Title	Safety premium point system : Mobility interactive system design management
Sub Title	
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Abstract	As 7400 car accidents occur in Japan annually, there is need for increased safety and security for drivers by avoiding car accidents. The statistics of traffic accidents by MLITT (2004) show that of these 7400 accidents, top three main root causes are speeding, distracted driving and drunk driving. The purpose of this project proposal presented by group 12 is to develop a Safety System to reduce the amount of car traffic accidents. Included in the scope are the research, development and selection of one of the designs to finally execute. Moreover this project focuses on Suzuki's small car segment with a high potential in Japanese and Indian market. These cars are cheap and relatively of high quality but have a bigger chance on a fatal car accident as their deformable zone is only small compared to big car models. Excluded is execution of the implementation of the final selected option and research on feasibility of worldwide product launch (including other car brands). A Safety Premium Point System is introduced as the final result. For every distance and time driven without any warnings of the system, the driver earns points. When the system defines a "danger" measured with an in-car sensor, an advice is provided to change this behavior. According to what is done with the advice, the system converts to points and a final amount of points appear. Services can be interchanged for the amount of points earned, to provide incentives for drivers to purchase system. With method we obtained the following characteristics of the in-car sensors, related to aforementioned root causes: webcam to detect distraction, alcohol detector to measure drunk drivers, car navigation to track speeding. Results from customer's request, provide us with the preference of possible services a driver can chose, respectively: car maintenance (24%), donation (18%), traffic voting right (18%), day-off (15%), discount highway (14%), motor sports tickets (11%), and discount of parking (1%). [1] When we think about business model, concerns of investors, customer's, supplier's, and competitor's have important meaning. There are many IT machines such as i-Pod or portable GPS cellular phone in these days, so above machinery system will be able to attain cheaply. However, funds and cooperation among involved companies is difficult as realizing implementation requires a lot of change in the world. Therefore, closer cooperation among government, NGO, Japan Automobile Federation (JAF), Japan Safe Driving Center and other companies surrounding Suzuki will be necessary in order to successfully integrate our system in people's daily lives. In conclusion, if our suggestion of SPPS pervades among drivers, they will pay attention more carefully while driving, and the number of traffic accidents will decrease, gradually. Not only pursuing one's company's profit, but also having close teamwork among car companies may be required, nowadays. After successfully launching in Japan and India we would like to launch this system worldwide. Any unexpected problems resulting in a substantial influence on one of the premises: cost, quality, time, schedule will result in a meeting with investors and first customer (Suzuki) on how to proceed. Quality control, budget control and time control are already implemented to avoid these unexpected problems, plus regular meetings with investors, end-users and customers.
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Group 12

Group 12's Theme Proposed by SUZUKI Motor Corporation

Theme 5:

Theme title : **Mobility Interactive System Design & Management**

Proposer Organization's Name : **SUZUKI** Motor Corporation

Supporter Name and contact info : Takashi **Hayashida** (the0116@a8.keio.jp)

Abstract of your project theme :

Safety & Security is one of the biggest theme for mobility all the time. For example, Air-bag, Anti-lock brake system, Vehicle Stability control…etc. In the near future, the more important thing is software. For example, Navigation, Road services, and Interactive-communication (- Blinking the hazard lamp of the traffic jam to the rear driver)
But there is not unified inter-communication system in the transportation field.

Benchmark image

・iPod & iTune system for the music business
・iPad & iBook system for the publishing business

Just image example

About 5 years later, at India, German, Japan…worldwide, with Navi, Cell-phone, iPad…any-device, it's application (like Car-twitter include HMI & Business model) for interactive communication of short mobility. [not limited]

For driving future with safety & security, we expect big solution for all customers on the road.
We hope many Sky-high ideas & Enjoy ALPS!

ALPS2010 "safety and security"

ALPS Final Report 2010

Group 12

PROJECT TITLE:
"SAFETY PREMIUM POINT SYSTEM"

Theme:
"Mobility Interactive System Design & Management"

Proposer Organization: SUZUKI Motor Corporation

Proposer Organization's Supporter: Takashi Hayashida

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1. EXECUTIVE SUMMARY

As 7400 car accidents occur in Japan annually, there is need for increased safety and security for drivers by avoiding car accidents. The statistics of traffic accidents by MLITT (2004) show that of these 7400 accidents, top three main root causes are speeding, distracted driving and drunk driving. The purpose of this project proposal presented by group 12 is to develop a Safety System to reduce the amount of car traffic accidents. Included in the scope are the research, development and selection of one of the designs to finally execute. Moreover this project focuses on Suzuki's small car segment with a high potential in Japanese and Indian market. These cars are cheap and relatively of high quality but have a bigger chance on a fatal car accident as their deformable zone is only small compared to big car models. Excluded is execution of the implementation of the final selected option and research on feasibility of worldwide product launch (including other car brands).

A Safety Premium Point System is introduced as the final result. For every distance and time driven without any warnings of the system, the driver earns points. When the system defines a "danger" measured with an in-car sensor, an advice is provided to change this behavior. According to what is done with the advice, the system converts to points and a final amount of points appear. Services can be interchanged for the amount of points earned, to provide incentives for drivers to purchase system. With method we obtained the following characteristics of the in-car sensors, related to aforementioned root causes: webcam to detect distraction, alcohol detector to measure drunk drivers, car navigation to track speeding. Results from customer's request, provide us with the preference of possible services a driver can chose, respectively: car maintenance (24%), donation (18%), traffic voting right (18%), day-off (15%), discount highway (14%), motor sports tickets (11%), and discount of parking (1%). [1]

When we think about business model, concerns of investors, customer's, supplier's, and competitor's have important meaning. There are many IT machines such as i-Pod or portable GPS cellular phone in these days, so above machinery system will be able to attain cheaply. However, funds and cooperation among involved companies is difficult as realizing implementation requires a lot of change in the world. Therefore, closer cooperation among government, NGO, Japan Automobile Federation (JAF), Japan Safe Driving Center and other companies surrounding Suzuki will be necessary in order to successfully integrate our system in people's daily lives

In conclusion, if our suggestion of SPPS pervades among drivers, they will pay attention more carefully while driving, and the number of traffic accidents will decrease, gradually. Not only pursuing one's company's profit, but also having close teamwork among car companies may be required, nowadays. After successfully launching in Japan and India we would like to launch this system worldwide. Any unexpected problems resulting in a substantial influence on one of the premises: cost, quality, time, schedule will result in a meeting with investors and first customer (Suzuki) on how to proceed. Quality control, budget control and time control are already implemented to avoid these unexpected problems, plus regular meetings with investors, end-users and customers.

2. Table of Contents

3. PROBLEM STATEMENT

In a report on domestic traffic accidents conducted by the ministry [2], the paper concluded that the worst traffic violation of drivers was excessive speeding, followed by distracted driving and drunk driving as respectively the second and third root cause of car traffic accidents. Also, the result indicated that most of the accidents have taken place at busy intersections in Japan. In order to prevent the fatalities caused by those root causes, the government tightened the traffic rules by creating a new law on vehicular homicide in 2007[3]. Since its implementation, the fatalities caused by drinking drastically decreased [4]. But on the other hand, there is much increase of hit and run death recently. Some experts say this is because the drivers are afraid of receiving more severe penalty than usual.

While the rate of accidents decreases, driver's behavior has worsened. The purpose of this project proposal presented by group 12 is therefore to develop a Safety System to reduce the amount of car traffic accidents. Included in the scope are the research, development and selection of one of the designs to finally execute. Moreover this project focuses on Suzuki's small car segment with a high potential in Japanese and Indian market. These cars are cheap and relatively of high quality but have a bigger chance on a fatal car accident as their deformable zone is only small compared to big car models. Excluded is execution of the implementation of the final selected option and research on feasibility of worldwide product launch (including other car brands besides Suzuki).

In order to identify what the real causes are, we carried out interviews and observations with at wide range of potential stakeholders. We directly contacted respondents such as car companies, car insurance companies, and gave them a lot of questions including responsibility and organizational tasks what they have committed themselves to in order to create awareness and reduce traffic accidents. For other key stakeholders like pedestrians, we hold an online survey among students of Keio University. The questions mainly focused on general traffic environment, which they are facing in daily life. Since we were not able to contact members of the Japanese MLITT directly, we accessed the official database to look for current traffic regulations and statistics on car accidents.

As result of expanding the scope of interviewees and preparing a large number of questions in detail, we analyzed the tightening the law could backfire and drivers could be encouraged to observe the rule by giving them something beneficial. In a word, they ask for safe and happiness in driving, it's concluded.

Related to competition in the market of in-car safety systems, we found that some car manufacturers provide their users with traffic information through the car-installed navigation system (4). This service is designed to encourage drivers to use the vehicle more safely. But it is not designed to give them incentives to provoke their voluntary effort towards driving safely. Volvo S60 and XC60's safety package and Lexus' technology package will be direct competitors [1]. However, we will focus on the point to differentiate our product. In order to do so we will develop a product applicable in every car and not restricted to Volvo or Lexus cars. The main premises of our project are therefore cost, quality and schedule. Quality and cost in order to create a competitive advantage, make the SPPS cheap and still with high performance. Schedule is important as new technological improvements are always threatening and we would like to be first in the Suzuki market. Another point of differentiation is that the drivers are provided with positive incentives as they can exchange the saved points for service such as car-maintenance, day-off and so-forth. By giving them services, they are more motivated to use the vehicle with SPPS and car companies can expect loyal customers who are feeling safe in long run.

4. ANALYSIS AND DISCUSSION OF ALPS METHODS

Scenario Graph

This tool helped a lot to group randomly addressed words into meaningful categories when we brainstormed to make our discussions more visible. When you brainstorm something, this method can effectively work to sort them out.

VOX

Before we carried out VOX tool, we had already implemented general interview for our stakeholders. However, by expanding the scope of interviewees and preparing a large number of questions in detail, we were clearly able to find out the boundary of the theme and identify what stakeholders are interested in precisely.

VOC

By using VOC matrix, we were able to specify customer requirements in order to realize safety premium point system. These are "service operability", "service benefits", "reduce traffic accident", "clear, simple, fair rule" and "reduce traffic rule violation".

OPM

OPM (Object Process Methodology) starts with clarifying the objects. Then the tool will help to illustrate the process and state of objects.

DSM

DSM (Design Structure Matrix) is a tool to identify input and output of components in order to foresee the expected iterations. In our group, we utilized the tool for scheduling and it went well for major parts, yet, we learned that the components should be MECE (Mutually Exclusive and Collectively Exhaustive).

NPV

The tool is used when we check financial feasibility of the business model from long-term perspective. As the result of its investigation, we judged the plan should be positive.

FMEA

Summary

The FMEA tool is used to determine which major risks the final product and the project bring. We arranged the risks according to the several steps our system chronologically passes and finally some general risks the project brings. This resulted in following categories: "FACIAL MOTION RECOGNITION," "TRANSFER DATA TO SPPS," "FEEDBACK FROM SPPS SYSTEM," SPPS SYSTEM REQUEST GPS FOR EXACT LOCATION COORDINATES CAR", "POINT CONVERTION" and "GENERAL FAILURE MODES." The ratings of the risks expressed in Severity, Occurrence and Detection results in a final number of RPN. These ratings are provided after research on similar projects and risks involved. Therefore they are based on experience and we may assume they are representative for our situation.

Assumptions

We assume that main risks might happen at the facial motion recognition as the calibration of the sensors is a tough task as every person is unique and has different facial characteristics and height, plus a lot of external factors can have a negative influence on facial motion recognition. This assumption was supported by the prototyping we performed in Hiyoshi Driving School; it was very difficult to track the facial motion of the driver. Moreover as the general failure mode we assume that cost might be an issue as it is very hard to estimate the exact cost of our project and even more difficult to estimate the amount of investment we can expect from the investors Suzuki and the Japanese Ministry of Traffic. This assumption was later on also supported by our financial analysis including the Cost Worth Analysis and Net Present Value analysis.

Key insights

From the RPN it follows that the general failure modes, related to the cost, have the highest impact in terms of Severity, Occurrence and Detection. Therefore we should hold regular meetings with investors, suppliers and customers to make sure the budget is not exceeded and no unexpected situations might occur in terms of investors who resist to pay and so on. Further elaboration on this and mitigation is provided in the section about future work chapter 8.

As explained before in the assumptions, "no facial motion detected" is also one of the main sources of failure for our system. Therefore this is a key insight for our project, we should not forget to consider this and in case of occurrence the right mitigation has to be followed.

Another key insight is related to the psychological state of the driver; Are they actually willing to follow our system? Therefore we decided after performing the FMEA that we would like to continue with the Design of Experiments in order to provide us with the willingness of drivers to invest in the system and moreover with the results on final preferences of several services. Besides these risks, problems with the transfer of the data can also be an important issue to consider. Therefore we included quality control in our future work as well and intensive product testing has to be performed before actual launching. For more details on this we refer to chapter 8.

5. DESIGN RECOMMENDATION

5.1 Proposed Innovation and Final Prototype

Based on root causes' system design assessment of traffic accidents, the requirements of the system could be defined as follows:

1). To detect the dangerous situation (distracted driving, drunk driving, speeding).
2). To notify the drivers about distracted driving.
3). To incentivize drivers to avoid distracted driving.

After investigation, which includes driving simulator and test-driving at Hiyoshi driving school, the system requirements have been narrowed down as follows:

a). Webcam, camera, car navigation system and alcohol detection sensor used for detection.
b). Alert messages provided by mini-computer in car
c). Points collection for safe driving and distraction for dangerous driving.
d). Points can be interchanged for Incentives afterwards

a). Webcam, Car navigation system and Alcohol Detection:

As shown in Figure 5-1, the system will require three major sensors.

1). Alcohol detection sensor near the AC to measure the alcohol level of driver's breath.
2). Webcam detection in front of driver to watch his/her facial motion.
3). Camera detection on the side of driver to watch body movement.
4). Car navigation system to track speeding.

Figure 5-1: Installation of Safety Premium Point System

b). Notification by System
5). System voice by the mini-computer will alert the driver to correct his/her behavior.

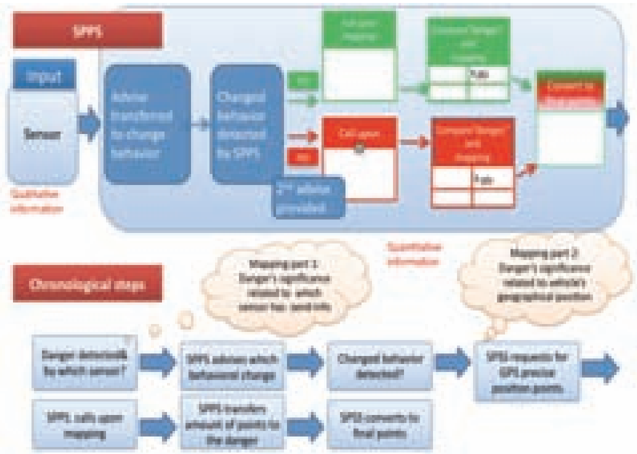
c). Point conversion
6). Points will be earned for every distance times time driven safely and distracted when dangerous driving occurs.

d. Incentives for Drivers
7). Good performance should be rewarded.

5.2 Diagrams of Systems and System Specification

Figure 5-2: Safety Premium Point System

The top figure of Figure 5-2, shows that the higher-level data flow starts with sensor to data conversion.



After one or multiple sensors measure a dangerous situation of driving, the system will provide the driver with an advice to change behavior. After this, according to whether the behavior has changed or not, a point calculation is made. If the person changed his/her behavior after the warning the amount of points distracted will be less. The bottom figure describes the flow in chronological order. In short, the qualitative data obtained by the sensors will be converted into quantitative information when it is converted into points. As for our case, it is assumed that the point conversion will depend upon two mappings:

1). Detection by which sensor(s)
2). Geographical position

$$\textit{Time in} - \textit{car}\,(\textit{hours}) * \textit{Distance driven}\,(\textit{kilometer}) - \{[\textit{danger detected}\,(y/n) + \textit{correcting behavior}\,(y/n)] * \textit{seriousness danger}\,(-) * \textit{position}\,(-)\}$$

Figure 5-3: Final points calculation

Figure 5-3 explains the formula used for the final points conversion, based upon above explanation. The two measures explained before, seriousness of the danger and position the car has, work as deductive functions on the amount drivers drove. Positive points are obtained by the in-car time (hours) and distance driven (kilometers).

In order to determine the final equation for calculating points, for the seriousness of the danger and the position the car has (near an intersection or on countryside road), a different value has been attached. We use the following information in order to come to the calculation. Japanese drive annually on average a distance of 15500 km/year. The average speed while driving is 80 km/hour.

This results in an average of 194 hours of driving per Japanese per year (In Japan the amount of fatal car accidents is 7400 per year). As there are 57 million cars in Japan, this results in 0.00013 fatal accidents per car per year. Moreover we assume that when a person is involved in a fatal accident, (s) he needs 5 years of average driving to reach the level of points being zero again. This results in the following calculation:

*Points formula= 5 (years)*194 (hours) * 15500 (km) – {(0.00013 (accidents/car)+1 (behavior not corrected) * seriousness danger * position) = 0 -> seriousness danger * position = 15.033.046.*

As root causes of fatal accidents are distracted driver, speeding and driving under influence, the following table can be made, providing the single and combinations of different sensors' detection resulting in different factors:

Detection	Webcam	Car Navigation	Alcohol Detection Sensor

Webcam	100	x	x
Car Navigation	10.000	1000	1000.000
Alcohol Detection Sensor	100.000	x	10.000

Figure 5-3: Point dedication to detection methods

As most fatal accidents will happen at intersections when most crucial combination is used (alcohol and speeding), factor 1000.000 represent the seriousness of the danger, and therefore factor 15 is related to most crucial position of the car on an intersection. We make the following division for this:

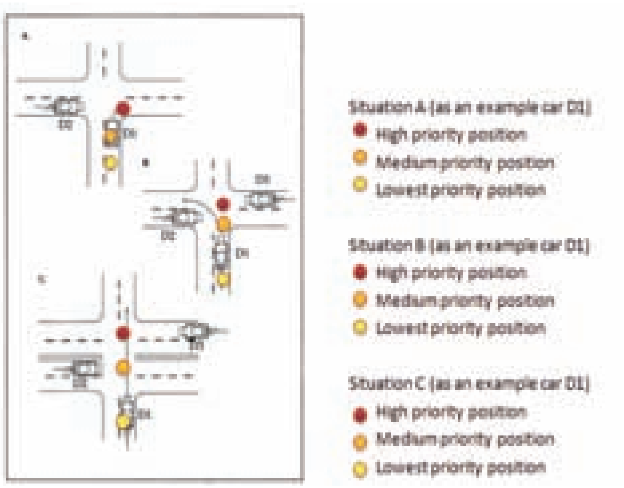


Figure 5-4: Points dedication to geographical position

Considering the seriousness of danger times position should be equal to 15.033.046, and given the points dedicated according to detection methods, a calculation of position priority results in following points dedicated:

- High priority position = factor 15
- Medium priority position = factor 10
- Lowest priority position = factor 5

5.3 Implementation Plan

As for implementation plan, the system will be implemented to Japan first. The exposure and practices of system will be gathered, as well as some important "lesson-learned". Once the best practices of Japan and other conditions (technological, infrastructural readiness) will be confirmed in India, the product will be implemented to India market, in which Suzuki has competitive advantage over other car manufacturers.

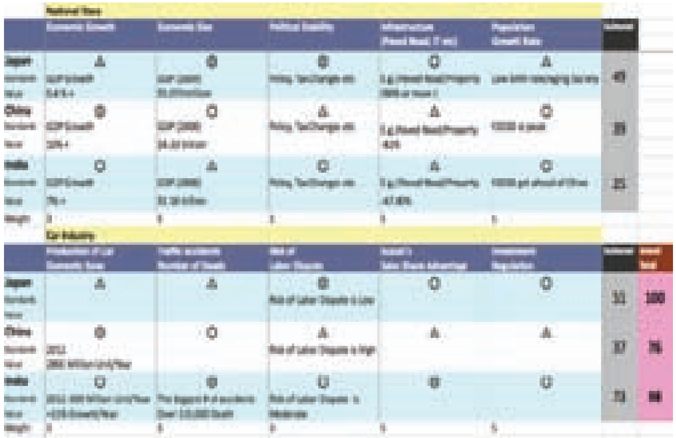


Figure 5-5: Market selection

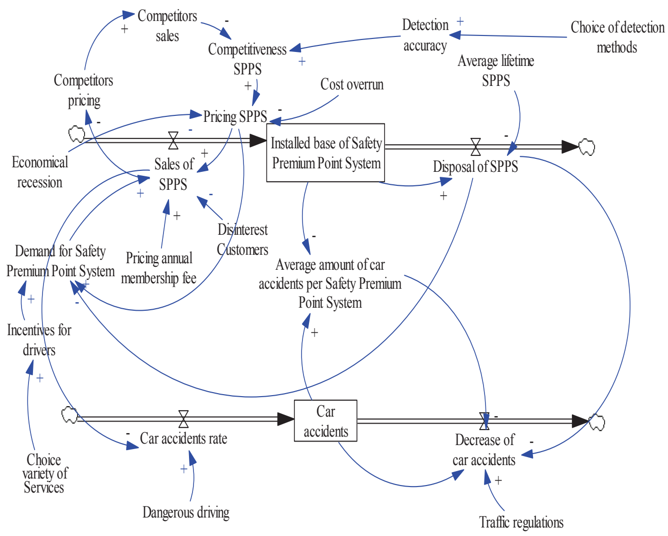
Upon product launch, we have surveyed the market of three countries; Japan, China, and India. As known, Suzuki has a strong market in India so we were much inclined to launch the system there. Yet, after re-considering the Technological Readiness Level (TRL) of India, we have come to doubt whether the country has enough IT infrastructure to run the system. Thus, the team has concluded that initial product launch will take place in Japan. After gathering best practices and lesson learned for Japan implementation, it will be implemented to India.

5.4 Life-Cycle Plan

Life Cycle of the product is assumed to be 5-6 years, which more or less matches with the life cycle of a car in Japan.

Figure 5-6 shows the overall system diagram including the life cycle.

Figure 5-6 Coflow



5

6. Competitive Analysis

6.1. Overview of Business Model and Value Proposition

Our business model, or strategy, is "low cost" and wide sales channel. As shown in Figure 6-1, the target market for our product is relatively big compared to other brands. Although the figure describes particularly the market of India, it was assumed that similar sales demographics can be drown for Japan, along with many other countries.

As for value proposition, the system holds two, besides the sales and revenues that it can get from low cost pricing. One is that contribution to safety driving in general. The real data of drivers' behavioral information while driving will be a great source of practice for the reduction of accidents. Another value proposition is that it will be a great integration of point system in future. There are numerous "point system" from various retail shops; clothes, foods, rental video-DVD, and so on. It is a de-facto standard that those different point systems to be integrated for their alliances and make synergies. Thus, having a point system will be a value proposition for Suzuki.

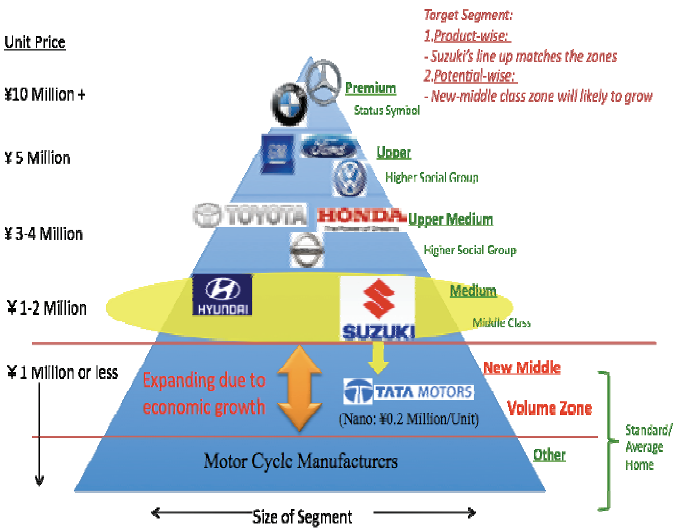


Figure 6-1: Market selection SPPS [6]

6.2. Revenue Sources and Cost Structure

In Table 6-1, it describes the overview of five-year financial forecast. As for the sources of revenue, the system expects gross cost margin per unit, gross membership margin, and governmental R&D funding expenses for ASV (Advanced Safe Vehicle).

As for cost structure, the major components will be consisted of development/enhancement resources, unit price, maintenance/administrative resources, office and other utilities.
Assumption of demand and NPV are described in the table. Development time and risk will be explained in a separate chapter.

Protections strategy against competition is our exclusive partnership with Suzuki and fully utilizing the existing channel while exploring a whole new exposure to another safety detection methodology. The data extracted from system will be analyzed and assessment for future improvement will be done. For Suzuki and the system, it is to have an intellectual property that be applied regardless of countries and car brand.

Another protection strategy is applied point system. Since this point system is a combination of mileage points (famous for Japanese air line agency) and deduction system, which is mainly based on local traffic regulation. The point system has a potential to provoke public and private sectors as well as boosting Suzuki's sales in Japan and India.

Figure 6-2:Cost and Revenue Structure

7. ALPS ROADMAP AND REFLECTIONS

This chapter explains the path we followed from Workshop 1 until Workshop 5 and which tools are related to each phase. Figure 7-1 shows the Roadmap of the entire ALPS project, including all tools relevant for our project. In our explanation below, we have made a division according to the different tools used in the homework in-between the ALPS workshops. Moreover we have provided suggestions for a preferable path to take, if we could start all over again, in order let the ALPS project be more smoothly. Finally, we dedicated a section to Pro's and Con's, suggestions and future improvements of the ALPS project.

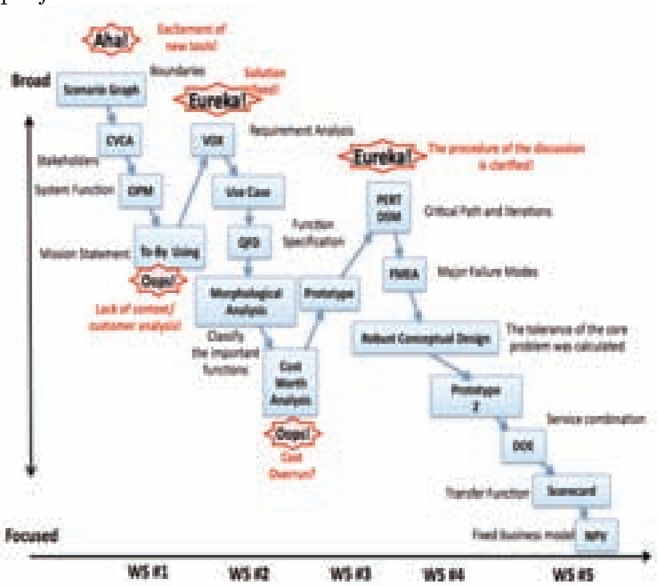


Figure 7-1 Roadmap

7.1. ALPS WS#1-2

We displayed "Aha!" in the Roadmap because we felt positive by using ALPS tools for the first time. As a first step, a rough scenario was selected by using "Scenario graph". As the second step, we made "CVCA" of the selected scenario. And we specified the main stakeholders from the result of "CVCA". Thirdly, we clarified the main function of the proposal by using "OPM". The final step before WS#2 was to make "To By Using" from the result of the "OPM" and we decided upon the main framework of our proposal. While we were using "To By Using", we felt that we were lacking context and customer analysis. So we displayed "Oops!" in the Roadmap.

7.2 ALPS WS#3

We clarified needs of the main stakeholders by "Voice of X". We especially valued and investigated "Voice Of Customer". As a second step, we thought about "Use Case" from the result of "Voice of X" and we decided upon the main situation for which the proposed solution was used. As a third step, we enlisted important factors of solutions that we proposed and we decided the importance of each factor by using "QFD". The fourth step was to visualize some solutions by using "Morphological Analysis" and selected a concrete final solution. As a fifth step, we clarified the cost-effectiveness for each function resulting from "QFD" and "Morphological Analysis". We displayed "Oops!" in the Roadmap because it was indistinct how to achieve the proposed solution. Then, as a final step, we made the "Prototype 1" combining the result of all tools that had been done up till now in a concrete concept. With this first prototype, we confirmed whether the proposed solution was really effective.

7.3 ALPS WS#4

To make a proposal as good as possible considering the time limit, we made "PERT" and "DSM". And we proposed the best process for ALPS. As a second step, we enumerated the risk in the proposed solution and clarified the danger of each risk by using "FMEA". We thought about the countermeasure to a dangerous risk. As a third step, we calculated to which extent the core problem could be solved by this proposed solution by using "Robust Conceptual Design" and the result of "FMEA". As a final step, to confirm the feasibility of our proposed solution, we made "Prototype 2".

7.4 ALPS WS#5

We clarified the best combination of services in SPPS by using "DOE" and estimated the costs related to our offer of services. The second step was "Score carding", in order to clarify the change in cost we developed the feedback function. As a final step, we proposed the business model. We confirmed whether the proposal was sustainable by calculating "NPV" from the results of "DOE" and "Score carding".

The path in figure 7-1 represents the progress through workshop. This "Roadmap" tool was a very convenient tool to show the progress of the project as we could make the logical connection between the different tasks visible. Therefore for future continuation of the project we would like to continue with the development of the roadmap to keep a clear overview of the project.

For a concrete overview of the required time each of the tasks has taken, we refer to the Gantt chart Appendix 1.

8. CONCLUSION AND FUTURE WORK

8.1. Conclusions

Although we have stated before we would like to enter the Japanese Suzuki market segment and afterwards the Indian market segment, we are aware of the fact that in order to become a market leader on providing the safety systems we have to make our system compatible for all car brands at the worldwide market.

However, this means we will have to compete with the Lexus and Volvo, which at the moment only implement their own systems in their own cars. So that is the second barrier, will all car brands develop their own safety system or are they willing to purchase ours? Another important issue comes from our main investors, Suzuki Corporation and Ministry of Traffic of Japan. As we want to expand to a broader market (outside Japan and more car brands), are they still willing to invest as much as they initially offered.

8.2 Future work

As mentioned before, we decided to stay owner of our SPPS and we have asked Suzuki, our customer, to invest in this project. As we have investigated the root causes for the traffic accidents and analyzed the main interests of customers for services, the next step would be to investigate on the specifications of the components to purchase and finally to combine this all into an actual system. In order to do so, the different components with requested specifications need to be purchased in accordance with the price Suzuki cars is willing to pay for it and considering compatibility with other car manufactures at a later stage. Moreover the software to link the several components has to be developed in-house. Finally contracts with the different service providers (i.e. car maintenance garage) need to be made in order to assure the service provision will proceed smoothly. In next section about project timeline all these actions can be summarized in packages of the Work Breakdown Structure.

8.3 Project Timeline

This section is related to the Gantt Chart created with MS Project, Appendix A, consisting of the ALPS project and future work for our company which will cover in total 451 days. With finalizing the ALPS workshop # 5 we have covered the first 181 days consisting of Preliminary Research, Planning and Design Phase (since May 2010) and therefore we can now proceed with the Project Execution Phase and Project Control phase. The different tasks in these phases are listed below and the due dates are mentioned as well. Moreover several meetings are scheduled to control development. As an example, some WBS tasks from the Gantt Chart with our main resource, manpower, required:

- *17-1-2011:* Create report on specifications of each component (webcam, alcohol detector, GSM) (resources: 4 manpower)
- *16-2-2011:* Set purchase contract with Suzuki (demand) (resource: 2 manpower).
- *4-3-2011:* Set the contract with suppliers (resources: 2 manpower).
- *15-3-2011* Set the contract with Service providers (e.g. car maintenance) (resources: 2 manpower).
- *28-11-2011:* Finish development software, (resource: 4 manpower).
- *30-12-2011:* Integrate system in cars (resources: 2 manpower).
- *11-1-2012:* Kick off steady state production.

8.4 Risk Register –Contingency Plan

Below is shown a risk register providing 9 key risks for our organization when operating this project on developing SPPS. We need a contingency plan for when one of the main risks might happen. When investors stop investing this will have great impact on our project. We will treat this by holding regularly meetings to confirm on expectations. Moreover when the detection instruments are not properly calibrated, the system can provide false feedback. We will take this risk and try to minimize it by performing enough test runs with different test persons. By outsourcing development of compatible security system we transfer the risk of privacy issues. Finally we will try to avoid a low demand of our product by advertising and holding regular meetings to confirm expectations of end-users.

The main premises of our project are cost, quality and schedule. Quality and cost in order to create competitive advantage, make it cheap and still with high performance. Schedule is important as new technological improvement is always threatening and we would like to be first in the Suzuki market. Quality, budget and time controls are added to avoid any unexpected problems.

	Causes	Risk event	Consequences	Premises	Likelihood	Impact	Risk mitigation
1.	Disagreement about project scope	Suzuki stops financing	Delay of design or cheaper design	Quality, Schedule, Cost	Medium	High	Treat: Regularly meetings are held to confirm on expectations of both customers and investors.
2.	Disagreement about project scope	Ministry of Traffic stops financing	Delay of design or cheaper design	Quality, Schedule, Cost	Medium	Medium	Treat: Regularly meetings are held to confirm on expectations of both customers and investors.
3.	Future technological inventories	Our system is outdated	No demand	Quality	Medium	High	Treat: We should make sure that our software can be easily adjusted when better detection methods appear.
		Improved traffic safety			Low/Medium	High	Take: We cannot predict this by now. Even if this happens in 20 years SPPS can serve long enough to be profitable for us.
4.	Complex system	Capacity problems of designers to develop software	System to late designed and implemented	Schedule, cost	High	High	Take: Search for an additional group of experts which can be deployed directly if necessary.
5.	Too little promotion and advertisement on use system	Demand lower than initially expected	System is available but no so widely implemented as was hoped for (lower network effects.)	Time, cost	Medium	High	Treat: Promotion campaigns and Training regarding the use.
6.	Change of requirements	Software needs to be redesigned/ renewed	Takes longer to launch the products	Time, Cost	Medium	High	Take: extra experts should be dedicated to designing if needed
7.	Failure of quality management	No quality assurance	Delivery of bad quality products	Quality	Medium	Medium	Take: Use quality plan to enhance quality
8.	Reliability issues due to cooperation problems	Conflicts of interest and goals between business partners	Collaboration might be hindered(partners might be seen as less reliable)	Cost, Time	Medium	High	Take: Apply business / decision making strategies to facilitate effective cooperation between partners
9.	Point system database hacked	Privacy issues	Less demand due to high risk.	Quality	Medium	High	Transfer: Outsource the development of a Security system.

Table 8-1: Contingency plan

9. ACKNOWLEDGMENTS

The team would like to thank Mr. Hayashida, our sponsor, from Suzuki Motors. Mr. Hayashida not only provided us an interesting and also challenging theme, but also actively participated our regular meetings to encourage and discuss the solution together. The team would like to show a great appreciation to Mr. Narukawa, our mentor, for providing insights and appropriate advice for our projects. The team would like to thank Hiyoshi driving school for providing us a great opportunity to test our prototype.

10. REFERENCES

[1] Overview of Suzuki; http://dic.nicovideo.jp/a/suzuki, http://ja.wikipedia.org/wiki/%E3%82%B9%E3%82%BA%E3%82%AD_(%E4%BC%81%E6%A5%AD)

[2] The white paper conducted by Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLITT) in 2004

[3] Penal code section 211, clause 2 "Negligent manslaughter crime caused by driving vehicle"

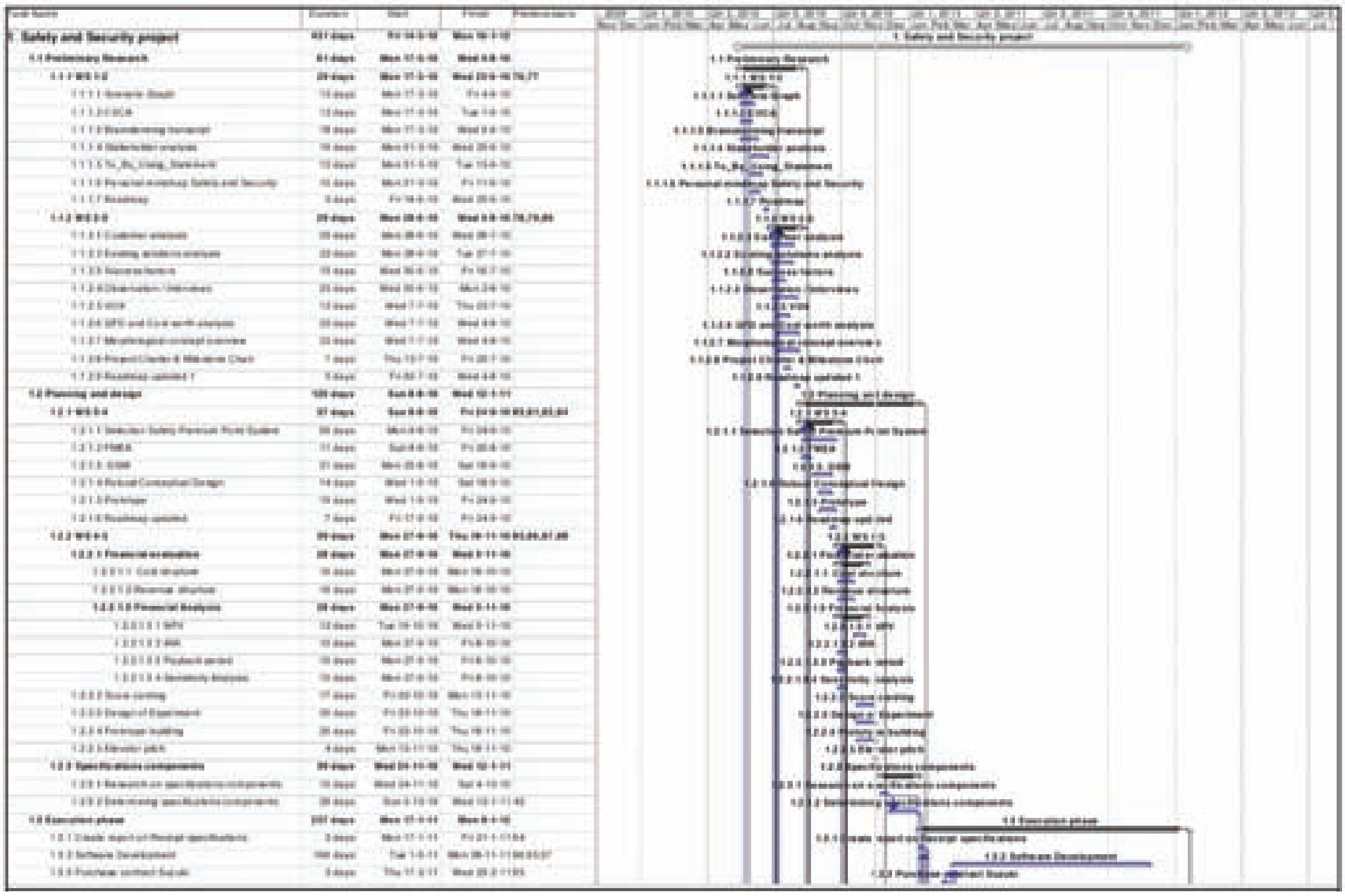
[4] The white paper conducted by Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLITT) in 2008

[5] www.volvocars.com, www.lexus.com

[6] http://www.automobileindia.com/cars/statistics/sales.html

APPENDIX

1. Details of Ghant Chart



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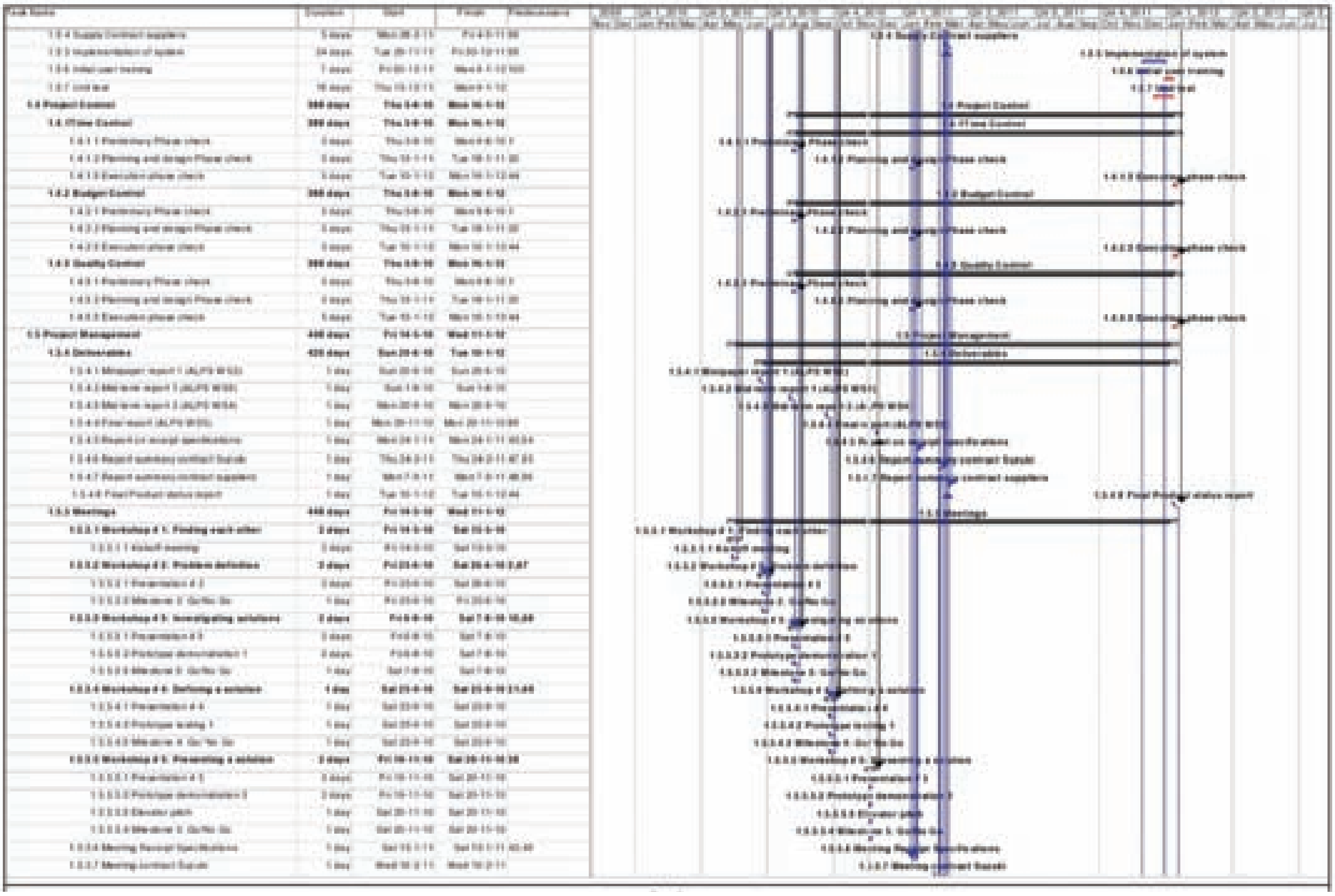


12

Group 12’s Final Presentation Slides

Safety Premium Point System

ALPS group12

Agenda

1. Background
2. Project proposal
3. Prototype
4. Business model
5. Financial Evaluation
6. CM
7. Future work

1.Background

Points

✓ Protecting driving speed
✓ Giving up roads to pedestrians
✓ Prohibiting using cellular phone

Suzuki shares the state of no.1 in the field of small cars during 34 years (1973-2006)

1.Background

2004 Traffic Accident

Violation of drivers

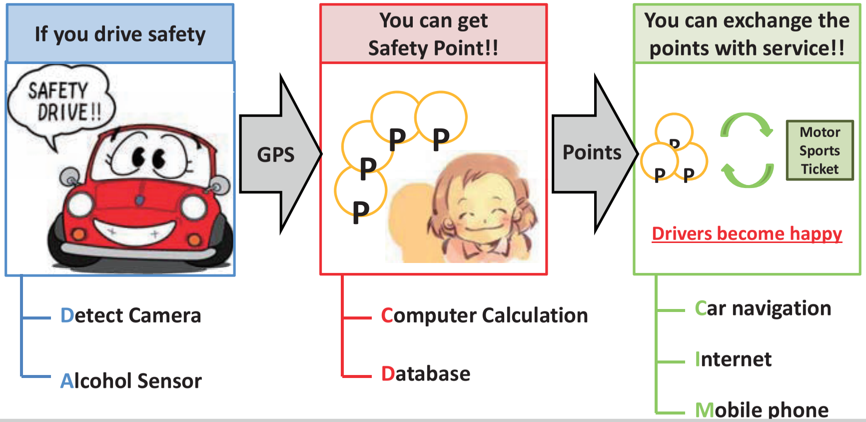
1. Maximum speeding
2. Looking off while driving
3. Random driving

Total Accidents

1. lacking confirmation of safety
2. looking off while driving
3. lacking confirmation of movements

2.Project Proposal

Safety Premium Point System



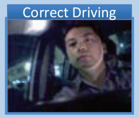
Society with Safe and Secure Traffic

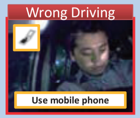
3.Prototype

Two Prototype for SPPS

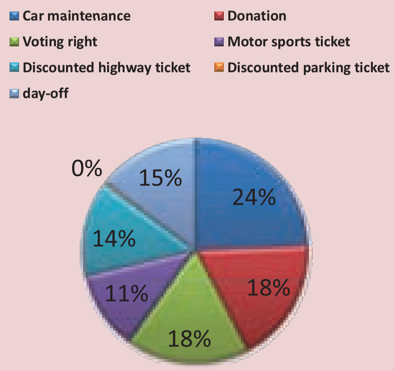
Camera Detection for Camera Detection

1. Check the expression of the face
2. Check the Scenery seen from drivers seat
3. Check the movement of the body





Best Service Combination



Using Conjoint Analysis

4.Business Model – Summary

- **Annual Membership**
  - Initial Year: 12000 Yen
  - From Second Year and so on: 4000 Yen
    - Application of Point System with Other Industries
- **Advertisement**
  - One click 0.1 Yen
- **Knowledge Database regarding Car Driving Safety**
  - Very Informative for Academic, and Business Best Practices
    - Potential Research Topic for Human Factors and Interface
- **Governmental Fund for Advanced Safety Vehicle (ASV)**
  - Annual Funding of 2009: 500 Million Yen
    - * If the system can be funded partially (5%), still a big plus.

4.Business Model – Strategy

	National State: Economic Growth	Economic Size	Political Stability	Infrastructure (Paved Road, IT etc)	Population Growth Rate	Subtotal
Japan Standards	△ GDP Growth	◎ GDP (2009)	◎ Policy, Tax Changes etc	○ E.g.) Paved Road/Property	△ Low birth rate/Aging Society	49
Value	0.4 % +	$5.073 trillion		(90% or more)		
China Standards	◎ GDP Growth	○ GDP (2008)	△ Policy, Tax Changes etc	△ E.g.)Paved Road/Property	○ Y2030 at peak	39
Value	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
India Standards	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]5
Value	7% +	$1.16 trillion		-47.40%		
Weight	3	5	1	5	1	

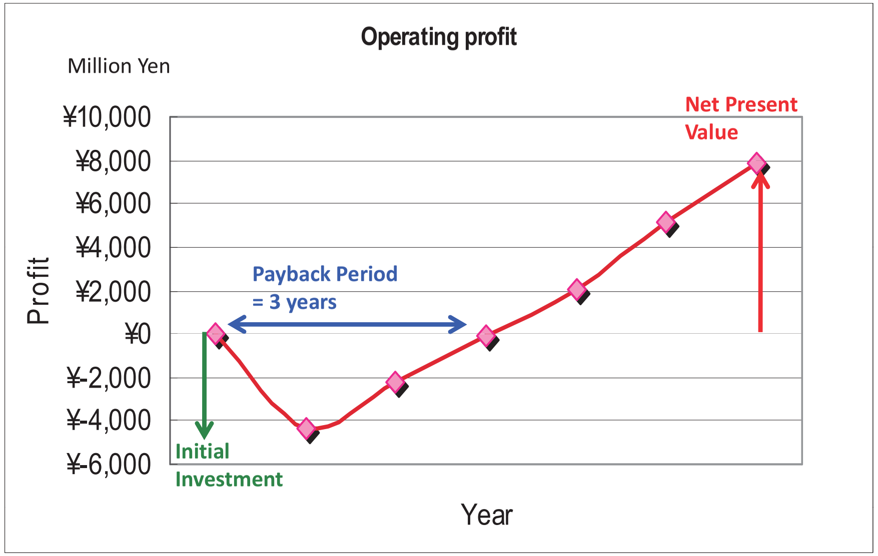
•Will Launch in Japan first as Pilot

•Will Launch in India, with Japan Practice.

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Subtotal	Grand Total
Japan Standards	△	△	◎ Risk of Labor Dispute is Low	○	○	51	100
Value							
China Standards	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]7	76
Value	2000 Million Unit/Year						
India Standards	○ 2012: 600 Million Unit/Year	◎ The biggest # of accidents	○ Risk of Labor Dispute is	◎	○	73	98
Value	+15% Growth/Year	Over 130,000 Death	Moderate				
Weight	3	3	3	5	5		

•Aims for World-Wide Spread.

5.Financial Evaluation



6.CM

Link http:*************

7.Future work

Project obstacles

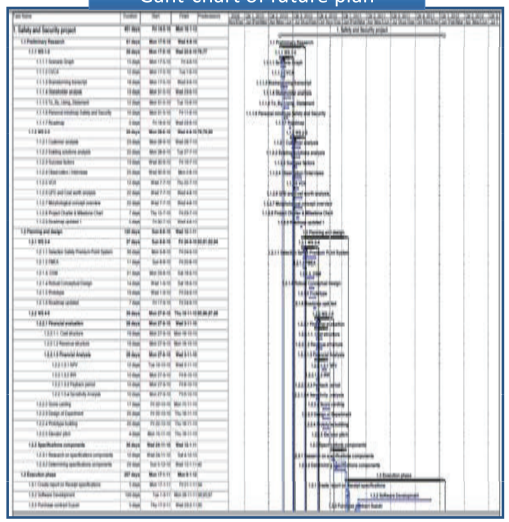
- ✓ Worldwide launch: willingness car developers to purchase our system or rather develop own?
- ✓ Competitive advantage over Volvo, Lexus?
- ✓ Willingness to invest by Japanese government if project not solely for Japanese market?

7.Future work

The Gantt Chart of our project shows the following main, next steps

- ✓ *17-1-2011:* Create report on specifications of each component (webcam, alcohol detector, GSM)
- ✓ *16-2-2011:* Set purchase contract with Suzuki (demand)
- ✓ *4-3-2011:* Set the contract with suppliers
- ✓ *15-3-2011* Set the contract with Service providers (e.g. car maintenance)
- ✓ *28-11-2011:* Finish development software
- ✓ *30-12-2011* Implement system in cars

Gant-chart of future plan



7. Future work - Contingency Plan

To given an idea

Risk	Consequence	Mitigation
1. Investors stop investing	Delay of design and/or cheaper design	Treat: Regularly meetings to confirm on expectations of investors.
2. Future technological improvements	Our system gets outdated	Treat: Software easily adjusted.
3. Demand for services different from analysis	Unavailability services	Take: Monitor on a regular base the in and outflow of the different services.
4. Too little promotion/ unawareness	Demand for product less than expected	Treat: Regularly meetings to confirm expectations customers, promotion and training.

Any unexpected problems of substantial influence on the premises (cost, quality, time, schedule) will result in a meeting on how to proceed. Quality control, budget control and time control are taken into account in the Gantt chart to avoid these unexpected problems.

Thank you for listening to our speech!!

a1.DOE

Purpose

✓Decide annual membership fee of SPPS system
✓Decide the price of the service consideration
✓research the needs of each service

Method

✓Conjoint analysis
✓Making of questionnaire table based on DOE

We use $L_8(2^7)$ orthogonal arrays

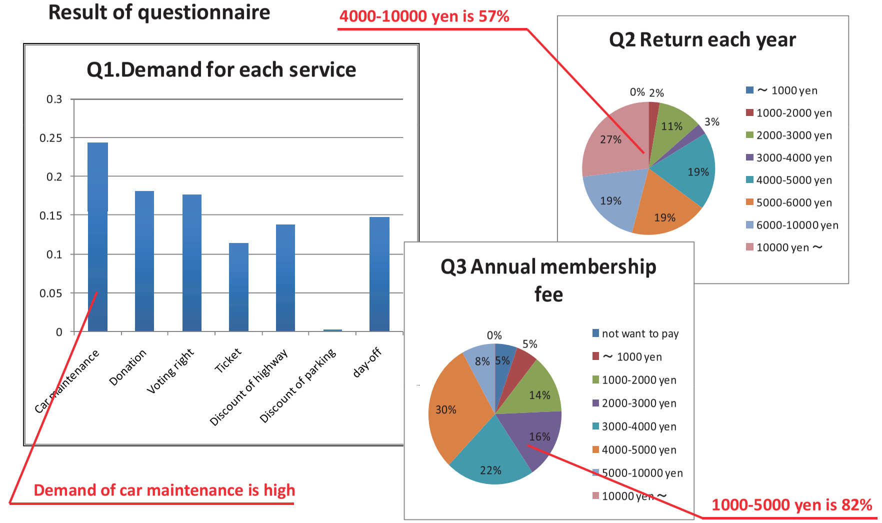
サービス	自動車整備	寄付	投票権	チケット	高速割引	駐車割引	day−off
1	1	1	1	1	1	1	1
2	1	1	1	2	2	2	2
3	1	2	2	1	1	2	2
4	1	2	2	2	2	1	1
5	2	1	2	1	2	1	2
6	2	1	2	2	1	2	1
7	2	2	1	1	2	2	1
8	2	2	1	2	1	1	2

questionnaire

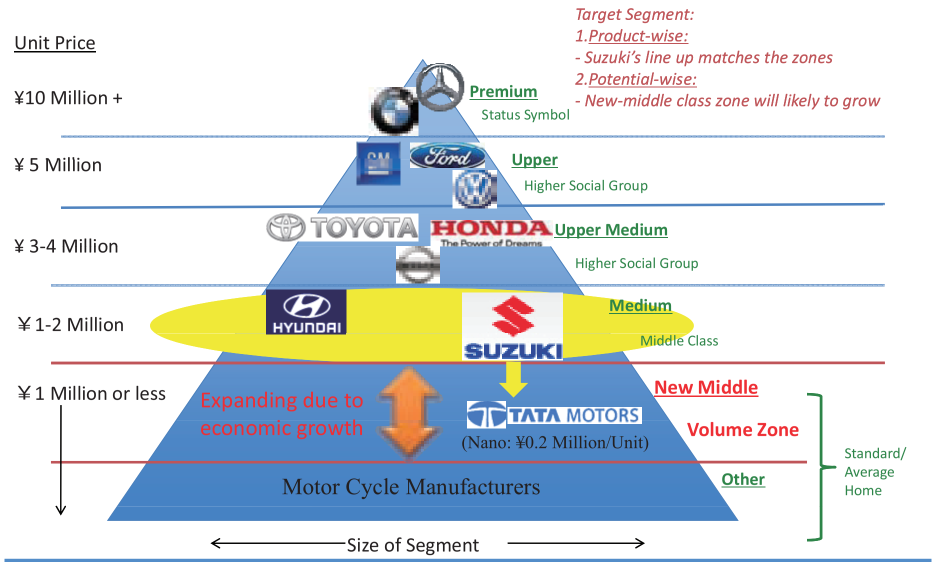
Question of questionnaire
Q1. Please choice combination of service of your favor.
Q2. How much do you want return?
Q3. How much can you pay annul membership fee?

a1.DOE

Result of questionnaire



a2.Market segmentation in India



System design and management ALPS group 12 SDM