Marketing Plan:

Garmin HUD Accessory

Course Title ***: Technology Marketing***

Course Number ***: ETM 555***

Date ***: March 14th, 2011***

Instructor ***: Shimon Shmueli***

Term ***: Winter***

Year ***: 2011***

Team members ***: Shahin Alijany, Chris Imondi, Matt Trippel, Mouhamad Zaher***

Contents

Background Information 3
Value Proposition and Garmin Mindset: 3
Mission Statement 4
SWOT Analysis 4
Strengths 4
Weaknesses 5
Opportunities 5
Threats 6
Technology Concept 7
Competitive Environment 9
Customers & Market Users 9
Competitive Assessment 11
Market Segmentation 12
Target Market 13
Target Driver Age 13
Target Vehicle Type 13
Target Income Level 13
Target Market Timing 13
Target Market Summary 13
Market Strategy 14
Pricing 14
Distribution 14
Promotion 14
Works Cited 16

Background Information

Garmin is an international producer of commercial and consumer GPS products. Primarily vertically integrated, Garmin designs, manufactures, markets and sells their products themselves. During any given conversation about a product, you're likely to find engineers, designers, product testers, artists, writers and salespeople sharing their thoughts. Investing in innovation has been central to Garmin's success. The original handful of employees in 1989 grew to a work force of 1,000 just 10 years later. That number doubled within four years and eclipsed 4,000 by 2006. In 2007, Garmin's worldwide work force topped 7,000 and showed little sign of slowing amid expansion in Europe and Asia.

Garmin designs their products with the customer in mind. Sidestepping the stress of navigation or travel begins with easy-to-use menus, logical options and intuitive features. Whether in their rental car or at a retail store, first-time Garmin users quickly realize the wealth of information that can be packed into a compact, portable unit. [**1**]

- Automotive products help drivers reach their destination effortlessly while getting the most out of the journey
- Marine units supplement detailed charts with essential data
- Aviation technology provides everything pilots need at a glance
- Fitness devices make every step of the workout more efficient.
- Outdoor recreation options are available for hikers and campers.
- Wireless applications bring the power of GPS to your smart phone

Value Proposition and Garmin Mindset:

As a design team at Garmin, we are looking to provide an aftermarket heads up display that interfaces with Garmin GPS units to provide a safer way to utilize GPS navigation systems in automobiles. Our competition's existing portable GPS navigation systems do not have the capability to provide HUD features, and existing HUD products on the market to not allow the user access to the multitude of features that Garmin GPS units provide. Garmin will deliver a versatile, safe alternative while providing a better customer solution to increase the functionality and convenience of GPS navigation systems for automobiles. We don't just design and sell products, we embrace the lifestyles. From aviation to marine, automotive to fitness, wireless solutions to outdoor recreation, Garmin employees are in the air, on the water, in the woods, behind the wheel and on the run. We're always thinking of ways to adapt and improve. At Garmin, you never know how the next great idea will be born. But you know it's coming soon. [**1**]

Mission Statement

Garmin's goal: "To create navigation and communication devices that can enrich our customers' lives." Garmin is founded on the principles of innovation, convenience, performance, value, and service. Garmin is vertically integrated: "we design, manufacture, market and sell our products ourselves. During any given conversation about a product, you're likely to find engineers, designers, product testers, artists, writers and salespeople sharing their thoughts." Garmin Divisions: Automotive, aviation, marine, fitness, outdoor recreation and wireless applications. [**1**]

The Garmin HUD concept conforms to this strategic mission statement by providing improved safety and convenience to consumers through technological advancement of existing Garmin products for the automotive industry.

SWOT Analysis

The current state of the GPS industry can be evaluated by detailing the internal strengths and weaknesses of Garmin as well as the external opportunities and threats to Garmin:

Strengths

A strength analysis was executed to determine Garmin's internal power factors for using to first, bypass the weaknesses, second, leverage the opportunities, and third, mitigate the threats. After doing research we found these components as the strength of Garmin:

Core competency: Core competency is the intersection of customers' need and company's capability outside of other competitors. Garmin is an established GPS organization which has been recognized as one of the best and largest player GPS maker in the market. [**1**]

Manufacturing capability: Garmin has capability to produce its own products. With this, they reduce their dependency on other companies for manufacturing. They have been focusing on a lean production philosophy which helps them to optimize the productivity with minimizing defective product and cost.

Global production: "Garmin International Inc." has been leading the global market by designing and manufacturing GPS since 1989. Garmin's products provide "automotive, mobile, wireless, outdoor recreation, marine, aviation, and OEM applications." Garmin Ltd is registered in the Cayman Islands and placed its main subsidiaries are located in U.S, Taiwan and the United Kingdom. It produces its high tech products in North America and produces some commodity products in overseas. [**2**]

Distribution Network: Garmin has expanded its strong distribution network, which includes more than 3,000 independent dealers with many of the most recognized electronics worldwide retailers. Indeed, Garmin's distribution and marketing are executed locally by the three business centers, through a "distribution network" of about 3,000 independent dealers and distributors internationally in 100 countries. [**3**]

Environmental: Garmin is environmentally friendly throughout its business operations and manufacturing by producing the products that meet valid "standards and regulations." They constantly optimize their performance by avoidance of pollution, and guarantee a safe and healthy workplace for their employees to achieve their goal of being environmental friendly. Their environmental criteria considerations are: recycling, product design, safe and proper disposal of Products, and material safety. [**4**]

Vertical Integration: Garmin believes its success related strongly to its "cooperative environment" that is the consequence of its vertical integration. They claim that they are capable to "design, manufacture, market, and sell" all their products by themselves. In any given circumstances through producing any product all the engineers, designers, product testers, artists, writers and salespeople contribute their consideration. Garmin is recognized as an Innovation driven and they believe they owe their success to this attitude. Their employees' number since 1989 has been growing strongly. In 2007, Garmin claimed that their worldwide employees' number ended up to 7,000 and they show interest to expansion in Europe and Asia gradually. [**1**]

Weaknesses

There can be no argument that GPS provides tremendous value to consumers and has revolutionized how we navigate streets, waterways or the backwoods. Since GPS uses extremely precise time settings to establish the position of the GPS receiver, the system is also an accurate source for time. However, when it comes to using GPS for setting time in the commercial environment, businesses need to be aware of several weaknesses

Standardization: Design of all Garmin GPS Navigation is very similar style and colors, with the same user interface for most of their products.

Installation: For some vehicles the mounting kits that usually come with Garmin GPS Navigation devices is difficult to reach which it makes the users difficult operate the touch screen.

Usability Issues: The integrated Bluetooth hands-free technology is still too new and many users have complained of difficulty of hearing with low volume microphone pick-up by the user calling.

Opportunities

An opportunity analysis was performed to identify components of the external market that could be leveraged with the introduction of the aftermarket heads-up display unit product offering. These market opportunities include:

Growing GPS Market: The location technology market is a growing market, with sustained growth in the overall market expected in the foreseeable future. The mobile location technology market is forecasted

to grow at a compound annual growth rate of approximately 20% between 2010 and 2013, resulting in an overall market sales potential of approximately 70 billion (USD) by 2013. [**5**]

Emerging Economies: The location technology markets are expected to grow as a result of emerging economies, such as India and China. In each of these countries, rapid growth is expected to continue and be driven by the launch of low-cost GPS technologies. [**5**]

Growing Automotive Market: The overall global vehicle market is expected to grow, increasing the number of sales opportunities for vehicle GPS systems. Again, the growing economies in Asia account for the most dramatic market growth, with forecasted vehicle sales expected to reach 30.7 million by 2014, representing over 70% increase in the vehicle market since 2009. [**6**]

Rising Fuel Prices: Increases in fuel prices can potentially be leveraged too drive growth in the GPS market. The use of GPS technology has been shown to improve route planning efficiency, resulting in the savings of over 2300 miles per week when implemented in manufacturing, trucking/warehousing industries. This route efficiency improvement results in an approximate savings of $51,582 annually. Additionally, studies have shown that individual drivers can improve their effective fuel efficiency by 12% using efficient route planning using GPS technology. [**7**] As fuel prices increase, the potential savings associated with GPS technology will increase.

No Competitive Products: Specific to the aftermarket GPS application, there are no established competitors in the marketplace. One company: Springteq has advertised a launch of a similar product, however there is no evidence that this product has been introduced into the marketplace. [**8**]

Depreciation: Vehicles with OEM installed GPS devices have a higher depreciation rate for resale compared to vehicles without the GPS device; the depreciation rate of vehicles with a dedicated GPS system installed in the factory is 2% higher than vehicles without the GPS system. [**9**] This increased depreciation rate is associated with the obsolescence of GPS technology and the limited capability to upgrade OEM systems once they have become obsolete.

Threats

A threat analysis was performed to evaluate components of the external market that could present a threat to Garmin's underlying business model, or present a specific threat to the HUD accessory product proposed. These threats include:

Competitors: While Garmin does have a dominant share in the United States, TomTom is not far behind; and TomTom also has a dominant share in the largest GPS market: Europe. There are enough competitors in the market, that prices have been continually pushed lower. Garmin will need to work hard to retain their market share in the future. [**10**]

Price Reductions: Due to the large number of competitors, and maturation of technology, there has been great downward pressure on prices in the GPS industry. This is a threat to Garmin, as it has the potential to reduce profit margins. Garmin will need to continually improve their products and production processes to mitigate this threat.

Factory Integration: Although it represents a small portion of the market, factory integrated GPS units reduce the potential market for aftermarket GPS units like the ones that Garmin offers. As cars continue to increase the levels of integrated technology from the factory, integrated GPS unit market share could increase in the future. This threat can be mitigated through the use of continually advanced technologies. Some 36% of drivers with integrated GPS still use aftermarket GPS products. [**11**]

Cell Phones with GPS Technology: The number of cell phones with built-in GPS capability is increasing. It is projected that four out of five new phones will have GPS technology by the end of 2011. [**12**] This presents a great threat both to aftermarket GPS units, and to accessories like the proposed HUD device. Some GPS enabled smartphones even have applications that are intended to turn the phone into a heads-up display that you can place on your dashboard.

GPS Network Reliability: Although no major problems have occurred to date with the international GPS network, some experts are concerned that the US Air Force is not replacing satellites quickly enough to ensure reliability in the future. Many of the satellites are reaching the end of their projected life, and the replacement plans are not moving forward quickly enough. [**13**] A decrease in reliability presents a great threat to the perceived value of Garmin's products.

Market Saturation: Garmin has experience very strong growth, particularly in the North American and European markets in the past few years. If technology does not improve enough, customers will not be as likely to purchase new GPS units to replace their old models. Garmin needs to continue to improve features or they will risk lowered sales due to market saturation.

Technology Concept

The GPS heads-up display technology concept at the focus of this market plan is shown below is Figure 1.

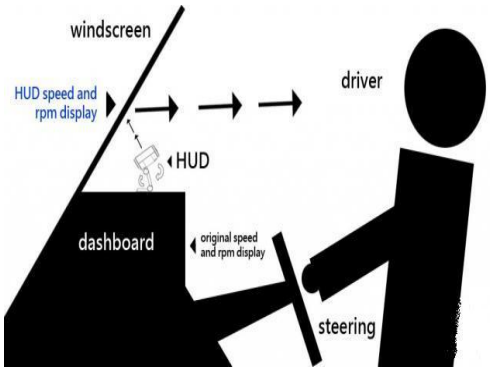


Figure 1. Heads Up Display Concept [**14**]

The four main components that make up the HUD system are shown if Figure 2, including:

-GPS system: For the proposed product, the heads-up display system is intended to interface with existing Garmin technology for vehicle position tracking and guidance.

-Projector: There are three different technologies that are available for mass distribution for GPS, including laser projection imaging, liquid crystal display (LCD) imaging, and light emitting diode (LED) display technology. A comparison of these technologies is provided in Table 1 in Appendix I.

-Combiner: the combiner of the system is provided in the vehicle; the image is projected onto the windshield or a panel adhered on the windshield to aid projected image visibility.

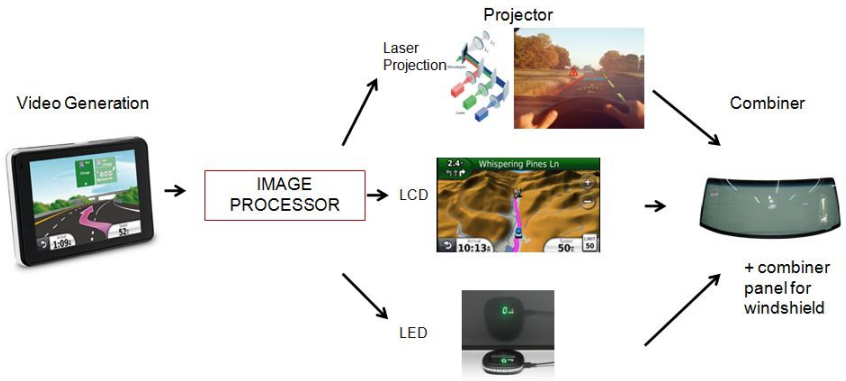


Figure 2. Heads up Display Components [**15**] [**16**] [**17**] [**18**] [**19**]

The selection of the projector technology for the HUD application is a key decision; the LCD projector technology has been chosen for the Garmin HUD. The LCD projection technology capitalizes on the existing display technology utilized by GPS and reduces overall cost of the unit to likely acceptable levels of the market; integration of the HUD with existing GPS products is expected to be simplified and speed the entry into the marketplace.

The LCD projection concept is to be utilized in conjunction with other Garmin portable GPS systems. A port to interface with the HUD projector is to be integrated into each existing line of GPS systems offered by Garmin to provide the consumer flexibility to utilize either existing Garmin products or upgrade those products to include the HUD technology through add-on components so existing successful product sales are not cannibalized through the introduction of the HUD option.

The flexible functionality is expected to differentiate the Garmin technology from other players in the industry. Existing major GPS units do not provide the option of a HUD accessory, and existing aftermarket HUD products offer limited functionality.

Competitive Environment

To evaluate the competitive environment facing this new HUD accessory product, a Porter Five Force Analysis was conducted and is shown below in Figure 3. An explanation of the Porter Five Force Analysis is provided in Appendix II: Porter Five Force Analysis.

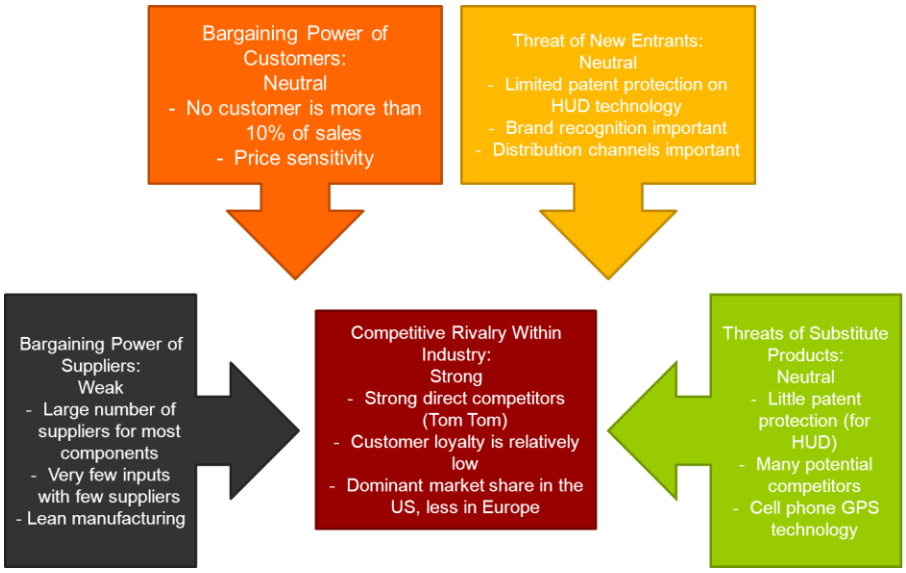


Figure 3. Porter Five Force Analysis—Garmin HUD

Customers & Market Users

The trends in global GPS market customers and users indicate a growing global market for GPS technology. The development and launch of the Garmin HUD concept will differentiate Garmin from its competitors and provide increased global market share in the growing GPS markets. A target market

for initial product launch (North America) will be discussed later in this market plan; beyond this initial target market, a global growth potential exists for the HUD concept.

North America GPS Navigation Market to rise to 4.3 billion in 2014

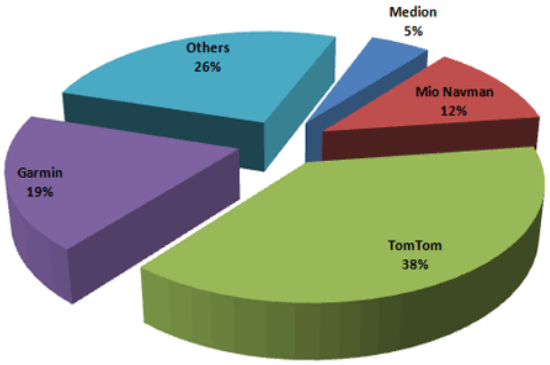
The North American market will account for 32.4% of the world market share for GPS navigation and LBS spend in 2014 according to IE-Market Research Enterprise Strategy. North American GPS navigation and LBS market are expected to rise to $4.3 billion in 2014. Garmin is the #1 GPS brand in the United States. It held 47 % total market share in 2007-2009, and holds 55% as of 2nd quarter 2010. Garmin see's the biggest growth coming from Location Enabled Search and Advertising in the North American market. Total spend in this category will rise in North America at a CAGR of 136% to reach $2 billion by 2014. There were 6.2 million Voice Guided in-car Navigation users in North America in 2009. This accounts for 42% of global users. We expect that in 2014, North America will have 17.2 million Voice Guided in Car Navigation users, accounting for 27.8% of global users of such services. The United States will still be one of the largest single markets for LBS in the world with a growth rate of 37.5% CAGR over the next five years. [**21**]

European GPS Navigation market to rise to $325 million in 2014.

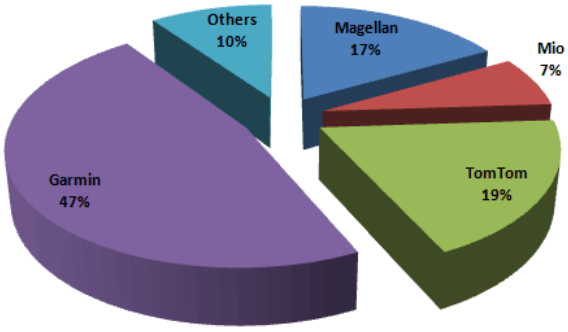
Tom-Tom is a Dutch based company that holds 38% market share in Europe, making it the largest GPS Supplier there. The category with the largest total spend in Eastern Europe will continue to be Voice-Guided In-Car Navigation. We expect that there will be 3.8 million users of Voice-Guided In-Car Navigation in Eastern Europe in 2014 with total spend of $151.6 million. However, the biggest growth will come from Location Enabled Search and Advertising in the Eastern European market. Total spend in this category will rise at a CAGR of 366% to reach $77 million by 2014. Russia is the largest market for LBS in the region with a growth rate of 69.7% CAGR over the next five years. We expect the Russian market to be valued at $158.3 million in 2014.Poland will see 73.2% CAGR in LBS spending over the next five years with its market valued at $78 million in 2014. [**21**]

Asia-Pacific GPS Navigation and LBS market to rise to $3.16 billion in 2014.

Asia-Pacific will account for 23.6% of the world market share for GPS Navigation and LBS spend in 2014. The highest growth will come from Location Enabled Search and Advertising in the Asia-Pacific market. Total spending in this category will rise at a CAGR of 115.6% to reach $1.63 billion by 2014, replacing Voice-Guided In-Car Navigation as the largest category in the regional LBS market from 2012 onwards. The largest LBS market in Asia-Pacific is Japan with an estimated total spend of $1.71 billion in 2014 (CAGR of 42.5%). The largest category in the Japanese market in 2014 will be Location Enabled Search and Advertising with $908 million in spending in 2014. China will see 67% CAGR in LBS spending over the next five years with a market valued at $233.8 million in 2014. Also, total spend in India's LBS market will rise to $158.4 million in 2014. [**21**]



European Market Share [**21**]

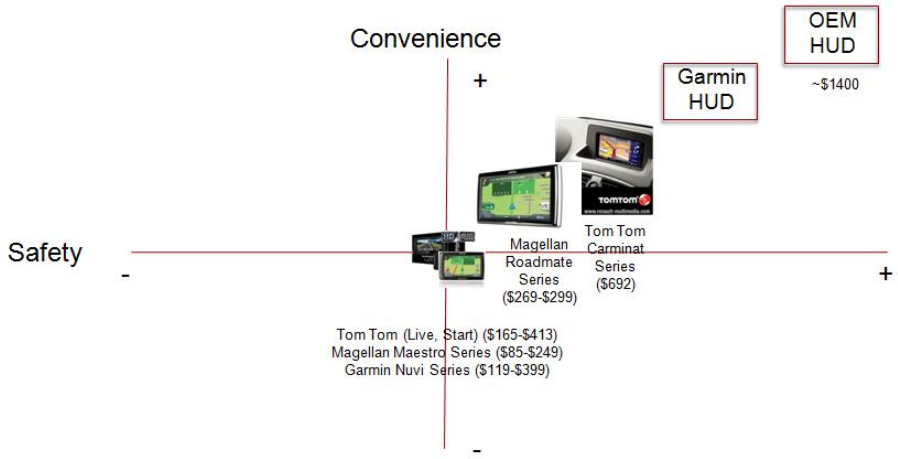


North American Market Share [**21**]

Historical trends in GPS technology is provided in Appendix III to this market plan.

Competitive Assessment

A variety of competitive products to Garmin's current automotive GPS product lines exist in the market is provided in Appendix IV. When charting the safety and convenience characteristics of each of these competitive products, a market opportunity can be observed with the Garmin HUD concept that provides improved safety and convenience over traditional portable GPS systems.



Competitive Assessment [**22**] [**23**] [**15**] [**24**]

Market Segmentation

A thorough automobile driver market assessment was performed; a market analysis methodology and data is described in Appendix V.

Based on an evaluation of the potential market size, buying power, assessment of Garmin's current or future present and market value (defined as how valuable Garmin's HUD concept is perceived as in each region), an evaluation of target market region was completed and shown below in Table 1: Global Region Market Assessment.

Table 1: Global Region Market Assessment

Criteria	Evaluation Method	China	North America	Europe	Japan/ Korea	South Asia	Middle East/ Africa	South America
Market Size	Global Vehicle Production forecast	5	4	5	4	3	1	1
Buying Power	Comparison of global economies	4	4	5	3	3	2	2
Current or Future Garmin presence	Garmin financial reporting	1	5	3	1	1	0	2
Market Value (Safety/ convenience/ other Benefits)	Basic assessment of society + intuition	2	5	5	3	2	1	1
Total Weight		**12**	**18**	**18**	**11**	**9**	**4**	**6**

As a result of the large market presence of Garmin in North America discussed earlier (47%), the North American market is viewed as the optimal market for initial product introduction.

Target Market

Target Driver Age

The relevant market in North America was segmented to identify the target North American market to focus the product launch on. A driver age segmentation analysis was performed and is provided in Appendix VI. The driver age that represents the largest market potential, annual transportation expenditure and seeks the largest safety improvements range between 35 and 54 years of age.

Target Vehicle Type

An analysis was performed to identify the target vehicle type to focus the Garmin HUD product marketing; this analysis is provided in Appendix VII. The vehicles with the largest market potential based on sales volume and fuel efficiency are Mid-size by 22.4%, small size by 17%, pick up light duty truck by 13.8, and cross-over light duty by 22.4% of all new car sales.

Target Income Level

An analysis of driver income level was performed and is detailed in Appendix VIII. The target consumer for the Garmin HUD earns $30,000-$90,000.

Target Market Timing

An analysis was performed to determine the optimal timing for product introduction. Leveraging improvements in vehicle fuel efficiency provided by GPS technology, an analysis was performed to identify the time of year when most driving takes place (see Appendix IX.) The target product introduction timeframe is the June, July, August timeframe.

Target Market Summary

After the all researches, analyzing all the data, and finding the market segmentation for our product, it's the time to find the intersection of the three segments: 1-age, 2-car type, and 3-income level. In North America, the marketing team is targeting consumers who are making more than $30,000, have age between 25-60, looking for pick up light duty truck, cross-over and van drivers. The graph below shows the US fuel consumption for each month in 2009. Based on the data from this graph our marketing team decided the best month on lunching the product could be one of the month which has the highest fuel consumption in the summer months.

Market Strategy

Pricing

Historical GPS product pricing data is shown in Appendix X. A cost breakdown of the Garmin HUD pricing methodology is provided in Appendix XI. The MSRP for the HUD component and GPS component is: $1231. This consumer price enables Garmin to achieve the required 6% margin.

Distribution

Garmin's vertically integrated business system can be easily understood in various segments. Garmin manufactures its products in facilities located in North America (Olath, Kansas), Europe (Totton, Southampton, England) and it largest manufacturing facilities in Asia (LinKou, Taiwan). More advanced products are produced in Europe and North America, including Aerospace products. Lower-priced products are produced in Taiwan. Distribution and marketing are done regionally via the three aforementioned business centers, through a distribution network of roughly 3,000 independent dealers and distributors globally to 100 countries. Typically dealers include companies like Best Buy, Amazon, and Wal Mart. Garmin keeps its advertising in-house, thus enabling them to streamline costs while taking a more focused approach. [**3**]

Garmin's U.S. consumer product sales are handled through its network of dealers and distributors who are serviced by a staff of regional sales managers and in-house sales associates. Some of Garmin's larger consumer products dealers and distributors include:

- *Best Buy*—one of the largest U.S. and Canadian electronics retailers;
- *Amazon.com*—internet retailer;
- *Costco*—an international chain of membership warehouses that carry quality, brand name merchandise
- *Halford's*—a large European retailer specializing in car parts and accessories;
- *Petra*—a large distributor who sells to a wide range of dealers;
- *Target*— one of the nation's largest general merchandise retailers;
- *Wal-Mart*—the world's largest mass retailer; and
- *Wynit*—a large distributor who sells to a wide range of dealers.

[**40**]

Additional information on Garmin's global presence is provided in Appendix XII.

Promotion

Garmin acquiesces 6% of its sales revenue for advertising [**41**]. Garmin's current advertising strategy focusing on TV commercials and holiday promotions will be utilized to promote the Garmin HUD. The key product differentiator that will be exploited when promoting the HUD concept is improved vehicle safety—it takes the driver approximately 2 seconds to look at in-vehicle information compared to 0.5 seconds to look at HUD information. [**27**] Since this is a new product with

enhanced features, print ads in car enthusiast magazines will target lead users interested in new vehicle technology and parenting magazines to emphasize safety improvements will be utilized. Inexpensive direct mail targeting these groups will also be used to advertise the product to potential consumers. The key product attributes of safety, fuel efficiency and product convenience will be emphasized in product marketing to drive awareness of the HUD capability in conjunction with other Garmin GPS products.

Additional information on the promotion strategy and methods is provided in Appendix XIII.

Works Cited

[1] Garmin. (2011) Garmin. [Online]. http://www8.garmin.com/aboutGarmin

[2] Garmin. (2008, March) Garmin. [Online]. http://www8.garmin.com/pressroom/mobile/033108g.html

[3] Aaron Horvitz. (2008, May) ModernGraham. [Online]. http://www.moderngraham.com/?p=288

[4] Garmin. (2011) Garmin. [Online]. http://www8.garmin.com/aboutGarmin/environment/?activeBranchId=about

[5] GIS Development. (2010, February) GIS Development. [Online]. http://www.gisdevelopment.net/news/viewn.asp?id=GIS:N_kzpdaxrluw

[6] "New Car Sales Industry Profile: Asia-Pacific," *New Car Sales Industry Profile: Asia-Pacific [serial online]*., 2010.

[7] Mobile Enterprise. (2009, May) Mobile Enterprise. [Online]. http://mobileenterprise.edgl.com/supply-chain/How-Can-Your-Drivers-Achieve-A-12-Percent-Increase-In-Fuel-Efficiency-59088

[8] Nelson Ireson. (2010, June) The Car Connection. [Online]. http://www.thecarconnection.com/marty-blog/1045975_springteq-unveils-first-aftermarket-hud-navigation-all-in-one-unit

[9] James Healey. (2007, May) USA Today. [Online]. http://www.usatoday.com/money/autos/2007-05-08-navresale-usat_N.htm

[10] Fletch. (2008, May) GPS Magazine. [Online]. http://www.gpsmagazine.com/2008/05/gps_brands_market_share_data_f.php

[11] Marketing Staff. (2010, November) Auto Marketing. [Online]. http://www.autoremarketing.com/content/trends/jd-power-portable-gps-devices-still-popular-vehicles-factory-navigation-equipment

[12] Jagdish Rebello. (2010, July) iSuppli. [Online]. http://www.isuppli.com/Mobile-and-Wireless-Communications/News/Pages/Four-out-of-Five-Cell-Phones-to-Integrate-GPS-by-End-of-2011.aspx

[13] Amy Gilroy. (2009, May) TWICE. [Online]. http://www.twice.com/article/263297-

GPS_Service_Could_Fall_in_Reliability.php

[14] JS Racing. (2010) JS Racing Performance. [Online]. http://jsracingperformance.blogspot.com/2010/04/digital-speed-meter-head-up-display.html

[15] Garmin. (2011) Garmin. [Online]. https://buy.garmin.com/shop/shop.do?cID=134&pID=63940

[16] Edward Buckley, "Full colour holographic laser projector HUD," *Dominik Stindt Light Blue Optics*.

[17] Lars Weinard. (2004, October) Toms Hardware. [Online]. http://www.tomshardware.com/news/head-displays-cars,282.html

[18] JK Autospares. (2011) JK Autospares. [Online]. http://www.jkautospares.co.uk/products/autostyle_gps_led_hud_head_up_display_pi_h800/universal/

[19] Arizona Windshields. (2011) Arizona Windshields. [Online]. http://arizonawindshields.com/windshield_repair.htm

[20] IE Market Research. (2010, July) IE Market Research. [Online]. https://www.iemarketresearch.com/Members/Reports/3Q-2010-United-States-GPS-Navigation-and-Location-Based-Services-Forecast-2010--2014-Total-spend-in-the-LBS-market-in-the-US-to-rise-to-4-16-billion-in-2014-RID1533-1.aspx

[21] R.J. King. (2010) DBusiness. [Online]. http://www.dbusiness.com/DBusiness/November-December-2010/Global-Auto-Forecast-mdash-2016/

[22] (2010) TomTom. [Online]. http://www.tomtom.com/en_gb/shop/car-navigation/

[23] http://www.magellangps.com/Products/All-Vehicle-Navigators. (2011) Magellan Corporate Website. [Online]. http://www.magellangps.com/Products/All-Vehicle-Navigators

[24] Doug Newcomb. (2010, January) Edmunds.com. [Online]. Automaker vs. Aftermarket Tech: Which Offers Better Value?

[25] Garmin Ltd. (2011) Garmin Financial Reports. [Online]. http://www8.garmin.com/aboutGarmin/invRelations/finReports.html?activeBranchId=investor

[26] Tech Pulse. (2008, November) Tech Pulse. [Online]. http://techpulse360.com/2008/11/12/garmin-roundup-advertising-strategy-rise-of-the-us-market-tele-atlas-bluff-mio-stuff-and-go-strategy-and-the-nuvifone/

[27] Jacques Lincoln. (2007, March) How Laser HUD Can Make Driving Safer. [Online]. http://www.microvision.com/pdfs/safer_driving.pdf

[28] ComputerGeeks.com. (2011, January) Computer Geeks. [Online]. http://www.geeks.com/details.asp?InvtId=SIL-USB-MINI-PROJ-2-PB&cpc=RESX

[29] Newegg. (2011, January) Newegg. [Online]. http://www.newegg.com/Product/Product.aspx?Item=N82E16824717003&nm_mc=OTCFroogle&cm_mmc=OTC-Froogle-_-Projectors-_-IMC-_-24717003

[30] Google. (2011, January) Google Products. [Online]. http://www.google.com/products/catalog?hl=en&q=pico+projector&cid=10828479487529199485&os=tech-specs

[31] Jaques Lincoln, "How a Laser HUD Can Make Driving Safer," Microvision, Inc, Redmond, Wa, 2007.

[32] Quick MBA. (2010) Quick MBA. [Online]. http://www.quickmba.com/strategy/porter.shtml

[33] Frost & Sullivan. (2005, August) U.S. GPS Market Size. [Online]. http://answers.google.com/answers/threadview/id/561093.html

[34] R.J. King. (2010, November) Auto Forcast--2016. [Online]. http://www.dbusiness.com/DBusiness/November-December-2010/Global-Auto-Forecast-mdash-2016/

[35] Trading Economics. (2010) Trading Economics. [Online]. http://www.tradingeconomics.com/data-all-countries.aspx

[36] (2011, February) Policy Information. [Online]. http://www.fhwa.dot.gov/policyinformation/statistics/2009/dl20.cfm

[37] Elena Malykhina. (2010, September) www.brandweek.com. [Online]. http://www.brandweek.com/bw/content_display/news-and-features/automotive-travel/e3iafd7f303bda986c2ebe476555028a83b

[38] US Census Bureau. (2004) US Census Bureau. [Online]. http://www.census.gov/prod/2004pubs/04statab/income.pdf

[39] Photius Coutsoukis and Information Technology Associates,. (2006) www.allcountires.com. [Online]. http://www.allcountries.org/uscensus/1045_age_of_driver_and_number_in.html

[40] www.gasbuddy.com. (2011) Gas Price Charts. [Online].

http://www.gasbuddy.com/gb_retail_price_chart.aspx?time=24

[41] Environmental Protection Agency. (2011, January) Fuel Economy. [Online]. http://www.epa.gov/fueleconomy/

[42] The Wall Street Journal. (2011, March) The Wall Street Journal Online. [Online]. http://online.wsj.com/mdc/public/page/2_3022-autosales.html

[43] US Department of Transportation Federal Highway Administration. (2010, November) Policy Information. [Online]. http://www.fhwa.dot.gov/policyinformation/statistics/2009/33ga.cfm

[44] Aaron Barr. (2006, June) Adweek. [Online]. http://www.adweek.com/aw/esearch/searchResult.jsp?keyword=Garmin&x=19&y=14&exp=y&searchInterface=keyword&matchType=mode%2Bmatchallpartial&an=adweek

[45] (2010) Trading Ecomonomics. [Online]. http://www.tradingeconomics.com/data-all-countries.aspx

[46] Dow Jones and Company. (2011) Auto Salesl Market Data Center. [Online]. http://online.wsj.com/mdc/public/page/2_3022-autosales.html

Appendix I. Technology Selection

Comparison of the cost, performance, complexity, state of technology and installation considerations for various HUD display technologies are summarized below in Table 1.

	Laser Projection	LCD	LED
			
Cost	High (projector: $337)	Medium (projector: $250)	Low (projector: $135)
HUD Performance	High (2000:1 contrast ratio)	Medium (200:1 contrast ratio)	Poor (200:1 contrast ratio)
Complexity	High	Medium	Medium
Technology State	Emerging	State of Art	State of Art
Installation	Average	Average	Average

Table 1. Comparison of HUD Technologies [**25**] [**26**] [**27**] [**28**]

Due to complexities associated with the application of laser project technology (integration, cost), the laser projection technology is not considered a feasible approach for product application. The LED projection is also not feasible due to the poor quality of display for HUD application. The LCD projection technology capitalizes on the existing display technology utilized by GPS and reduces overall cost of the unit to likely acceptable levels of the market; integration of the HUD with existing GPS products is expected to be simplified and speed the entry into the marketplace.

Appendix II. Porter Five Force Analysis

The model of pure competition implies that risk-adjusted rates of return should be constant across firms and industries. However, numerous economic studies have affirmed that different industries can sustain different levels of profitability; part of this difference is explained by industry structure.

Michael Porter provided a framework that models an industry as being influenced by five forces. The strategic business manager seeking to develop an edge over rival firms can use this model to better understand the industry context in which the firm operates. [**20**]

Porter's Five Force Analysis includes the following evaluations:

- Competitive Rivalry – Strength of competition in the market
- Threat of New Entrants – Evaluation of barriers to entry in the market
- Threat of Substitutes – Threat of products from other industries
- Bargaining Power of Buyers – Strength of buyers in the market
- Bargaining Power of Suppliers – Strength of suppliers in the market

Each force is given a rating: either "strong", "neutral", or "weak". The analysis for our product is given below:

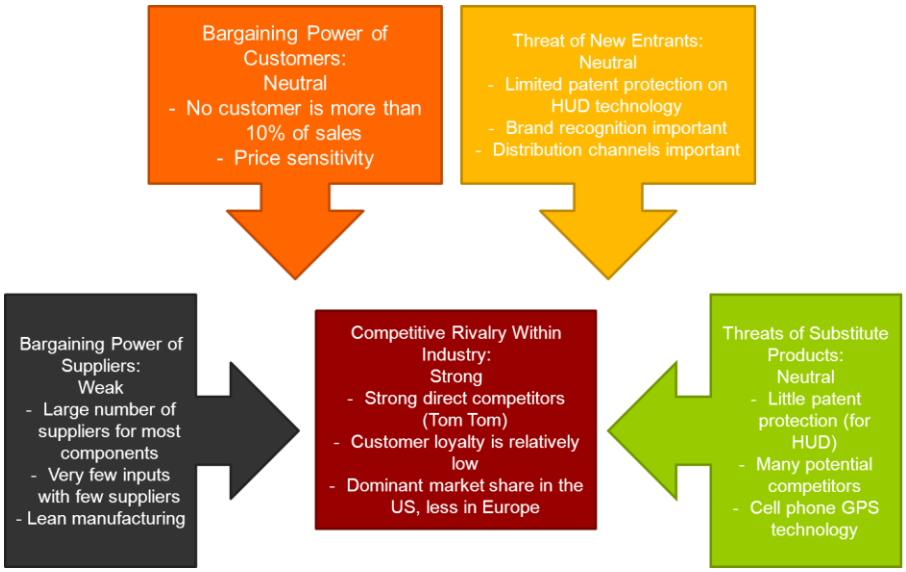


Figure 3. Porter Five Force Analysis—Garmin HUD

Appendix III. Historical revenues GPS

Consumer GPS market from 2003 to 2010

Year	Revenue
2003	$1,820,000
2004	$2,132,000
2005	$2,548,000
2006	$3,026,000
2007	$3,432,000
2008	$3,900,000
2009	$4,420,000
2010	$5,140,000

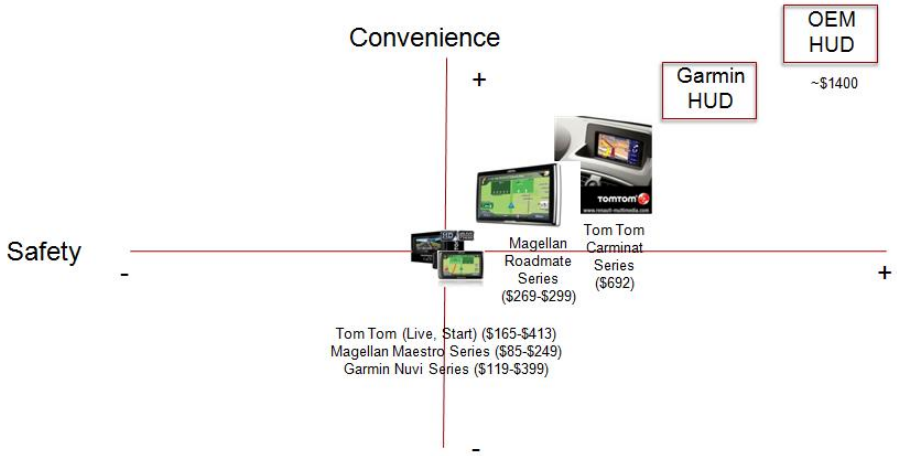
[**32**]

Appendix IV. Competitive Technology Assessment

A variety of competitive products to Garmins current automotive GPS product lines include:

- TomTom Live/Start series: TomTom's conventional portable automotive GPS systems that ranges in cost between $165-$413.
- Magellan Maestro series: Magellan's conventional portable automotive GPS system that ranges in cost between $85-$249.
- Garmin Nuvi series: Garmin's conventional portable automotive GPS system that ranges in cost between $119-$399.
- Magellan Roadmate series: A large screen portable GPS offering with a 7" viewing screen that ranges in cost between $269-$299.
- TomTom Carminat series: An integrated, updateable TomTom GPS system available in Fiat, Renault, and other vehicles in Europe that retials at $692
- OEM Heads-Up Displays: An OEM installed system option that typically retails for approximately $1400.

When charting the safety and convenience characteristics of each of these competitive products, a market opportunity can be observed with the Garmin HUD concept that provides improved safety and convenience over traditional portable GPS systems.



[22] [23] [15] [24]

Appendix V. Regional Market Definition

To define the potential markets for the Garmin HUD product, the global presence of Garmin products allowed for the potential scope of the target market to reach all regions globally. Current and future global light vehicle production data was analyzed to identify both the largest markets and the fastest growing markets in the world (see Figure 3.)

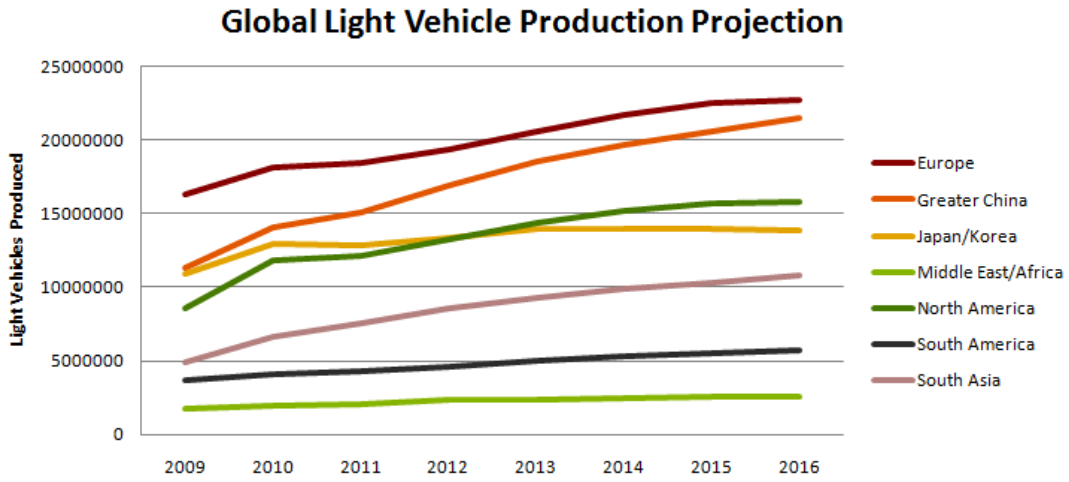


Figure 3. Global Light Vehicle Production Forecast—2009 to 2016 [**29**]

The light vehicle forecasts were assumed to be indicative of all automotive vehicle type trends (including cars, trucks, SUVs). Using this methodology, Europe is identified as being the largest vehicle market currently and the largest market in 2016, indicating a high market potential for application of aftermarket Garmin HUD technology. While Europe represents the largest market, China represents the fastest growing markets while North American and Japanese/Korean sales representing a smaller market with slower growth. The remaining markets make up 20% of the global market combined.

The financial assessment of each region was next investigated by investigating the relative strength of the economies and estimating the typical income of the vehicle purchasing population as indicated by nation gross domestic product (GDP) per capita adjusted for purchase power parity (PPP). The purchasing power parity is "the number of currency units required to buy goods equivalent to what can be bought with one unit of the base country."[1] Using PPP, accurate comparisons can be made between various countries with various currencies.

The GDP per capita (adjusted for PPP) is shown below in Figure 4. North America and Europe represent the highest GDP per capita, indicating higher incomes and potential to purchase products, compared to other countries. It is important to note the broad geographic and populations spead of the China population; while the GDP per capita is very low, this is expected to under-represent the buying

potential of the Chinese population with the ability to purchase automobiles that the Garmin HUD could be potentially applied.

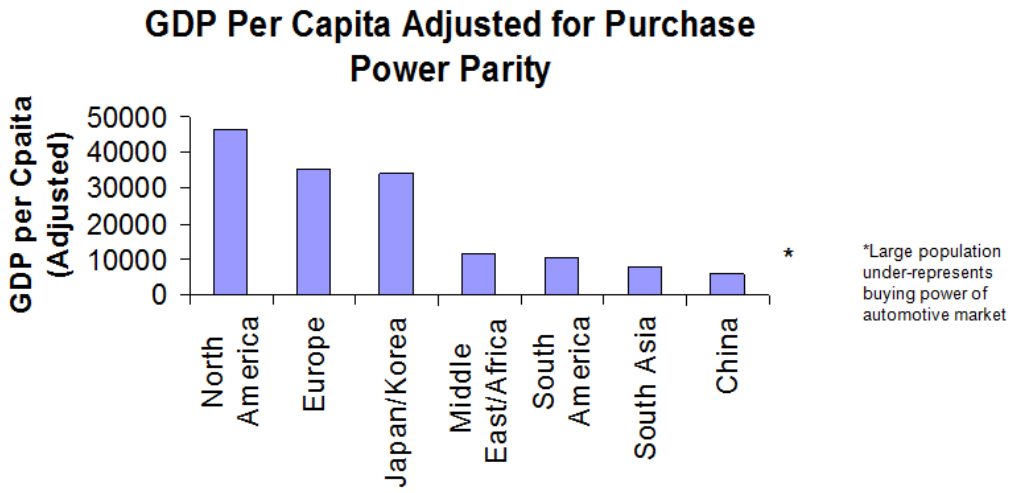


Figure 4: GDP per Capita Adjusted for PPP [**30**]

The current GDP per capita was analyzed along with the forecasted GDP per capita over the next 5 years to identify growing markets where new purchase opportunities may arise. For example, the GDP for China over the next five years is expected to nearly double (Figure 5), indicating a potential market opportunity that must be considered when identifying the target market for this application.

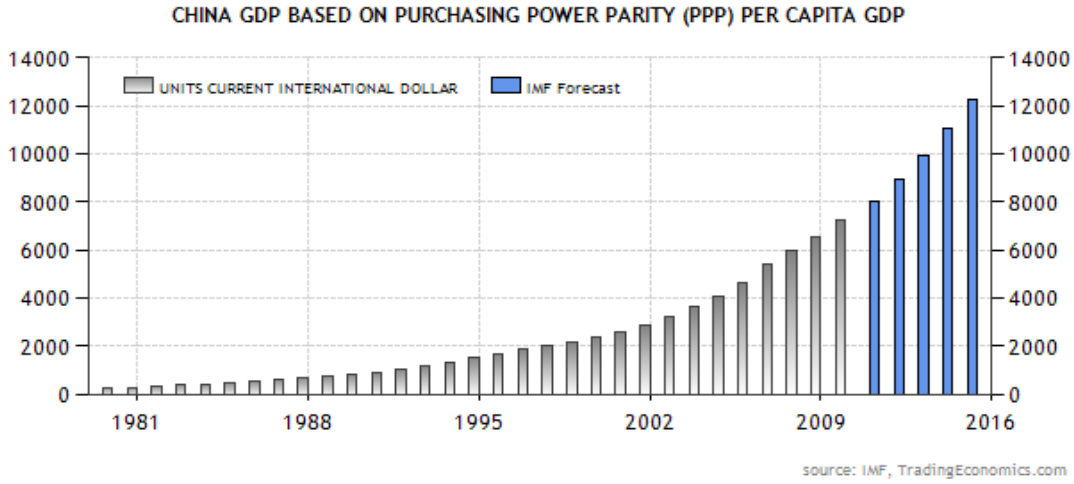


Figure 5. GDP per capita forecast for China (2010-2015) [**30**]

After researching about different region worldwide we split the potential market region to 7 regions: China, North America, Europe, Japan/Korea, South Asia, Middle East/Africa, and South America. [**31**] To decide about each region to pick the best reasonable area as a candidate for our target market based on

the geography, we came out with four criterion; Market Size, Buying Power, Current or Future Garmin Presence, and Market Value. Then we created a decision matrix and started to weight each criterion for each region. [**30**]

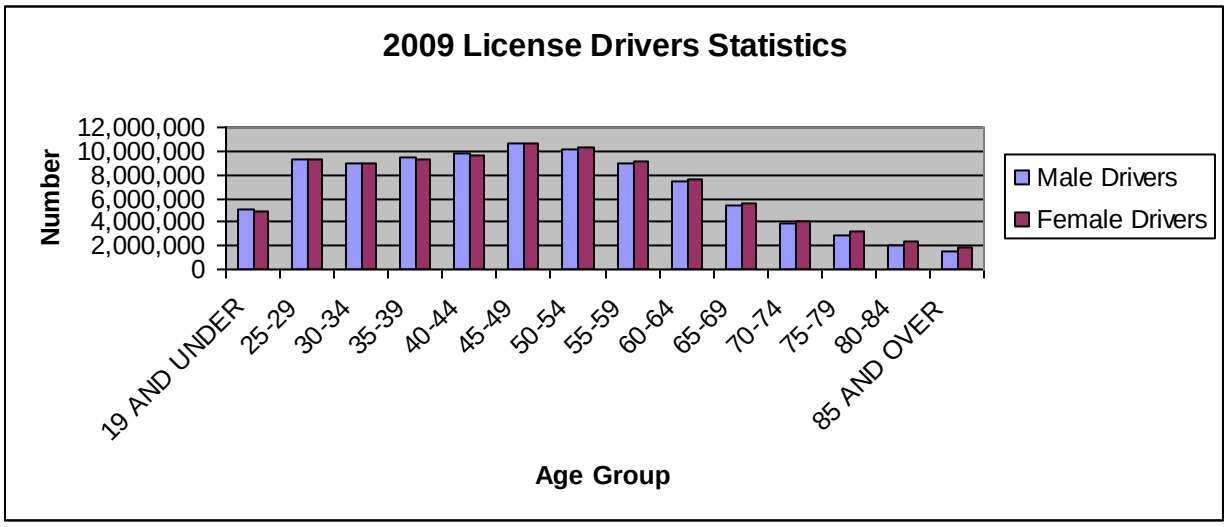
Based on our previous market analysis in market size, buying power, and GDP per capita for each region, we could create a ranking system between zeros to five for the first three criterion, and for the last one which is market value we tried to rank it based on our intuitive knowledge and feeling because we could not find any quantitative information for this criteria through our marketing research. After calculating the total weight, the result of the geographical target market includes China, North America, and Europe which North America and Europe founded as the highest ranked region through our research.

Criteria	Evaluation Method	China	North America	Europe	Japan/ Korea	South Asia	Middle East/ Africa	South America
Market Size	Global Vehicle Production forecast	5	4	5	4	3	1	1
Buying Power	Comparison of global economies	4	4	5	3	3	2	2
Current or Future Garmin presence	Garmin financial reporting	1	5	3	1	1	0	2
Market Value (Safety/ convenience/ other Benefits)	Basic assessment of society + intuition	2	5	5	3	2	1	1
Total Weight		**12**	**18**	**18**	**11**	**9**	**4**	**6**

As a result of the large market presence of Garmin in North America discussed earlier (47%), the North American market is viewed as the optimal market for initial product introduction.

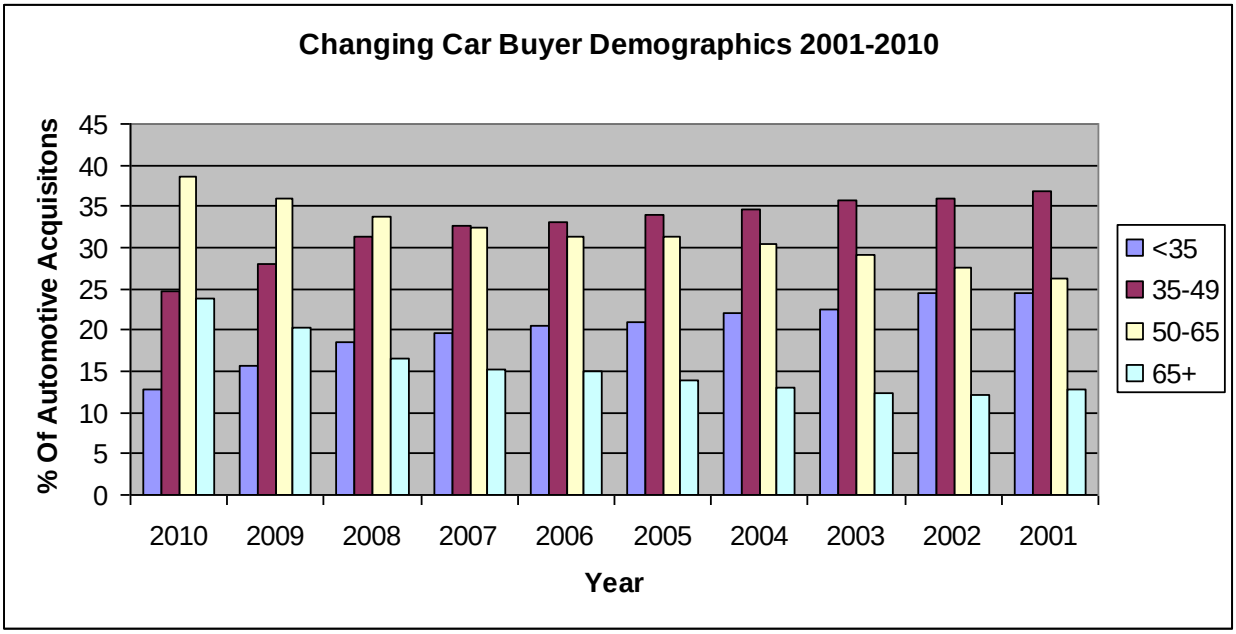
Appendix VI. North American Market Segmentation

The North American market is now segmented into various groups and categories so a market strategy can be developed. The potential North American market consists of all licensed drives—this potential market can be broken down by age group:



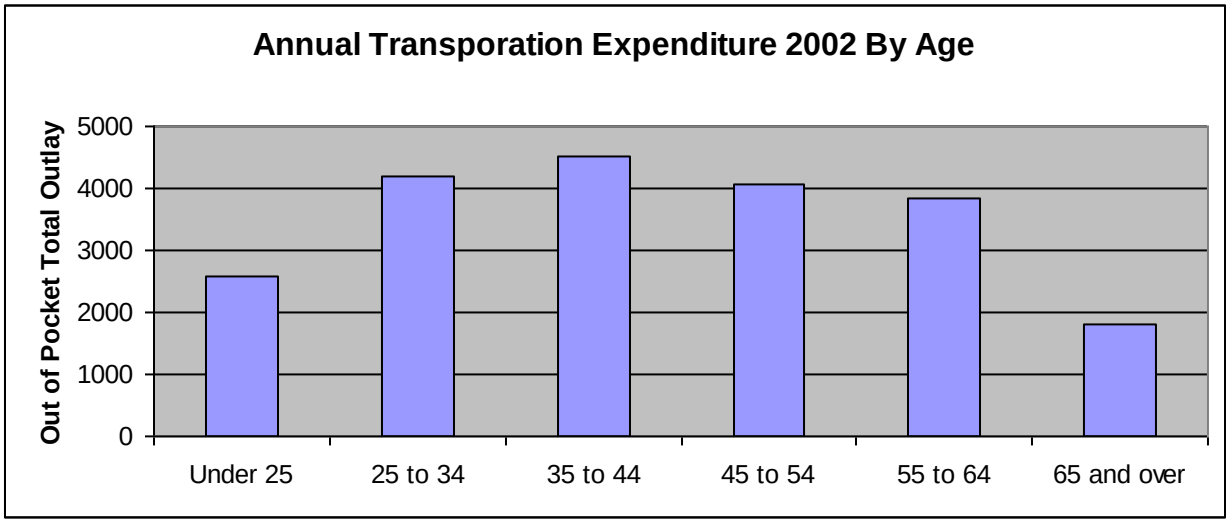
[**32**]

The largest market based on age group spans the ages 44-54. A trend toward older driver buying automobiles can be observed over the past 10 years, as the percentage of car buyers above the age of fifty changing from 25% of new cars purchased in 2001 to nearly 40% in 2010.



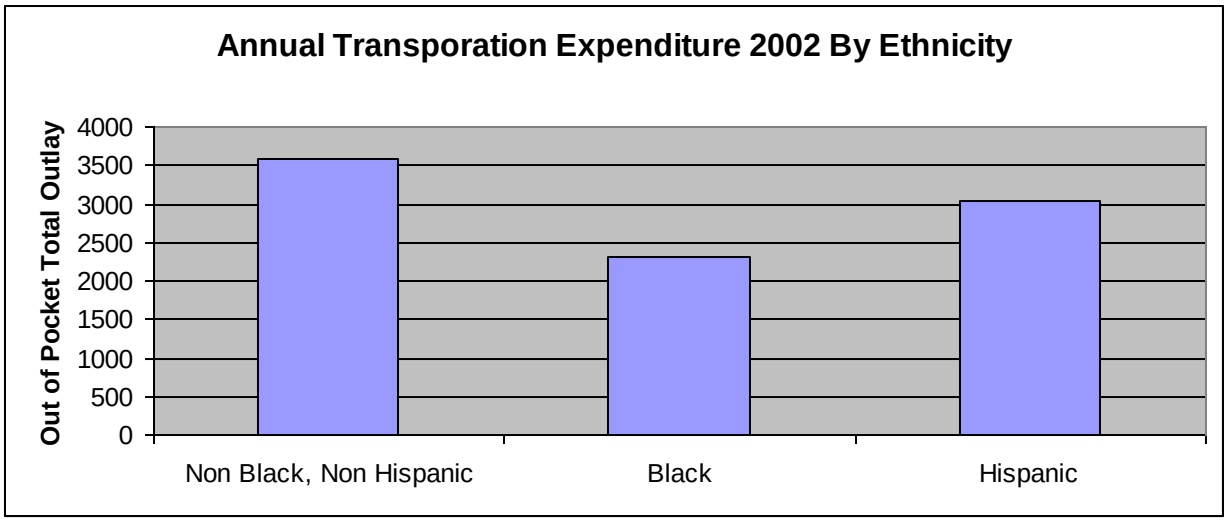
[**33**]

The total out of pocket outlay per year based on age indicates that consumers 35-44 years of age spend the most on transportation per year (2002 data).



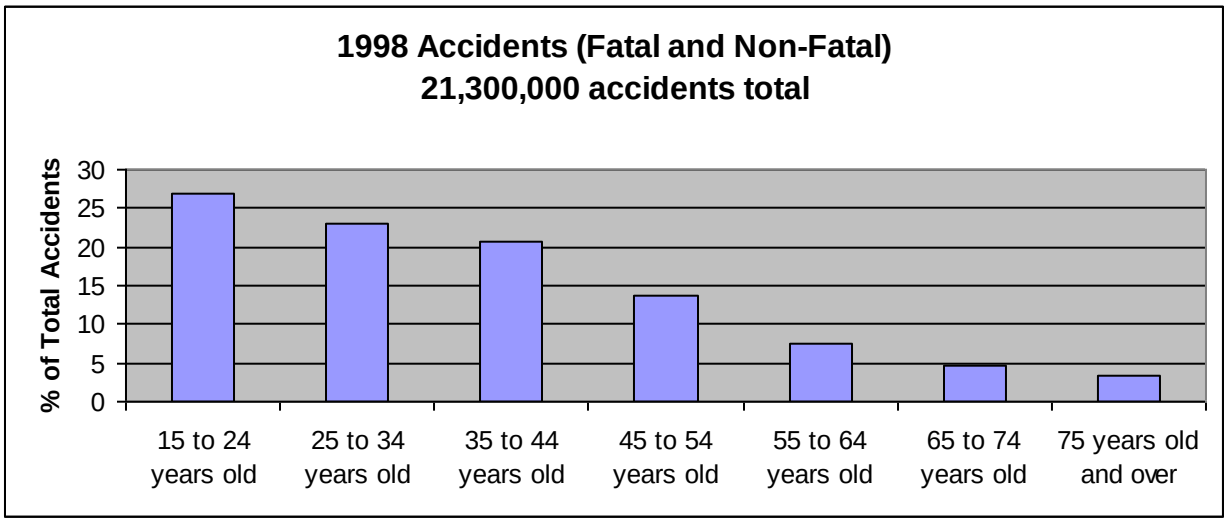
[**34**]

The out of pocket outlay for automotive transportation broken down by ethnicity (non-black non-Hispanic, black and Hispanic) indicates that non-black non-Hispanic ethnicities spend the most on transportation, with over $3500 per year spend on automotive costs.



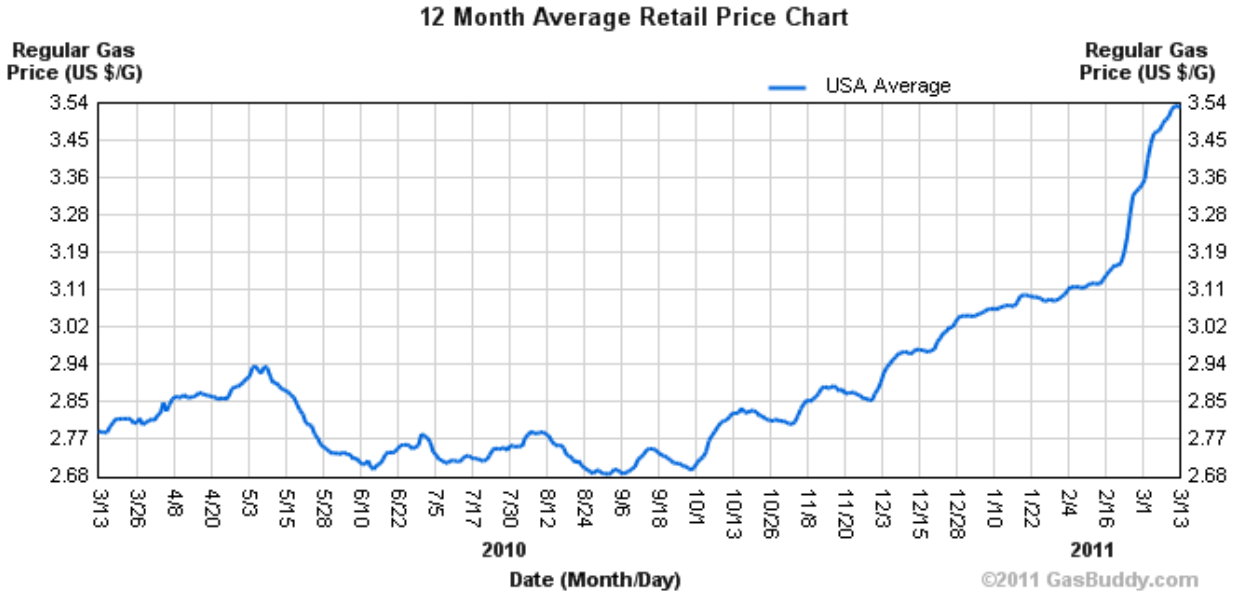
[**34**]

Since safety is a key driver for the implementation of heads-up display technology, the accident rates of various age groups are compared. Drivers between 15 to 24 years of age account for over 25% of accidents per year.



[**35**]

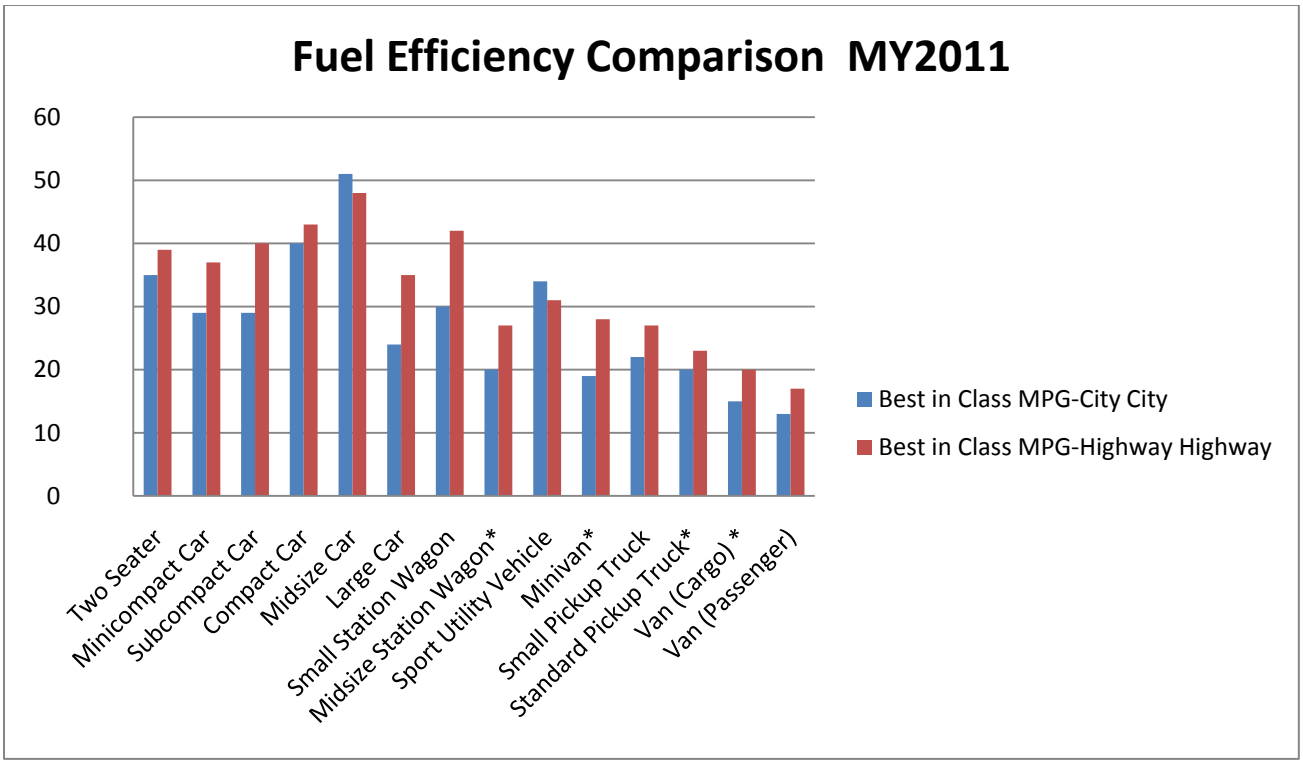
Another key driver for use of GPS navigation systems is improved fuel costs with an average of 12% fuel economy improvement. The increasing trend in fuel costs is expected to continue to drive growth in the GPS market.



[**36**]

Conclusion: Emerging market for GPS based on fuel savings—fuel savings should push market to our product.

A comparison of the typical vehicle type fuel economies (segmented by vehicle class) indicates that sport utility vehicle, minivan, pickup truck and van classes have the worst fuel economy, representing the vehicle classes with highest potential savings with implementation of the GPS navigation system.



[**37**]

Finally, the other aspects of the "market value" category refer to the qualitative values that potential target markets have for this product. In the United States, for example, our culture would value products that increase safety or convenience. Additionally, certain drivers in the U.S. would value the product for its "coolness" factor. It could be perceived as a "cool" technological device. These customers are likely early adopters of technology. Due to cultural similarities between the U.S. and Europe, we rated both markets highly in this category. Japan was rated moderately in this category, and developing markets were rated lower. Our group felt that developing markets would be less concerned with the convenience and safety features of the HUD product.

Appendix VII. Market Segmentation analysis

Market segmentation directs us to the ideal market for the product based on the factors used above. It is important to obtain additional information on the target market, to improve the effectiveness of the marketing strategy.

Age

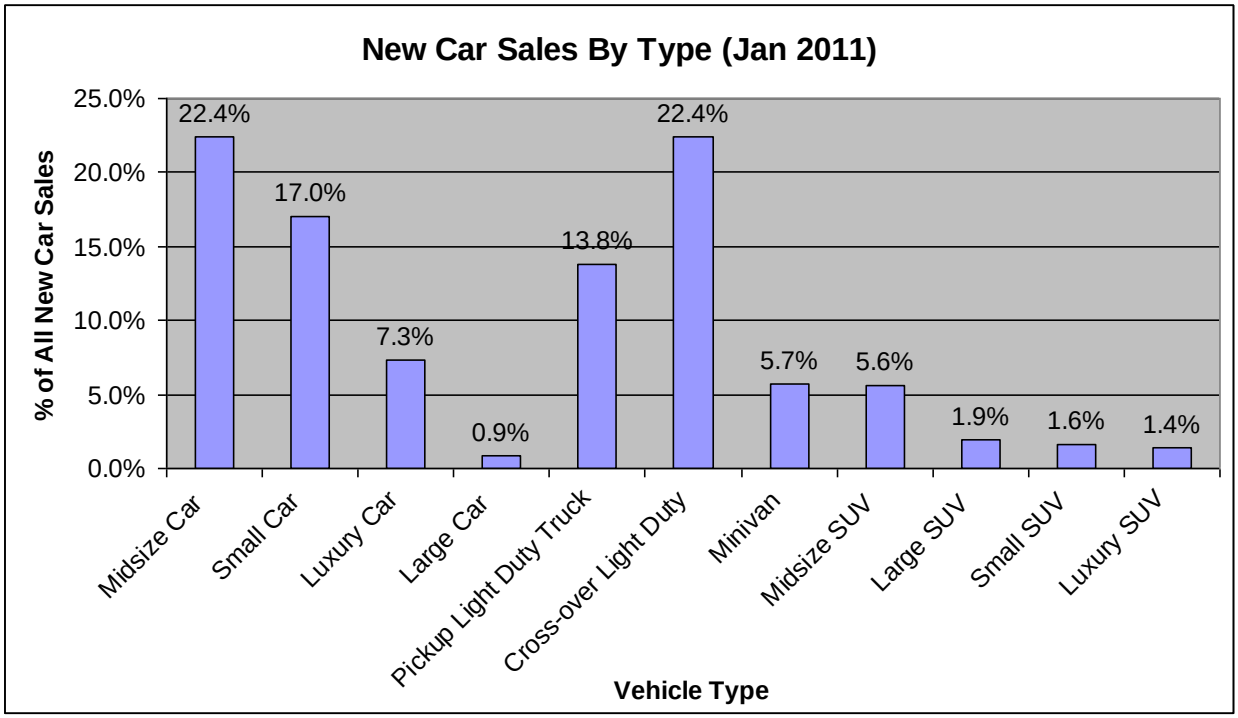
Age is one of the most important factors that demonstrate the market segmentation. So many habits, culture, and especial behavior ware implied inside the age of a person (customer). For example, for the specific product which is marketed in this project, age of customer answers to some important questions like: What is the relation between the age and buying the car for customers? Does the customer have a driver license? Age-wise how much annually he/she is going to spend for transportation? What is the relation between age and accident of car's owners?

After doing all the research and analyzing the data related to the age during the marketing research it was founded that almost 50% of the graphs and diagrams through the research were related to the age of consumers which shows how important the age is for determining the market segmentation. Now, the question is: what age (or rang of age) is the best to be marketed by our product? To answer to this question, we define four criteria related to the age of customer based on the marketing research. The criteria are: who has driver license, changing car buyer demographic, annual transportation expenditure, and accident. All these criteria are age-wise.

The decision making matrix which is demonstrated here is made by the ranking scale 1-5 based on the information from License Driver Statistic (2009), Changing Car Buying Demographic (2010), Annual Transportation Expenditure (2002), and Accident (1998). Although the year of the information which was gathered doesn't match together (that's what was found during the research), it helps to determine a good estimation about the best market segment related to the age. None of the ranking is intuitive All the ranking was made based on the information from the previous graphs' data. Our marketing team is looking for the age segmentation which has ranking over 15. The segmentation which was found is bolted in the total row in the decision making matrix.

Appendix VII. Vehicle Type Segmentation

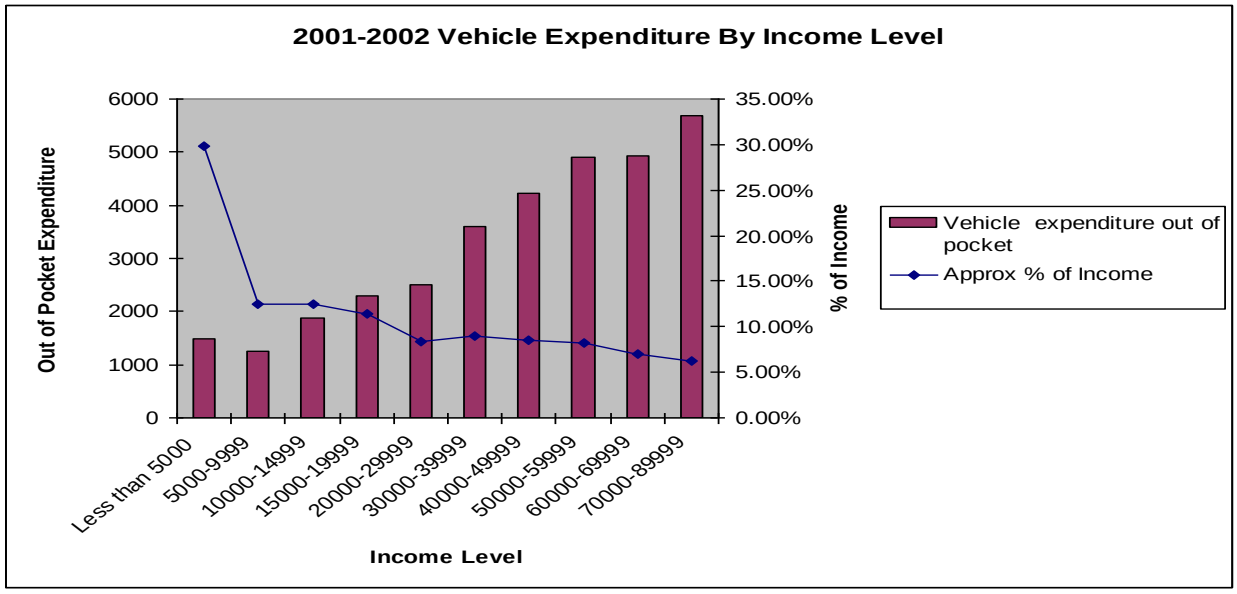
The second market segmentation criterion is related to the car type. No doubt, the car type that has the highest sales percentage has more potential to fit in our market segmentation. After the all research our team found the statistic of new car sales by type percentage-wise. Our team decided to select the vehicle types which have more that 13% of "new car sales." The statistic in the graph below shows that the best 4 top types are: Mid-size by 22.4%, small size by 17%, pick up light duty truck by 13.8, and cross-over light duty by 22.4% of all new car sales. These car types are chosen for the market segmentation. All this information is gathered on Jan 2011.



[**38**]

Appendix VIII. Driver Income Segmentation

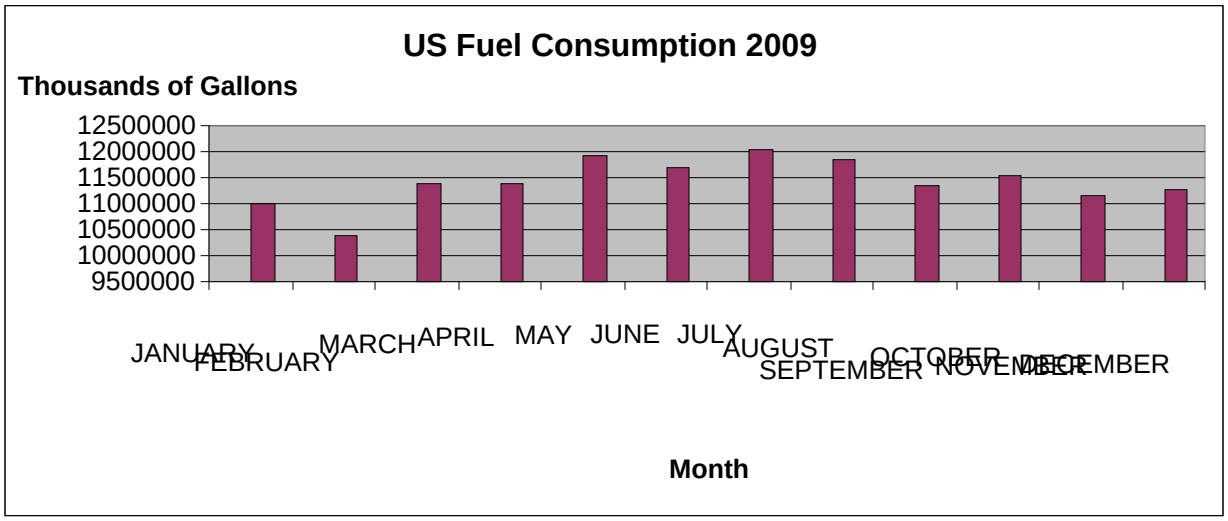
Income level has a direct relation to the vehicle expenditure. Usually, people who have more income can afford to spend a portion of that for buying car or some stuff related to the car more than people who has less income. Indeed, the meaning of "expensive" for people with different income level is different. After Through the marketing research, our team found that approximately the car buyers who have income level about $30,000 to $90,000 has the highest vehicle expenditure out of pocket. Obviously, these people would spend less percent of their income by having higher income level than people who make less money. As a result, their buying power is much higher and their regret feeling after purchasing is much less. That's why our team decided to choose customer whose income level is $30,000-$90,000 in the market segmentation.



[**34**]

Appendix IX: Target Market Timing

Fuel consumption rates were analyzed to determine the optimal time of year for product introduction.



[**39**]

Conclusion: Marketing product during summer months may be beneficial since most driving takes place in summer.

Appendix X. Historical GPS Pricing

Garmin Stays Ahead of the Pricing Curve: The GPS market is still considered a niche market. Although Garmin reaches the high-end consumer offering GPS products in the average price range of $350, 70% of the most popular GPS products listed are Garmin products.

For January 2010 the average price of GPS products was $300, a 15% decrease from January 2007. Holiday shopping in Q4 of 2007 marked the quarter where prices dropped significantly below the $300 range that the GPS market maintained over the course of over two years.

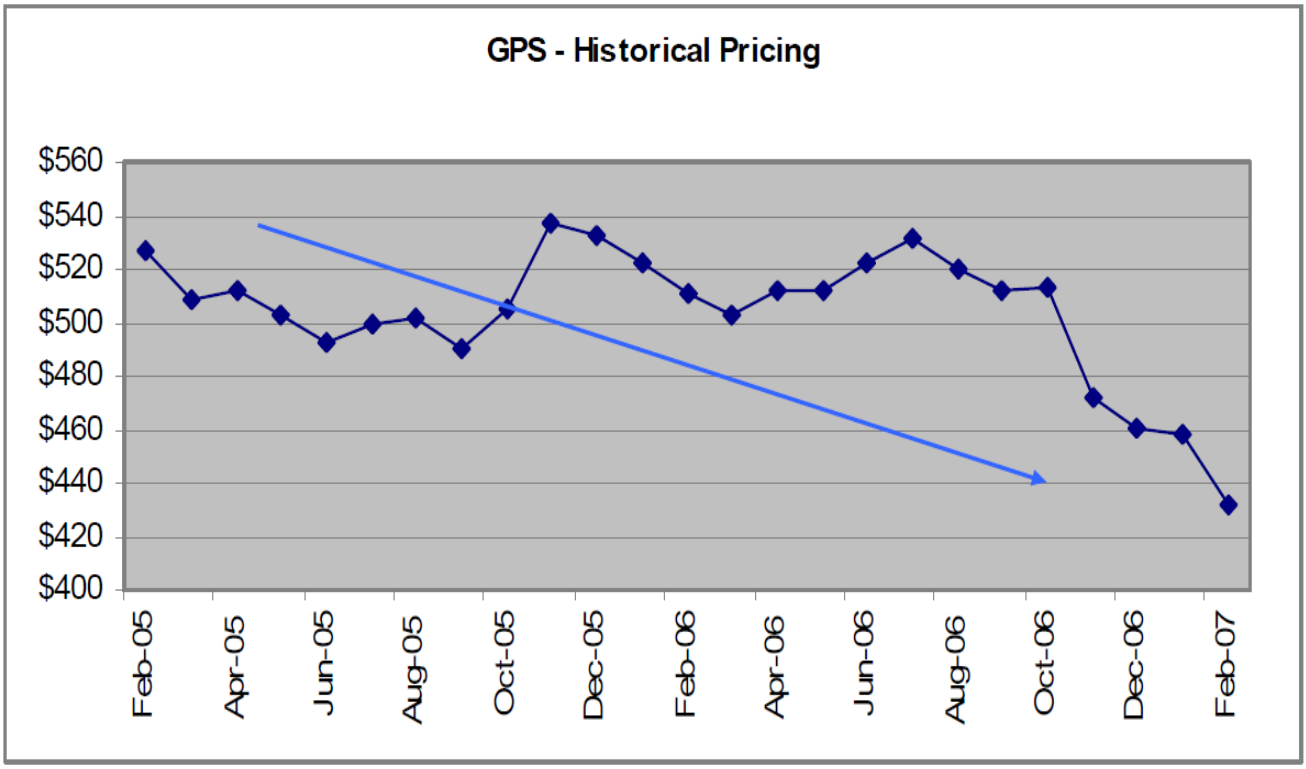
A closer look at average prices segmented by manufacturer reflects a wider range of pricing for GPS products. As of February 2010, the average pricing for Garmin products remained fairly constant and stayed close to the $350 range mark over the past two years, with a minor jump closer to $400 in October 2010. Garmin's consistent pricing strategy for the past two years has now placed it as the most expensive in average pricing for all its GPS offerings compared to other manufacturers in the first two months of 2010.

$350 average price range - Garmin

$300 average price range - TomTom, Magellan, and Lowrance

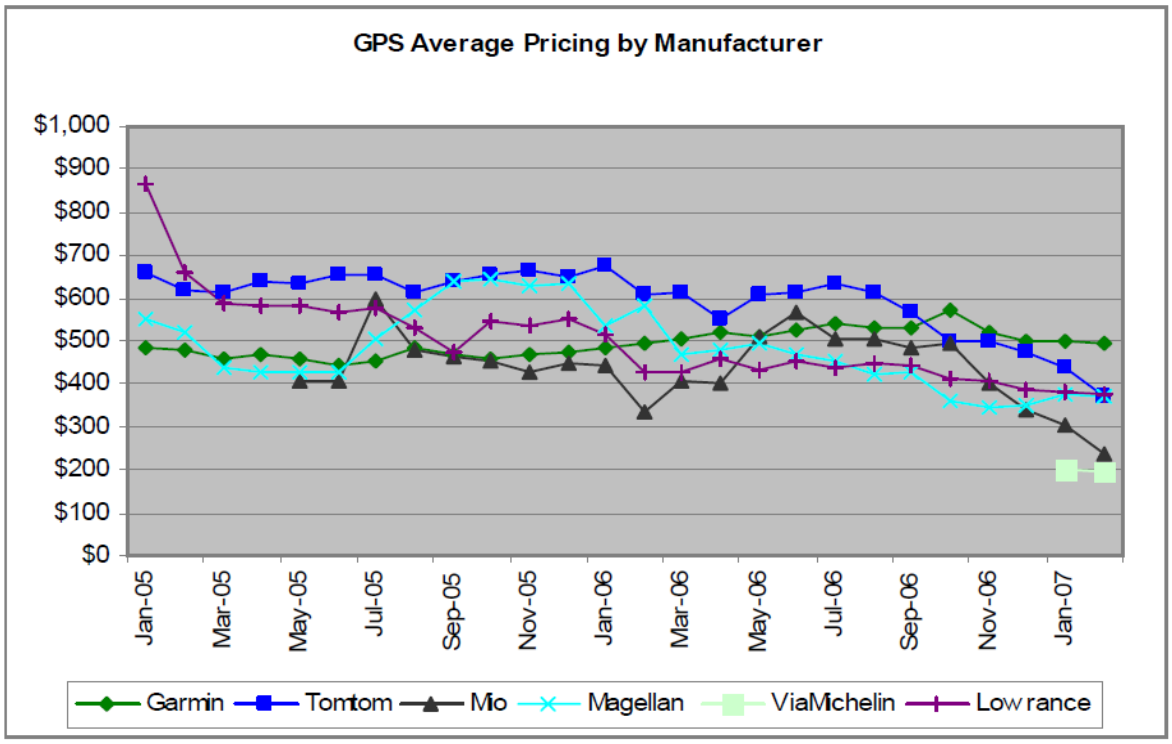
$200 average price range - Mio and ViaMichelin

Mio and ViaMichelin, which are newer to the GPS market, offer lower-priced alternatives for consumers, with recent average prices on GPS products now at the $200 range. Their pricing strategy is clearly targeting mainstream consumers. The rest of the GPS manufacturers such as TomTom, Magellan, and Lowrance have had fluctuating prices within the past couple of years, and they all have now reached an average price range just below $300.



Source: Market Reporter PriceGrabber.com 2007
* Pricing based on average monthly price of all GPS products

The most popular GPS products, seven out of the top ten are produced by Garmin. TomTom and Mio, both known for offering several affordable GPS products for the mainstream consumer, also made it on the top ten lists. Being the main manufacturer on this list, Garmin's GPS products had an average price of $400. Non-Garmin GPS products on the list had an average price of $300, priced 34% lower than Garmin GPS products. Prices for GPS products have come down substantially in 2010. Older models launched in 2007, with staying power in the top 10 list, reflect the large pricing decreases for GPS products.



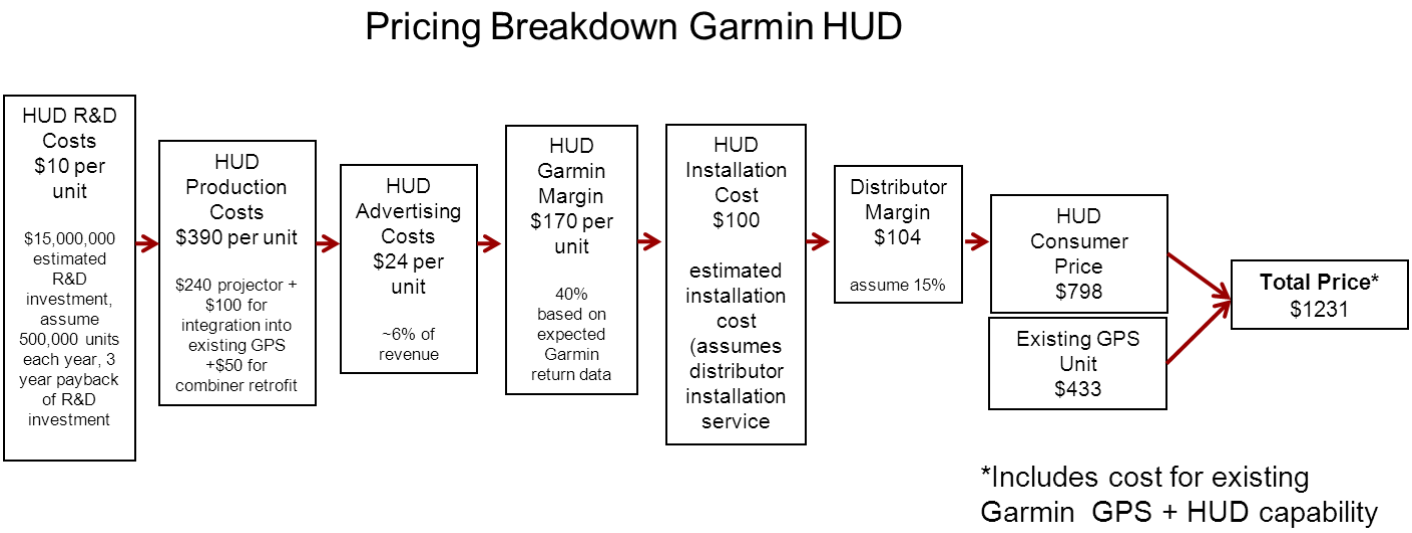
Source: Market Reporter PriceGrabber.com 2007
* Pricing based on average monthly price of all GPS products by manufacturer

GPS products have yet to fully penetrate the mainstream market. Pricing on GPS units are falling gradually, but the market as a whole remains a niche market with the average price in February 2007 still at $433. Much emphasis has been placed on offering an all-in-one product that includes a digital entertainment system such as music playback, image viewing and storage, and GPS-enabled handsets. As manufacturers roll out newer models into the market, just as much attention should be focused on targeting the mass market through lower price points.

Manufacturers such as TomTom, via Michelin, and Mio are offering GPS models with lower prices to attract a wider consumer range. We predict that substantial price drops in 2007 for GPS products are expected with the introduction of newer low-priced models and discounted prices on older models to draw an active marketplace for GPS products. We will track these pricing trends over the coming 12 months.

Appendix XI. Pricing Methodology

Pricing methodology can be found below:

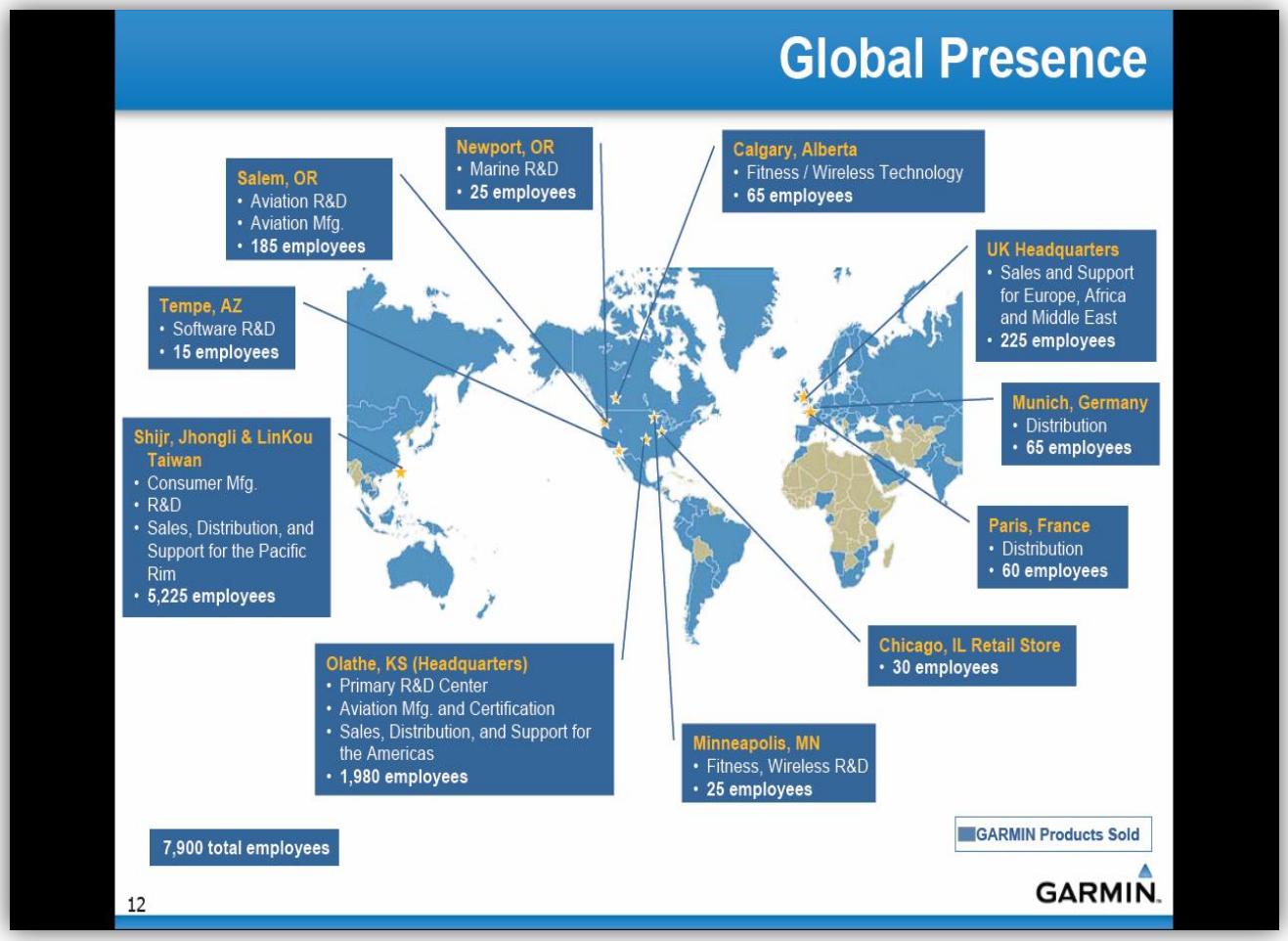


The financial expectations/estimated used as a basis for pricing are defined in Garmin's annual financial report.

Fiscal year ended December 25, 2010	Outdoor/ Fitness	Marine	Automotive/ Mobile	Aviation
Net sales	$559,592	$198,860	$1,668,939	$262,520
Cost of goods sold	195,136	74,212	995,986	78,203
Gross profit	364,456	124,648	672,953	184,317
Advertising	24,485	9,834	106,950	3,344
Selling, general and administrative expenses	58,313	23,497	188,799	17,215
Research and development	30,633	23,854	131,290	91,484
Total expenses	113,431	57,185	427,039	112,043
Operating income	251,025	67,463	245,914	72,274
Other income / (expense), net	(13,553)	(5,032)	(40,027)	(792)
Income before income taxes	$237,472	$62,431	$205,887	$71,482

[**40**]

Appendix XII. Garmin Global Presence



Garmin Locations Internationally. [**1**]

A key decision in the marketing of the Garmin HUD accessory is how to distribute the product. Given the well-established global network of distributors, it is felt that this product would be best distributed using the existing network. Customers already look to these retailers for their Garmin and general GPS needs, so they will be most likely to find this product at the existing retail locations.

The product is to be sold separately from the Garmin GPS units, but could potentially be sold as a packaged product, if the retailer so desired. To maximize sales, both existing and potential customers need to be considered. Current customers that have already spent several hundred dollars on a GPS unit will be looking to purchase the HUD accessory alone, while potential customers that do not already own a Garmin unit could be enticed with a package deal that provides a small discount over purchasing the GPS unit and HUD accessory separately.

Appendix XIII. Garmin Promotion Strategy

Garmin acquiesces 6% of its sales revenue for advertising [**41**]. Most of this budget goes for traditional retailers "co-op" ads. The amount that they are spending right now is about $118,713 [**40**] which is just for automotive and mobile section. Garmin's strategy and advertising methods are clear. They focus on TV commercials (sometimes using famous shows like Jay Leno), holiday promotions, or using "creative agencies across the country" [**42**]. After we came out with the target market based on the marketing research, in our marketing plan, we decided to follow Garmin's current advertising strategy with the same current methods which now they are doing, but based on our target market we are going to emphasize on two methods more.

1. **Print ads in car magazines**

A simple solution will be print ads in car magazines. Now depending on what type of magazine we are using to sell our product. No doubt, selecting luxury car magazines is a big mistake. Most cars in this class already have a GPS system and they are out of our target market. For list of magazines, we might go to Amazon.com and select magazines from the list.

2. **Direct mail**

Direct mail advertising is what you get in the mail. This is where most of car gadgets are sold today. Based on the target market, we approach people who are fit in that category. After getting their address (buying those addresses) we would send them direct mail.

Our goal of using these methods, are approaching the right lead users based on the information which we had gathered through the marketing research. Again, our target market is determined based on age, type car, and income level (In North America, the marketing team is targeting consumers who are making more than $30,000, have age between 25-60, looking for Mid-size, small size, pick up light duty truck, and cross-over light duty type cars). "US Fuel Consumption 2009" [???] demonstrates that May, could be a good month to lunge the product by having one of the maximum consumption index and being before summer which is a good season for traveling. So, we decided to start at least three month before the time that we plan to lunge the product. So, we plan to start advertising around month February.

	Garmin 52-Weeks Advertising Expense 2010		Garmin 52-Weeks Advertising Expense 2009		Year Over Year	
					$ Change	%change
	% of Revenue	Advertising Expense	% of Revenue	Advertising Expense		
Automative/Mobile	6%	$106,950	6%	$118,713	-11,763	-10%

[**40**]