

## **MotorTek-Case Study**

### **Assessor Guide**

#### **The Situation** (Information given to the participant)

You are Deepak John, the newly appointed Head of the Innovative Research Excellence at MotorTek Research & Development India (MRDL). As one of your first tasks on the new job you have received an appeal from Sudha Kopker, Market Research Manager, to help revive a Research Project that has been suspended by your predecessor, Harish Jain.

#### **The Project** (Information given to the participant)

The project is related to Vehicle-to-vehicle communication (V2V). Put simply, this technology will allow vehicles on the road to communicate with each other wirelessly in case of an emergency. For this, two-wheelers will need to be equipped with sensors to measure speed, braking, location, etc. Vehicle-to-vehicle communication's ability to wirelessly exchange information about the speed and position of surrounding vehicles will help avoid crashes, ease traffic congestion, and improve the environment.

#### **Reference Information for the Assessor**

##### **Introduction to V2V Communication**

V2V (vehicle-to-vehicle) is a communication technique that aids in crash avoidance. It makes use of VANETs (vehicular ad hoc networks), which are wireless networks that allow vehicles to communicate and share information about their driving habits. The data comprises speed, geolocation, braking, stability, and travel direction. This technology is critical for improving road safety by sending out incident notifications before a driver notices them.

Vehicle-To-Vehicle communication technology allows vehicles to transmit data using a mesh network that is wireless, to send and receive signals. These nodes can detect traffic conditions several miles ahead of a driver, giving the driver enough time to manage their vehicle. Under the V2V umbrella, there is the Vehicle Systems for Infrastructure (V2I) which includes traffic signs and various fixed devices.

Current vehicle safety programs, such as embedded technologies that permit adaptive cruise control, blind-spot detection, rear parking sonar, and backup cameras, are in comparison less powerful than V2V technology. V2V technology provides 360-degree awareness of surrounding risks, which improves performance and safety. This technology would initially be used to essentially inform the driver while not altering the vehicle's motion to avoid a collision. The following implementations may improve the steering and braking systems, allowing for complete control of the vehicle's behaviour:

##### **Vehicle-To-Vehicle Communication Protocol**

Wireless communication technology underpins the vehicle-to-vehicle communication protocol. Because it is based on wireless technology, the V2V communication protocol is fairly simple to create. We can communicate with more than two automobiles using an NRF Transceiver Module. 3 strategies can be put to use to warn the driver: LCD alert, audio alert, and LED alert. The proximity sensor provides the distance measurement. A proximity sensor detects the presence of nearby items without making direct contact with them.

## **Vehicle-To-Vehicle Communication Applications**

Among the most important vehicle-to-vehicle communication applications are:

Information on traffic in real-time

Roadside support tailored to the driver's needs

Vehicles having the opportunity to monitor and change their position/route etc.

Warning drivers if they are drifting out of their lane

Slowing down/crash alert if the vehicle gets too near to the other vehicles/objects around them

## **Vehicle-To-Vehicle Communication Advantages**

### *Improving Traffic Management*

Vehicle-to-vehicle communication is essential for enforcing traffic laws as it facilitates traffic monitoring and management by using real-time vehicle alerts to relieve traffic congestion. Officials use communication with vehicles to divert traffic, track vehicle locations, ensure obedience to speed limits, and adjust traffic schedules. For drivers, V2V communication helps them avoid traffic jams and keep a reasonable distance from other vehicles.

### *Driver Assistance*

V2V communication allows drivers to have complete control over their vehicles. For drivers operating huge fleet vehicles or moving oversized cargo, timely warnings such as the height of a nearby bridge are extremely valuable. The technology may also aid in safe parking, such as parallel parking, which is made possible by delivering notifications about surrounding vehicles.

### *Improved Fuel Efficiency*

Vehicle-To-Vehicle Communication allows for close formation driving, which improves fuel economy. All vehicles are forced to modify their speed and placement according to a communication stream by forming a continuous formation

### *Route Optimization*

One of the main reasons fleets invest so extensively in fleet management systems is to optimize routes. This technology aids drivers in getting to their destinations faster. Vehicle-To-Vehicle Communication is intended to provide drivers with important travel information directly through installed devices, among other things. This technology can send information such as the optional routes to the destination, maps, and route optimization advice.

### *Crash Prevention*

The numbers of road accidents continue to rise even as new motorways and high-speed vehicles are introduced. As a result, road safety is a top priority. Despite all efforts by stakeholders to raise awareness about the necessity of safe driving, human error continues to be the leading cause of road accidents. V2V communication can help reduce accidents on

the road because of crash prevention pre-warning. The futuristic idea is to even take control the vehicle in case human control does not happen on time.

## **Vehicle-To-Vehicle Communication Limitations**

While vehicle to vehicle communication comes with a slew of benefits, this technology definitely has certain limitations to its utility and performance. Some of the reasons holding this innovation back are:

### *Privacy Concerns*

Individual driver data is processed by the vehicle-to-vehicle integrated network. Private companies and the government can readily track automobiles because there are no concrete restrictions governing the technology. They can also monitor drivers and their driving patterns at the same time. Automated License Plate Readers (ALPR) can monitor and collect data involving automobiles that communicate with one another via V2V. Should this data be hacked or misused, it may jeopardize personal privacy and raise other security problems.

### *Security Risks*

Any security failure caused by V2V-enabled vehicles has the potential to be disastrous, with business wars and criminality accounting for a significant portion of road hijacking. Comprehensive security measures are required for vehicle communication to be fully integrated. Losing control of an automobile to another person as a result of a hacked system could result in the car doors closing up or the engine exceeding the speed limit etc.

### *Liability Issues*

The V2V communication technology is still in its infancy, and clear norms are yet to be drafted. Liability considerations may arise from incidents involving automobiles equipped with V2V. If, for example, the V2V communication system prompts do result in an accident, determining who was at fault in the first place would be difficult.

### *Potential Driver Distraction*

Human intervention is required for vehicle-to-vehicle communication to work. To run the system, the driver must perform some actions, like texting or talking on the phone. There is still a lot of work to be done to ensure that drivers are not distracted by the systems which may lead to an accident.

## **Future Scope of Vehicle-To-Vehicle Communication**

In terms of mobility, V2V technology can help to alleviate traffic congestion in a variety of ways. First, the fact that cars connect with a central hub provides real-time traffic data to transportation authorities, allowing them to better manage their facilities to maximize efficiency and decrease congestion. The V2V communication system could potentially allow vehicles to collaborate on the roadway by moving closer together in a platoon with other vehicles traveling in the same direction. As a result, roadways improve capacity by accommodating more vehicles in the same amount of area.

Although we are still a long way from having a linked vehicle road transport system, there are technologies already available today that can bridge the gap between existing and V2V

technologies. Adaptive cruise control uses radar to scan adjacent vehicles and adjusts speed accordingly. Some premium automobiles have lane departure warning systems that can alert you if your vehicle is drifting out of its lane. Both of these high-tech elements assist drivers in being more aware of their surroundings.

Before a connected-vehicle transportation system can be fully effective, a few obstacles need to be resolved. All vehicles on the road need to be fitted with the technology, legislation must be enacted at several levels, and the issue of liability for automated systems must be addressed. There is, however, no doubt that a connected vehicle system, in which vehicles and the roads they ride on are linked in ways we have never seen before, will be a part of our future. We cannot afford to ignore the tremendous possibilities for safer and more efficient roadways.

### **Abacus Market Research (AMR)**

- An independent Consultancy specialising in Market Research, with its Head Office in London and a global presence.
- Abacus (AMR) has extensive experience of conducting market research and has carried out similar surveys for other motor manufacturers.
- MotorTek has never used AMR previously, although Sudha Kopker did take references before appointing the consultancy and she is very satisfied with the quality of the work undertaken by AMR so far.
- A fixed-price contract was agreed between MotorTek and AMR for the project to be conducted in 2 phases. The contract also included a cancellation clause which states that a cancellation fee of 10% of any portions of the contract that are not carried out will be levied if the contract is terminated prior to its completion.
- A spend of 11 crores has been incurred on the 1<sup>st</sup> phase of the research, and the second phase is estimated at another 10 crores.

### **Sudha Kopker**

- Sudha Kopker is a Market Research Manager with MotorTek Research & Development India (MRDL). She works with the Innovative Research Excellence of which Deepak John is the newly appointed Head.
- Sudha regards this project as 'her baby', as she initially proposed that this research should be carried out and she is a great advocate of vehicle safety innovations
- Sudha considered several external consultants for this assignment before selecting AMR and she took AMR's proposal to Harish Jain for final sign-off, which was agreed and signed 4 months ago. The 1<sup>st</sup> phase of the research has been completed.
- She feels that to stop the project at this stage, would mean that MotorTek would be falling behind in comparison with similar survey done by MotorTek's biggest competitor TruMobile.
- She does not agree with Harish Jain's view that the research should be discontinued. She is convinced that the automobile industry is headed towards V2V Communication and being industry ready is the way to go

## Harish Jain's Reasons for Suspending the Research

- Due to the current market condition and the Covid situation MotorTek has been trying to cut costs. Harish has been under pressure from the Finance Director to reduce his 550 crore marketing budget by 225 crores. He chose to discontinue the research, so as to make a significant financial saving.
- The research emphasised that before a connected-vehicle transportation system can be fully effective, a few obstacles need to be resolved. All vehicles on the road needed to be fitted with the technology, legislation must be enacted at several levels, and the issue of liability for automated systems must be addressed.
- The actual amount that would be saved is 9 crores. The organisation would incur a cancellation of 1 crore which is 10% of the 2<sup>nd</sup> phase estimated budget which is 10 crores.
- In trying to cut his budget, Harish identified that the only other alternative available to him, which would save about 11 crores, would be to cancel the Traction Control System (TCS) research. This new technology in bikes protects them from drifting by regulating the power given to the back wheel. MotorTek could reap immediate benefits by launching this new technology and customers safety would improve immensely
- Harish had conducted a dip stick with the other departmental and concluded that they were in favour of supporting the other running projects as opposed to the V2V Communication project. They believed that the success of the other projects would bring them the required profit in the short term. Eg: Sales, Visibility in the local market,
- Despite suspending the research, Harish was bought into the idea of V2V communication and suggested that Sudha should find a way of continuing the project internally.

## Deepak John

Deepak John the newly appointed Head of Innovative Research Excellence at MotorTek. He was handpicked for his current role by Sanjeev Ghani the MD of MRDL and Ashish Malhotra the CEO of MIL. He brings to the table 25 years of experience in the automobile industry of which 8 years are in core R&D.

<b>Arguments in favour of the continuing the research</b>	<b>Arguments against continuing the research</b>
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1. The Parent Organisation (MCL) is in favour of the research as Japan has the infrastructure required to make this happen. This might prove useful in improving the declining sales of products, post the pandemic	The cost of this project could be leveraged to meet the ongoing projects that is closer to completion, and has potential to earn revenue for the organisation in the short-term
2. Your biggest competitor, Trumobile is investing heavily on this technology.	A connected-vehicle transportation system could only be fully effective if all vehicles on the road were to be fitted with the technology. Government legislation also needed to be enacted at several levels, and the issue of liability for automated systems needed to be addressed.
3. The technology used for V2V Communication is relatively simple	Technology for other projects like Traction Control requires comparatively more investments
4. Sudha, who has good potential, has indicated that she would need to consider her future with MotorTek if the research is discontinued, as she sees this project as a means to express her potential.	Ashish Malhotra, the chairman of the MIL is more focused on meeting the needs of local customers to improve its position in the Indian Market
4. The company's values are supportive of the V2V communication project as it would position the company to be a leader in safety innovations in the country.	The Traction Control System research focuses on the immediacy of customer benefit and can be sold to the customer as benefit that is available right away
5. The 11 crores already spent on AMR could be taken to fruition	Accepting sunk cost would be more beneficial and further cost averted
6. The TCS project might not be a success as the current team does not have the required expertise to carry it to completion successfully	A dipstick revealed that the other departments were in favour of the Traction Control System and other running projects, as the success of these projects would bring them the required profit in the short term. Eg: Sales, Visibility in the local market,