JARVIS
Personal Concierge Concept

PROJECT REPORT
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Project Report
Autonomous Vehicle Project

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EXECUTIVE SUMMARY

This project explored the emergence of autonomous vehicles, and the impact that autonomous vehicles will have on users and the transportation ecosystem. Our team focused primarily on the user perspective, and what effects autonomous vehicles would have on the user transportation experience. While Goodyear aims to increase engagement with its users, users are likely to become less engaged with their vehicles, and thus less engaged with Goodyear. What we found, however, was that although autonomous vehicles will likely cause users to be less engaged with cars in their current form, autonomous vehicles will actually increase user engagement in an entirely new way. Our research shows that autonomous vehicles will create a paradigm shift and completely change the way we think about and interact with our vehicles. We also found that the transition from using a manually driven car to a fully autonomous vehicle would leave a large physical and emotional gap between the user and the vehicle. In response, we designed Jarvis, a cross-platform digital concierge designed to connect users to their vehicles, giving them control and peace of mind during their transition from manually driven cars to fully autonomous vehicles. While the emergence of autonomous vehicles poses significant challenges for Goodyear and the rest of the transportation ecosystem, it also creates exciting new opportunities and possibilities.
The automotive industry is making a gradual but consistent move towards autonomous vehicles. From innovation giants such as Google to long time industry players such as Nissan, companies all around the world are taking huge strides toward this paradigm-shattering new method of transportation. Recent developments in the industry include cars sporting an autopilot mode, self-parking cars, and even experimental fully autonomous vehicles. Autonomous vehicle technology is progressing faster than ever and will bring significant changes to the transportation ecosystem.

Goodyear is a major player in the tire industry and plays a major role in transportation all around the world. They develop, manufacture, and distribute tires with 96 manufacturing facilities in 28 countries. This huge shift in the automotive industry will undoubtedly have a tremendous impact on the company. Goodyear has expressed concerns about what implications the shift toward autonomous vehicles might have on different aspects of the vehicle such as ownership, usage, and maintenance. They are also curious about the changes autonomous vehicles are expected to bring to the transportation ecosystem, and how they can adapt or play a role in that new ecosystem. One of Goodyear’s greatest goals has always been to increase its customer engagement. The shift toward autonomous vehicles presents Goodyear with significant challenges and potential opportunities.

Player’s Landscape of AV industry

[Image of the Player’s Landscape of AV industry diagram]
Goodyear wishes to become more engaged with its customers. As adoption of autonomous vehicles increases, fewer users will be the drivers of their vehicles. Users will become less engaged with their vehicles, and consequently less engaged with Goodyear.
Since users are responsible for driving their vehicles, they are more engaged with the vehicle’s operation. Users are currently active in the driving experience: starting the car, shifting gears, scanning mirrors, monitoring speed, mileage, and fuel, etc. Each aspect of the driving experience provides the user with feedback, and in turn the user’s senses are more attuned to the operation of the vehicle. Once the user relinquishes control of the vehicle to the vehicle itself, the user’s senses are no longer bound to the operation of the vehicle. The user’s current responsibility to drive the vehicle dissolves along with his engagement.

**HYPOTHESIS**

Our survey shows that the biggest motivation of respondents to purchase fully autonomous vehicles is increasing productivity. We spend a lot of time to drive now, and many people consider this is a kind of waste of time.

On the other hand, the report written by Boston Consulting Group mentions top three reasons for buying a fully autonomous vehicle based on their research. “Increase safety”, “Lower insurance premium”, and “Multitasking & Productivity” are the biggest interests of consumers. This result taught us that there is still space that we can increase engagement with AV users by focusing on these factors.

**STATISTICS**

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On the other hand, the report written by Boston Consulting Group mentions top three reasons for buying a fully autonomous vehicle based on their research. “Increase safety”, “Lower insurance premium”, and “Multitasking & Productivity” are the biggest interests of consumers. This result taught us that there is still space that we can increase engagement with AV users by focusing on these factors.
The central idea or hypothesis for our project is that users will not become less engaged with their vehicles, but rather they will become more engaged with them in an entirely different way. We also hypothesize that the transition between using manually driven cars and using autonomous vehicles creates a physical and emotional gap between the user and the vehicle.

The concept of engagement with vehicles takes on a whole new meaning once we make the shift from manually driven cars to autonomous vehicles. When one drives a car, his senses are engaged with the act of driving. His eyes are scanning the road and the cars around him; his limbs interact with the controls of the vehicle; his hands and feet feel the texture of the road through the tires; his ears are attuned to sounds that might cue him to slow down or warn him of an approaching emergency vehicle. Once the vehicle no longer requires a driver, users are no longer bound by the constraints of operating a vehicle. They have become fully disengaged with the operation of the vehicle. In an autonomous vehicle, the driver’s seat has expanded and evolved from being a cockpit to being a space between where we are and where we want to be. This redefinition of the driver’s space presents an opportunity in which the previously disruptive experiences in transportation can become seamless. Increased productivity and connectivity will allow experiences to be continued as we travel between fixed locations.

While the autonomous vehicle frees the user from the responsibility of driving the vehicle, it also deprives the user of the control and sense of security to which he is accustomed. Autonomous vehicles dissociate users from the vehicle controls, creating a physical and emotional gap between users and their vehicles. This gap places the burden of anxiety and relinquishment of control on users. We therefore believe that a seamless transportation experience predicates on our ability to fill the gap created by the transition from manually driven to autonomously driven vehicles.

Potential factors that cause less and more engagement

In terms of positioning of characteristic of vehicles, there would be big change. Existing public transportation, such as buses and trains are not changing their positions a lot, and airplain must vary their characteristics depending on prices of seats. For example, a first class or business class seat can become a bed, office desk, restaurant table, or sometime a movie theatre. On the other hand, consumers demand the flight tickets as cheap as possible. Low cost carriers are providing seats for extreme low prices, and they work only as transportation.

Taxi and existing consumer fleets would be integrated as shared vehicle driven by robot thanks to technologies of driver less car. To increase efficiency and utilization, several users might have shared-ride, and the robot taxi still would have a characteristic of public transportation.

Position of cars would be drastically changed. Car is mainly owned privatelly nawadays, but it would have more wider range between private and public characteristics since it would be driven automatically and could replace home and office as a “multi purpose moving space”. As a result, times spend at office and home would be declined, and people would spend more time in autonomous vehicles. Productivity, which many consumers are expecting to autonomous vehicle, seems to have similar meaning to spend more time in vehicles.

This hypothesis also means that there still would be space to increase engagement level between users and autonomous vehicles.
Research efforts have been fundamentally supportive of the shaping of understandings and perspectives about not only the advent of autonomous vehicles but also the potential implications of the technology as it is being thought about today. This research has continued throughout the course of the project as new information came to light, new perspectives were sought, or new press releases were announced. The technology is, after all, a hotbed of activity with significant research continuing to support ongoing development into this bright new future full of possibilities. These research threads can be categorized into industry research and user research.

Our industry research developed within influences from research papers from consulting firms such as our referenced Boston Consulting Group article as well as news publications covering anything from technology developments to considerations of the implications and possibilities. Further research pursued concept videos presented by a number of OEM auto manufacturers, such as Nissan and Mercedes-Benz, as they move to present their vision for what autonomous vehicles could be to the end user.

User research was motivated with developing an otherwise limited view of what users may think about the technology. We wanted to understand the concerns that users may have with respect to autonomous vehicles and just as significantly what their motivators could be to adopt and adapt. This effort took the form of user-surveying with the purpose to reach a broad base while retaining the ability to generate qualitatively significant information.

The combination of these research directions lead to the evolution of the initial problem statement from its early beginnings to that which shaped the effort to the solution that will be presented within the following section. It facilitated that development of the vision and the supporting development of the realm about the idea through application of concept mapping.

**PERSONA**

**Pamela**

- 32 years old
- Single Mom of a little child
- Marketing manager at a jewelry company
- Living in a city
- Used to love driving
- Doesn’t know well about car maintenance

We assumed some personas considering age, living location, job, families, understanding level of car maintenance, curiosity about advanced technologies, current engagement level with normal car, and so on. In conclusion, in order to consider the engagement level between users and autonomous vehicle, the persona who would seem to be least engaged with autonomous vehicle. Since she is living in a city, there would likely be many opportunities to try car sharing services and automated commercial fleets. She used to love driving, but she had lost interest in car because now she is not only a single mom of a little child, but also working at a jewelry company as a marketing manager. She is busy, and has no time to care about vehicle itself.
Values brought by autonomous vehicle - Why autonomous vehicle is needed?

Users' demands
1. Increasing safety *
2. Lower insurance premium *
3. Allows multitasking and productivity while vehicle drives *

Car manufacturer's strategy
New Product / Market
Parts Supplier
Supplier side
IT company's Strategy
New Market

Public / Government
User
Personal Owner
Distributor
Fleet

Less maintenance
Less Cost
Efficiency
Parking
Traffic
Human error
Reliability
Sensor technology
Government
Infrastructure (Road etc.)

Sensor
Cloud server
Telematics
Intelligent Map
Autonomous Vehicle
Products
Information

Fun to drive
Energy Efficiency
Comfortable
Productivity
Space, not vehicle
work place
Entertainment
Fitness
Sleeping Space

What do personas expect for autonomous vehicle?
Users' demand is not owning cars, but going to destination w/o concens
3. Allows multitasking and productivity while vehicle drives *

Public / Government
Personal Owner
Distributor
Fleet

CONCEPT MAP

According to our survey and the report by BCG (as we describe later), we figured out that these three issues - "Safety issue", "Cost issue", and "Productivity issue" - might be able to resolve less engagement between autonomous vehicles and users. Based on this thought and the players landscape of autonomous vehicle industry, we drew a concept map as a figure on the left.
Assuming a Pamela as a persona and that there would be more various kinds of car-sharing services in the future, we created journey maps. Since this is about far future, it is hard to imagine but we had tons of discussion and assume the most likely scenario about city life with fully autonomous vehicles. In this scenario, most of cars in a city of the U.S. are autonomous vehicle, and users can operate them through smartphone apps, home display devices, smart watches, and other electric devices we have never seen.

Although Pamela has her private autonomous vehicle, she still uses car-sharing services depending on situations and her demands for activities during drive. If she wants to have meeting with others, she would reserve a large one box car that has table and chairs for commuting. She also can be a commercial fleet owner while she doesn’t use her car.

To assume more likely future, we collected data from existing researches. Although numbers are different depending on research, it could be said that cars in the U.S. are spending most of time not working but parking or under maintenance, and this causes more demands not to own private cars. Especially in a city, consumers can cut cost significantly by using car-sharing service instead of having private cars. Number of Car-sharing users would definitely increase in the near future, and there must be more variety of Car-sharing services.

### Car utilization in the U.S. in 2015

Actually, utilization of cars in the U.S. is only 5%, and 95% of cars are not on the road. This data indicates that having a private car is basically not cost efficient if you are not heavy user of cars.

### Number of Car-sharing service users

Number of Car-sharing service users in 2015 was 5.8 million all over the world including North America, Asia pacific, and Europe. This number is increasing day by day, and the report by BCG says it would be 35 million in 2021 and increased continuously. This tendency would be accelerated if autonomous vehicle became practical in daily life.

**2015 → 2021**

- **2015:** 5.8 million users are using Car-Sharing
- **2021:** 35 million users

**86,000 cars are being used for Car-sharing service**

### USER JOURNEY MAP

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### DATA COLLECTION

To assume more likely future, we collected data from existing researches. Although numbers are different depending on research, it could be said that cars in the U.S. are spending most of time not working but parking or under maintenance, and this causes more demands not to own private cars. Especially in a city, consumers can cut cost significantly by using car-sharing service instead of having private cars. Number of Car-sharing users would definitely increase in the near future, and there must be more variety of Car-sharing services.
The solution concept presented must be acknowledged as being more focused on the abstract than the artifact. Our idea then, is the advent of the personal concierge concept which we have named Jarvis. Our intent in utilizing this name is to facilitate a connection with a digital assistant that people may be familiar with, easing the understanding of our vision and the implication of how it can assist the user. The concierge concept becomes the driver, without physical presence, that takes over the duties we’ve formerly associated with our driving experience. He takes over those responsibilities, so that the user can focus their attentions on other tasks or activities, facilitating their productivity in a previously disruptive experience.

Our personal concierge is a digital assistant aimed squarely at easing user transition from traditional modes of transportation and into all manners of autonomous vehicle applications. The concierge is the user’s means of interaction with the vehicle and through humanlike presentation and means of communication, is meant to ease this transition by assuaging concerns and reservations while being the bridge by which information is relayed between the technology and the user. The emphasis is on being the means by which the user is engaged.

Furthermore, we envision that in the future, the concierge can become an aide between the spaces we occupy in our daily lives. It would be capable of transitioning between various digital mediums, truly becoming fully-connected to our lives. This ability to transition between digital mediums or devices would facilitate our moving about our lives with less disruption between spaces, and then less distinction between those separate experiences. This seamless transition is a part of the core idea with respect to autonomous vehicles as well as the more long-term development of the solution.

Prototypes of Concierge App
The significance of the solution concept lies in the implications for users as well as for Goodyear as an entity. The objective having been to study the space around autonomous vehicles and identify a means by which Goodyear could propel themselves forward, regardless of connection with their existing core competencies. It is our belief that the personal concierge concept previously detailed is just this means of connection. A stretch into new technology and application as the world moves toward the advent and impact of autonomous vehicles.

The user stands to benefit with the advent and adoption of autonomous vehicles as there will be emotional barriers that will require attention to ease the transition. We expect that users will take time to adjust as in the proverbial elevator operator example. We envision the concierge concept to be the means by which we can bridge the transition period, reducing the overall impact as a fundamental part of people’s lives changes from something they may have known all their lives, into this brave new direction.

The benefit for Goodyear is closely tied to those of the users and their marketing position in how they position their tires for the consumer market. The benefit is that Goodyear is the provider of this transition aide, that can become much more, once again position themselves as the means by which people are...
infused with an ability to trust and feel at ease in their vehicles. Safety and reliability have been the message of the day with the likes of Aquatred and similar focused designs, and the personal concierge is the means by which they make that same splash into another segment of the overall marketplace. The user stands to benefit with the advent and adoption of autonomous vehicles as there will be emotional barriers that will require attention to ease the transition. We expect that users will take time to adjust as in the proverbial elevator operator example. We envision the concierge concept to be the means by which we can bridge the transition period, reducing the overall impact as a fundamental part of people’s lives changes from something they may have known all their lives, into this brave new direction.

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**JARVIS provides seamless experiences**
Goodyear Smart Tire Concept

The concept narrowed on here is a tire that goes a step beyond into the information gathering and analyzing space. The tire here developed would be embedded with further technology that could aide in gathering information about tire and road conditions. The information gathered could open up a completely new space in terms of data analytics. It could build a webbed understanding of our road infrastructure that could be utilized to aide AV users, tire manufacturing design, auto manufacturers, and perhaps even infrastructure oversight bodies. Our vision is for Goodyear to internally develop the information and provide this to interested parties based on interest and need.

Interchangeable Cabins

The idea of the interchangeable cabin was more closely tied to our discussions of the personal concierge. Particularly with the idea of seamless transitions in mind as opposed to the contemporary idea of transitioning between spaces where we have distinctly disrupted experiences flowing together. Understanding that user wants, needs, and engagement will change focus, we built upon other industry thinking to discuss interchangeable cabins as a means to facilitate different types of productive efforts with an autonomous vehicle. Since the user is no longer constrained by needing to control the vehicle, a traditional cabin layout will be highly unnecessary. Why then, not allow reconfiguration to allow for further work time productivity, relaxation and entertainment mediums, etc.? This concept would be the furthest step out in consideration of a timeline of development.

Strategy Roadmap

Although the main proposal of this project is JARVICE - a personal concierge concept for autonomous vehicle, we believe that this concept can strategically connect current Goodyear’s business and future concept tire called smart tire or Eagle 360 to interchangeable cabins concept. The strategy roadmap which we are assuming is as follow: