and IP assets to improve deal terms? ▪ When and how should we file patents? Should we hold trade secrets instead? ▪ How can we demonstrate to potential investors that our IP is valuable? ▪ How should we prioritize business development and partnership opportunities?
<u>IP licensing companies</u> (product businesses and NPEs)	▪ What is our monetization strategy and how will we grow the business? ▪ What technology sectors should we be targeting for acquisitions? ▪ What assets should we buy and how should we structure those deals? ▪ How should we structure our organization and prioritize investments?
<u>Investors</u> (venture capital, private equity, hedge funds, patent litigation funds, etc.)	▪ Can we monetize the IP and technology in a struggling portfolio company? ▪ How should we value technology and IP when considering an acquisition? ▪ Is our investment target’s technology truly advantaged? ▪ How well does our investment target’s IP protect its competitive differentiation? ▪ What are the risks/benefits of patent litigation and is funding needed?
<u>Investment banks</u> (bulge bracket or boutique)	▪ How should we evaluate and communicate the value of technology and IP assets that are key drivers of a transaction? ▪ How we can we help our client’s understand the value of their IP?

Additional 3LP team members

Calvin Wong
Director

Calvin joined 3LP Advisors in 2011 as an Associate in the Silicon Valley office. Previously, he was a Staff Engineer at Broadcom Corporation where he focused on IC (integrated circuit) packaging and system thermal design. Calvin attended UC Irvine where he was a member of Tau Beta Pi, and graduated with a double major in Mechanical Engineering and Materials Science Engineering.

Colin Santangelo
Associate

Colin joined 3LP Advisors in 2013 as an Analyst in the Boston office. Previously, he worked as a consultant at Endeavour Partners, a boutique consulting firm specializing in telecoms and the mobile ecosystem, and as an engineer at tool, inc., a product design firm. Colin graduated from Harvard University with a B.S. in Mechanical Engineering and Materials Science. He was a four-year skipper on the Harvard Sailing Team, as well as co-chair of Leverett House.

Bruna Favetta
Analyst

Bruna joined 3LP in 2015 as an Analyst based in the Boston office. She graduated from Princeton University with a major in Chemical and Biological Engineering. Previously, Brunna worked as a summer analyst for Locus Analytics, an asset management start-up, and as a researcher in computational biology at the Stockholm Resilience Center.

Kaitlin Maier
Analyst

Kaitlin joined 3LP in 2015 as an Analyst in the Boston office. Kaitlin earned a BA in Engineering Sciences from Dartmouth College and a BE in Mechanical Engineering from Dartmouth's Thayer School of Engineering. Previously, she interned as a Product Engineer at Casper, a mattress startup company, and as a Markets Analyst at Royal Bank of Scotland. In college, she worked on human-centered design projects in the women's health field.

Matt Mahoney
Analyst

Matt joined 3LP as an Analyst in the Silicon Valley office. He graduated from Dartmouth College as an Economics major and Government minor with concentrations in finance and law. Matt previously interned at the University of Virginia Investment Management Company, where he worked on analysis for investment decision-making and risk management. At Dartmouth, Matt was also the captain of the club soccer and club basketball teams.

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