

Automotive Communication

A Sample Case Study Illustrating Effective Design Research

Prepared by: Tasneem Babul Rayani Industrial Designer / Design Researcher October 2006

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What's This All About?

Project Background

This project is an exercise in effective Design Research and has been designed to showcase both my Industrial Design and Design Research skills. After discussions with Automotive Designer about their challenges when it comes to designing vehicles, I felt that there was an opportunity to help streamline a vehicle's development process, specifically at the junction where Marketing data meets Design and Engineering.

With a limited budget and over a two week period in June, 2006, I collected and interpreted marketing data, including conducting (a non-scientific) focus group, to develop viable Design Features and early vehicle concepts. When I started this project, I did not know who my target market would be or what would come out of it, but I did successfully present my initial results to the Chief Design Executives of Hyundai-Kia Motors (Irvine, California) in August 2006, were it was well received.

This current report builds on the preliminary report first presented in August, but only in creating a cleaner layout and focusing the text to emphasize what I can bring to the table. The interpretation, concepts and features sections remain unchanged.

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I would love to hear your feedback, if you have any comments or suggestions or would like to discuss your future projects, please feel free to contact me through my website: <u>www.tasneem.ca</u> or email me at <u>tasneem@tasneem.ca</u>.



What if Management, Marketing, Design and Engineering Spoke the Same Language?

Company Objective

If you look at the diagram at the top of this page, you'll notice three lines...three lines representing the Management, Marketing and Product Development (Design and Engineering) departments of a typical company. The ebb and flow of their day to day communication makes it a challenge for each department to know what other departments are up to.

As a skilled Design Researcher and Industrial Designer, with a solid understand of the way each department thinks and operates, I can create clearer cross-communication by delivering information in a language that is specific, relevant and inspirational to each team. I help adjust the volume, reduce the noise without losing the message, and more importantly, help to ensure that everyone is on the same wavelength.

Bringing all the Puzzle Pieces Together

Investing in a Design Researcher ensures that everyone stays in the loop. Designers and Engineers understand what the customer wants and why, Marketing gets innovative solutions to satiate the customer and Management sees the value in investing in a new idea because it will improve the company's bottom line.

This experienced Design Researcher understands a company's business goals of being profitable, innovative and adaptable, while dealing with the challenges of having: the right people, an effective communication strategy, the budget, the time and a quality product. Strategically aligning and combining the creative capacities and expertise of each department early on in the creative process can help ensure that design initiatives follow the company vision as set out by Management. This also provides Designers and Engineers the opportunity to validate their ideas and continually refine them with Marketing's assistance, creating a positive effect on profit margins, market readiness and product release cycle times.

Specifically, I take Marketing focus group research, competitor analysis and emerging technology research and *translate it visually* into tangible goals and features to help the Designer and Engineers understand their challenges and create viable solutions faster. Ensuring that Marketing and Design share valuable research and bounce ideas off of each other, can reduce redundancies in research time and budget expenditures. Meanwhile, Designers and Engineers need to leap out of the drawing table and present ideas and concepts that speak to the company's bottom line. A Design Researcher like myself can help a Designer evaluate and create compelling business cases around innovative ideas to Management.



Project Summary Everyone is talking, but do they hear each other?

Background

When Automotive Designers and Engineers attend Marketing and Management meetings, they prefer to see *visual* data to help them understand the Design Challenge and the marketplace. In cases where the Marketing data is not well understood, many Designer will re-research the topic from their perspective and often under time and budget constraints. Knowing how to translate research data, be it financial, marketing or technical, into a form that is inspirational, concise, prioritized and visually exciting will greatly speed up the development phase, reducing repetition and stagnation.

Many Designers and Engineers welcome the idea of having an intermediary feeding them relevant and up to date research that keeps their creative juices flowing.

Objective

To exemplify how I can assist in this process, here is an Automotive Sector Case Study that will illustrate effective Design Research, which can improve the lines of communication between the Management, Marketing, Design and Engineering departments for an Automobile company.

This case study has a budget of two week and has been successfully presented to the Chief Design Executives of Hyundai-Kia Motors (Irvine, California) in August 2006, were it was well received.

Methods

The first step is to understand the Automotive Sector by looking at the latest trends, innovations, consumer comments and concerns for a **Design Impetus** to power the Design Challenge. Research shows that *many customers feel that their vehicles are somehow incomplete, and as a result, they have a strong desire to accessories them.*

The **Design Challenge** narrows in on a particular market segment that is dissatisfied with their vehicle and suggests that there is an opportunity to design a vehicle for the professional woman between the ages of 24 to 45 living in Manhattan.

Next comes the task of communicating the Design Challenge to the Product Development team by:

- Translating Marketing Data into a Visual Story to inspire Designers and Engineers
- Identifying Opportunities, and Specifying Features and Goals from Focus Group comments and Marketing Data
- Providing research that delves deep into an area and presents the most pertinent information



Searching for the Spark

Design Impetus

Did you know that "**the number of car owners who modify their [vehicles] continues to rises**. Almost 44% of the car owners surveyed will spend \$1000-\$3000 annually on modifications and accessories...experts [believe that] **most consumers often see their vehicles as incomplete** ... [and] they want to impart individuality into the car they love." (R. Pierce for <u>Auto News, Auto Trends and Innovations</u>).

Marketing Implication

As an Automotive company, one would look at this trend and think:

1. Here is an opportunity to generate additional income with higher margins if we *create our own after market products* and supply this trend or at least create a vehicle that will accept modifications easily.

2. Lets create strategic partnerships with aftermarket manufacturers and *license our brand* and have it earn money for us without any upfront cost or risk to us.

3. Maybe this trend is indicative of a far more serious issue - how many potential customers walked away because they just didn't find what they were looking for?

Resisting the Trends

Maybe if we create a daring innovative car that actually speaks to the customer and their lifestyle, aftermarket accessories would be less necessary and in achieving this, we will create a loyal customer base that will support the vehicle despite economic constraints.

Take for instance, the popularity of large sized Pick Up Trucks, which outsold the smaller sized Pick Up Trucks almost 4 to 1, despite the soaring gas prices in the US. "The simple reason is that too many Americans like to own trucks. Even though in 2005 truck sales fell around 2.5%, Americans still bought over 1.2 million more trucks than compact cars" (Business Week Online, April 28, 2006). Maybe not every Pick Up Truck customer will use it for towing or hauling but they do identify with the vehicle and the lifestyle that surrounds it.

Instead of creating a generic car that only somewhat satisfies a large segment of the US market, focusing our attention on creating a vehicle that satisfies a very specific market segment in a region that is traditionally overlooked, can yield loyal customers who's role as trend setters can influence vehicle sales beyond just their own region.



Igniting the Torch

Design Challenge

Design a vehicle for the professional woman between the ages of 24 and 45 years old living in Manhattan.

Market Justification

Upon initial Marketing research, Manhattan is a tough sell:

- It is the only place in the USA where 75% of the population do NOT have a car but rely on public transport
- It also has the highest density of people living anywhere in the USA almost 67,000 people/square mile so you know that parking is an issue and it also has some of the highest real estate prices in the world

However:

- It is also the place with the highest density of people earning more than \$90,000/ year - nearly double the household income of the average American
- The people and their lifestyle have been setting both cultural and design trends for decades and will continue to influence the market

So if you can develop a vehicle that appeals to a Manhattanite, you can entice anyone!

Marketing Approaches

Understanding what your core customers wants in a car and understanding why they choose not to have a car can provide some valuable ways to turn their objections into opportunities.

Turn the day-to-day headaches in owning a car into opportunities to build loyalty and prestige such as:

- · Creating a preferred maintenance program where cars are picked up and dropped of while the customer works
- · Offering programs with the city for reduced parking rates

Sometimes a subtle method of introducing the vehicle to the customer becomes necessary. Maybe focussing on the TAXI fleets that service the area or car co-ops and rental agencies that will not only provide initial volume sales, but could be seen as a luxury vehicle - a preferred method of getting around the city from the ubiquitous yellow cabs and limos.

However you choose to approach your market, you first have to create a successful vehicle that speaks to your core customer. But communicating your customer's needs and desires to your Product Development Department needs to be more inspirational than the typical charts, graphs and a list of your customer's comments.

Manhattan Population Demographics



Number of People





Turning Up the Heat

Turning Data Into Vision

First, create an exciting story to stimulate the Designers and Engineers by turning those valuable Marketing charts, figures and facts into something that is instantly understandable and FUN. Translating market trends, gap analysis surveys and focus group comments into valuable opportunities requires experience and the ability to see the big picture - and a picture is worth a thousand words.

Visualizing the Customer

A better way to describe the core market: *the professional woman between the ages of 24 to 45 living in Manhattan* than the graphs and diagrams of the previous page, could be to use the characters portrayed in HBO's award-winning television show: THE SEX IN THE CITY. This show is dedicated to the trials and tribulations of four chic professional women living in Manhattan who are searching for the perfect man, while they balance their family, career and their relationships.



Meet the four main characters:

Carrie - artistic, free-spirit, curious (writer/fashionista) Miranda - smart, ambitious, practical (lawyer/mother) Charlotte - innocent, sweet, sincere (art dealer) Samantha - confident, scintillating, aggressive (PR exec)

Creating a Story - and Being Creative About It!

These ladies don't skip a beat and they have a want ad in the *New York Times* to capture what they're looking for in their perfect car.

Here's the Hook - A New York Times Want Ad

Four fun-loving, stylish, intelligent, successful professional women from Manhattan SEEK a sleek, dependable, versatile city car to call their own. Must be good listener, fun, outgoing, exquisite taste, environmentally safe, enjoys exploring city, nightlife/parks, open-minded, sensitive to a women's needs, clever but not arrogant, funny, enjoys romantic excursions in the sunset, good with money, loves pets and kids, and most of all puts his woman first. Call 555.5555.





Fanning the Flames

Understanding Your Customer

Aside from the expected ergonomic data about your customer's dimensions and abilities, it is important to give the vehicle a social context. Knowing what your customer buys, what they like, their tastes, what they surround themselves with is very helpful, and a good place to start is in their closet and in their home.





Spreading Like Wildfire

Understanding Your Customer's Lifestyle

What is their lifestyle like? Where do the vacation? Married? Kids?What do they do for fun? What kind of music do they listen to? Hobbies? Sports?Where do they eat, sleep, party, work, hangout? What's their pace of life like?What is Manhattan like? Famous symbols?What is the traffic, road conditions, weather like?Do they own bicycles, rollerblades, carseats that they need to transport with them?





Beyond the Blaze

Inspiration Outside the Customer

When you've got a good handle on the customer and their lifestyle, it's time to turn your attention onto your competitors, not just to see what's been done, but what needs to be improved on to be more competitive.

Knowing Your Competitor

Who are they? What's their market share? Why do they stand out? What's innovative? Where are there gaps in the Marketplace? What can be improved on? What do they lack?

Lateral Thinking

Looking beyond the Automotive Sector to find inspiration for both materials, process and form. Check out the advances in architecture, medicine, genetics, natural sciences, biofuels.

Biomimicry

This Abalone shell is lightweight but highly fracture resistant and perhaps a great material for advanced windshields?





Focusing the Fire

Identifying Opportunities from Focus Group Comments & Research

With a better understanding of the general design considerations for the Manhattan market, it is time to ask the Focus Group, what it is they want in their dream car.



Focus Groups are a challenge all on their own: First, you have to find a representative cross-section of your market and ask open-ended questions that give you insight into their mindset. Sometimes, the participants will be influenced by other participants and the results might not be accurate, so it is always recommended to have several focus group meetings through out the developmental cycle.

Second, it takes foresight and patience to analyze focus group comments for Design Opportunities and then pair them to

specific Design Features within the various vehicle activity zones. Grouping Design Opportunities can assist the Designers and Engineers in developing solutions where by one suggested Design Feature can solve two problems.

Manhattan Challenge Focus Group Results

For this case study, several professional women in the age group who have lived in Manhattan or in similar urban settings in North America were individually questioned and asked to comment on what they looked for in a vehicle, what they wished they could have and what they don't like about vehicles or driving in general.

The comments are broken down according to the zones in the vehicle they influence and have been paired with images or information on the latest innovations to support the ideas and they include: Vehicle Exterior, Interior, Seating, Steering Wheel, Controls, Displays and Accessories.



Preliminary Exterior Concept for the Manhattan Challenge



Vehicle Exterior Opportunities 1

Styling, Material and Proportion

Focus Group Comments	Design Opportunities	Features
l'd love it if my car could make a real statement - I love architecture (there's so much of it in NYC).	Wouldn't it be cool if each city adopted a car for it's taxi fleet -something that reminds the customer they're in an "exclu- sive" signature vehicle.	 Overall proportion Wheel base Style - Cross Over Utility Vehicle
It would be great to person- alize the car - something to match my different moods!	What if the opacity of the car could be altered to create an individual and unique tone? The Smart Car offers digital skins that can be customized to the customer's specs.	 Material selection Color Control Mechanism to change color - dial?
Girls love romance and want to feel special.	Competitors like Citreon have a good sporty proportion, while line, form and structure can be inspired from architecture or shoes, even!	 Form breakup Headlight details Grills/Trim Windows Color

Vehicle Exterior Opportunities 2

Under-Shielding and Exterior Lighting

Focus Group Comments	Design Opportunities	Features
I hate when people don't signal.	Maybe rear lights could extend to the side of the car so it's clearer when you signal. What if the signals kept tune to your heartbeat or made interest- ing patterns or shapes?	 Head Lights Rear Lights Indicators, Hazard Fog lamps, Ambient lights Protective Under-shielding
I want my car to stand out but in a subtle way - it can't be too flashy be- cause it could get broken into. I can't stand those ugly rust buckets with all the metal sticking out from the underside,	What if the underside lit up or was a completely different color like some of those designer shoes? What if there was a protective under-shielding to prevent dents, scratches, rust on the underside of the car?	



Vehicle Interior Opportunities 1

Dashboard, Color, Vents and Controls

Focus Group Comments	Design Opportunities	Features
I hate when my clothes and shoes get wet because of the rain, slush and snow - maybe	What if the roof and floor had air vents to dry you from the rain?	 Air Vent Controls Air Vents (Form) Vent Placement (Face, Feet, Rear, Roof)
you can do something about staying dry.		
It would be nice to create	Create a dial to control the tint	Interior Lighting Controls Tomporature Controls
changing the tone or look of the car.	levels of privacy or change the interior light level or color.	Material Color and Detail (Seat)Removable Seat Covers
What if the interior reminds you of your favorite night spot?	Maybe the car's colors change depending on the mood of the driver - it could measure your heart rate and you could re- member to stay calm and not	Interior Break upMeasure Heart Rate on Steering
	get upset.	



Vehicle Interior Opportunities 2

Windshield and Steering Wheel Design

Focus Group Comments	Design Opportunities	Features
Ever had some mornings where you wish you were still in bed, and battling traffic is the last thing you want to do.	What if your car reacted positively to you com- ing in or encourages positive driving habits? Maybe it smiles, lights up, purrs?	DashboardYokeSteering WheelDisplays/Controls
		• Looking in depth at a particular design element like the steering wheel helps to identify potential gaps in the marketplace.
It can be quite hectic driving in NYC!	What if the A column was clear so it doesn't interfere with your vision while turning?	A Column - Material ChoiceWindshield



Vehicle Interior Opportunities 3

Safety, Displays and Controls

Focus Group Comments	Design Opportunities	Features
Driving in NYC can be tough - the traffic sucks (I hear LA's even better) so make sure we can clearly see the displays, and help us avoid traffic jams. Also there are tons of crazy bike couriers that you have to watch out for maybe there should be a way to double check your blind spots.	Create a proximity detector to make sure you don't crash into the car in-front of you, espe- cially if you're on the phone. Or better yet a camera on the antenna that can help you see three cars ahead and helps you anticipate what's coming. How about a GPS system that focuses your attention in front of you rather than to your side.	 Displays Speedometer / Odometer / RPMs Fuel Level Fuel efficiency Temperature Readings GPS/Entertainment Engine Lights Radar System Proximity System
		PARK PARK
Parking can be even tougher - small spots, not enough money for the meter, knowing when not to park when the street cleaners come - wouldn't it be nice if the car could help me deal with this.	What if your car was hooked up to a city wide parking network and could tell you when there were free spots so you don't have to drive around? What if your car could help you: park, see in the dark, check your blind spot, let you know when it's safe to change lanes, or back up -	 Parking Assistant System Parking Info Display Camera System



Vehicle Interior Opportunities 4

Seating and Ergonomics

Focus Group Comments	Design Opportunities	Features
Having a coffee is a must in NYC and so is take out food but if the car could double as the ultimate traveling diner, we could enjoy breakfast in front of Central Park in winter.	Create Swivel front seats so that everyone can face each other - add a fold-out table and it's a perfect place to park and have a coffee. Maybe the seats could fold down and you could transport your bike, pets or large paint- ings. What if you could safely read the newspaper or watch the morning news while stuck in traffic.	 Form/Functionality for Front Seats Control Mounts and Mechanism Adjustability/Ergonomics Seat Warmers Work Table/Storage Options Headrest Seat Belt attachment Back Seat Fold-down?
Getting in and out of car can be tricky and can be a sure way to mess up your clothesso make it easier for us ladies.	Use a material that could go from slippery to rough depending if the door is open or closed to help you in and out of the car.	Material/Texture/Color/Firmness



Vehicle Interior Opportunities 5

Accessories

Focus Group Comments	Design Opportunities	Features
Girls have tons of accessories they have to carry around - just ask one to empty her purse - so maybe you can help us put	Create a glove box that can actually be useful - keep change, lipstick, pens, phone charger, ipod. Every car should come with an emergency kit.	 Dashboard Glove Box Compartments on Doors/Roof Materials / Contours
some of these essentials somewhere? Ohand I hate when I forget my	Keep an accessible basket for the driver to reach to keep their purse so they don't have to stretch and take their eyes off the road.	 Storage compartments Trunk /Grocery Bins Bike Locks/Pet Harness Emergency Kits
lipstick in the car - it melts - any thoughts.	What if your car reminded you to take things you could forget - your umbrella or your fa- vourite lipstick?	Cup HoldersMagazine StorageEntertainment ports
A mini bar would be nice or a place to keep my lunch cool.	Have temperature regulated containers so you don't need coolers for cold drinks.	
	Create secure, temperature controlled con- tainers to separate the car maintenance prod- ucts from others.	





Specifying

Sample Feature Design Checklist

Whenever possible, one should strive to create a Feature Design Checklist that has a particular focus to see if there are additional areas of convergence within the vehicle structure and activity zones. Also, being aware of the specific market, the vehicle will be introduced into allows for creating features that are custom designed for that market. For instance a vehicle designed for the American market will have higher, sight lines and a larger seat depth from a vehicle designed for the Asian market, due to the fact that North American's tend to be larger than Asian.

The key to performing this task is to be aware of the end user's activities, motions and thoughts. Being able to think laterally and see multiple connections can help to build appropriate features.

A sample checklist titled **Improving A Driver's Visibility** on the next page illustrates the factors that can influence the driver's ability to see and provides in depth comments based on ergonomic and safety considerations for improving this particular function for the end-user.

Considerations

The following are considerations that one should be aware of while researching and that influence the design of features:

- Budget
- Time
- Technical Expertise
- Safety Criterial
- Government Legislation
- Intellectual Property
- Material Advances
- Manufacturing Capacities
- Technological Advances
- Environmental Considerations
- Cultural Considerations
- Economic Considerations
- Raw and Natural Resource Availability
- Social Challenges
- Immigration and Foreign Policy Changes
- Genetic and Scientific Advances
- Transportation and Shipping Considerations
- Customer Ergonomics, Cognitive Functions
- Market Size

Improving A Driver's Visibility 1

Feature Design Checklist

Factors (+/-)	Features	Considerations	Opportunities
Light Conditions Darkness Sunlight Weather Precipitation	 Exterior Lights Headlights/ Rear Lights Reverse Lights Fog / Hazard Lights 	 Shape/Form/Color/Placement Beam Intensity and angle Light Intensity/Range and their Adjustability Cover Material/Texture/ Reflectivity 	 Car could read signs in the dark and the radio announces it Headlights adjust intensity to not distract other drivers and adjust to dark Onboard Proximity detectors warn you if too close to other cars especially during heavy rainfall and fog
 Fog Temperature Ice/Snow Rain Driver Reach Size 	Interior Lighting	 Light beam/color/intensity Energy efficiency Front and Back Mounts Doesn't interfere with other driver 	 Light beam/color/intensity Central light activates automatically when entering the car Interior lights blink on and off to keep you alert while you drive Each passenger has their own light and controls Leaving lights on won't drain battery
 Strength Age Eyesight Wearing sunglasses Mobility (turn head) Right or Left handedness 	Windshield (Front/Back)	 Clarity/Distortion/Refraction of light Glare reduction (Sun/headlights) High degree of road visibility Side visibility especially while taking corners Material Selection Reducing distraction from bright lights from oncoming traffic (LED bulbs) Insulation qualities 	 Windshield comes with Polarized glass mode to reduce sun glare Windshield has built in shades GPS information is projected straight ahead of driver on the windshield so they don't have to turn their head Markings on windshield denote the edges of car to help in parking Built in Ice Scraper and Snow remover Communicate with other drivers through a message system (let me in please/thanks/ sorry/baby on board)
 Passenger blocks view Obstructions (mirror, orna- ments) Reflections 	Windshield Wipers	 Far Reaching No Streaks Makes contact at high speeds Easy to turn on for driver Variable speed settings Back Wipers Rear Defrost 	 Activation mechanism and placement Built in Ice Scraper

Improving A Driver's Visibility 2

Feature Design Checklist

Factors (+/-)	Features	Considerations	Opportunities
Light • Conditions • Darkness • Sunlight Weather • Precipitation • Fog • Temperature • Ice/Spow	Temperature Regulation	 Placement Optimizing per passenger Air Flow Defrost Mechanism Heated Windshield to remove ice 	 Controls where easier to use and see Cool or Hot air actually reached the passengers and more interactive Windshield reduces Auto regulator could reduce fogging up of mirrors Made removing snow and ice easier from your car Dried your shoes and reduced fog formation
 Rain Driver Reach Size Strength Age Eyesight 	Dashboard Design	 Road not obstructed Control placement and ergonomics Control Activation Method (buttons) Non-reflective Material Fan mounting/display 	 Controls Lit up and are easier to read Proximity detector to change lanes or park Controls to keep track of fuel conception and efficiency
 Wearing sunglasses Mobility (turn head) Right or Left handedness 	Visor	 Material Grip ability Activation Method (Button/flip down) Form/shape Right/left handedness 	 Placement when not in use Compactness Fold out shape Accessory placement like mirrors/lights/ spare keys Side Visor Design Placement when not in use
 • Passenger blocks view • Obstructions (mirror, orna- ments) • Reflections 	Rear view/ Side view Mirrors	 Mounting Adjustable (Manual/Automatic) Back up Sensors to check for obstructions 	 Blind spot sensors Dual Angled mirror for blind spot Adjustable Mechanism placement and style Auto adjusts to users (preset preferences)



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Credit List

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