ASSIGNMENT 2

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Unit number and title	Unit 13: Computing Research Project		
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Class	PBIT17101	Assessor name	Nguyen Thai Cuong

Student declaration

I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.

Student's signature	Quach Cong Tuan

Grading grid

P6	P7	M4	D3

☐ **Summative Feedback:**   ☐ **Resubmission Feedback:**

Grade:	Assessor Signature:	Date:

Internal Verifier's Comments:

Signature & Date:

Table of Contents

Table of Figures

I.   Introduction

Project Title: **The Future of Autonomous Vehicles in Artificial Intelligence And The Internet Of Things**

In the context of technology 4.0 is gradually developing and transforming into industry 5.0. The technological transformation towards automation and development focuses on enhanced human-machine interaction. This will be one of the things that help businesses grow quickly and reduce a lot of work processes and operating costs. For this part of my research, I chose the topic of understanding the development of Machine Learning in Internet of Things, or what can be called "AI-ML in IoT".

The recent proliferation of IoT devices and their convergence with cloud-based technologies are making it easier to generate data on building performance – creating a key opportunity for property owners. Building owners apply AI and ML to make critical financial and operational decisions.

Buildings today have evolved into complex connected technology systems that can be operated to maximize efficiencies such as cost savings or improved worker productivity and occupant comfort. Companies like Siemens, PointGrab, Crestron, Aquicore, and others are implementing AI and ML to achieve operational efficiencies that save building owners energy costs or increase productivity in the workplace.

In this report, I have noticed some limitations, and also developed some potential in artificial intelligence in general and more specifically in autonomous vehicles being developed. I also have objective views from both user and developer perspectives. Based on these two factors I found that the issues would lead me to comment on the report below. A report on artificial intelligence in the internet of things.

P6. Reflect on the effectiveness of research methods applied for meeting objectives of the computing research project.

During the research process, we applied the research methods presented in assignment 1 to clearly demonstrate and explain thoroughly the IoT research project. I applied to research automated vehicles using artificial intelligence technology and the internet of things to do it. With the research presented, I demonstrated and explained the problems and the tools and technologies used.

1. Impact of research proposal

In this research project, I worked on "The Future of Autonomous Vehicles In Artificial Intelligence And The Internet Of Things".

The reason for my project is rooted in seeing the issues that can change and help in the future of the technology industry. Especially when using artificial intelligence and IoT in people's daily lives.

Today, artificial intelligence and IoT are developing quite strongly and helping people to change their lives and develop their lives in a positive way. Realizing the importance of applying AI and IoT in life, I have made judgments and aimed to analyze the application of AI and IoT in life.

To choose a topic, I realized that participating in traffic in Vietnam is very complicated. Sometimes there are systems that need us to upgrade and improve. Further, the use of technology to apply to autonomous vehicles will be a new step in the technology industry.

In Vietnam, I realized that automated vehicles are not yet popular and active, but I see the potential of this application in the future, so I decided to analyze this project.

I believe that after my research, the application of automation in AI and IoT will be more popular and developed, helping users have better experiences in life.

2. Impact of sequential research process

During the research process, I have come up with a number of steps to evaluate the project step by step to be able to comment on the problem in an objective way and achieve the highest efficiency. Using and following the steps helps us to clearly define our future goals.

I've identified 8 steps I need to take:

Step 1: I have identified the problems I need to do and developed a preliminary idea to carry out the research process. At this step, I need to identify the questions and understand what goals I need to exploit and develop. Questions and issues such as survey questions, interview questions, and case studies. For this part of my research, I made it clear in assignment 1.

Step 2: In this phase, we have clearly identified the problems and focused on solving the research and implementation problems that are partitioned and have not been resolved, and need further investigation into it. With assignment 1, I investigated further and came up with research conclusions as well as demonstrated some more information about the research problem. The such review gives me access to more important knowledge and helps me to follow the research process effectively.

Step 3: During this phase, I consulted more and together with my guide came up with hypotheses to implement the project, along with that, we also consulted more project participants in the development of the project. develop automated vehicles for additional proof-of-concept and commitment to their development goals. Assumptions have been established and clarified by me.

Step 4: In this research design phase, we have come up with a sub-plan with 04 objectives including exploration and survey of the research problem, experiment, data analysis, and observation. In the above plan, I have explored and found that the use of automated vehicles in developing countries has been very much but not widespread because there may be many problems related to general policies. I have also carried out data analysis and observations by gathering information from reliable sources and making personal judgments based on articles and information. I will update my research information under References.

Step 5: In this study, I will focus on and develop the survey based on participants from the technology industry in general, who are living in high-end apartment buildings and resorts. How will the use of automated vehicles help them?

Step 6: Data collection is important in obtaining the knowledge or information needed to answer the research problem. Every study collects data, either from the literature or the people being studied. Data must be collected from two types of researchers. These sources can provide primary data.

- Experiment
- Table of questions
- Observe
- Interview

The secondary data types are:

- Document survey
- Formal, and informal reports
- Library resource-based approach

Step 7: After collecting data through the above forms, I explained further and started to analyze the data and select the data with the main factors to develop for this research project.

Step 8: Then I will write a report to inform about the data I have analyzed. The data and data analysis report has been presented by me on page 38 of assignment 1. I have mentioned the data and information I have collected. In part 2. Conclusion on page 42 of assignment 1 I gave a summary comment on the research problem based on surveys and interviews.

Finally, following the research process allows me to develop a clear and correct research direction that avoids violations of research principles. With this process, all of my information is developed and exploited in a clear sequence.

3. Literature review

The research was done by me in the Literature section in the most detail. In this section, I presented the research methodology, the studies I used and the secondary research section. The sections were clearly presented by me in Part II of Assignment 1.

In this research paper, I will combine both research methods including secondary research, and primary research. In which to collect data and information in the most effective way, I will combine qualitative and quantitative research to clarify and get the best quality and closest surveys to the research problem. The methods are all done by me, and I will explain them in the following section.

Quantitative information is organized and responsible. This kind of data is prepared to provide organization, arrangement, and searchability.

Unstructured data is what qualitative data is. This kind of information is formatted (and is renowned for being) personalized, subjective, and personalized. It's open season. Because of this, using only qualitative data in a study is poor. It is still valuable, though.

In general, quantitative data is preferable for data analysis since it is more tangible. Numbers are reliable. However, combining qualitative and quantitative methods produces the most accurate findings for complete statistical analysis.

This section can be considered the longest and most important in my whole research proposal. In this section, I have mentioned 2 resources with the same topic as my topic. That is:

Article 1: https://www.fpt-software.com/fpt-software-offers-public-demo-of-autonomous-vehicle-at-urban-township-ecopark/

Article 2: https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/why-the-automotive-future-is-electric

Figure 1 Vehicle autonomous

4. Project plan

In this research plan, I will take the following steps to be able to get on the right track. The study plan bulletin boards were provided by me to the instructor for 15 weeks. I also mentioned the project development plan in the Proposal Form section to present. The sections have been mentioned by me with detailed contents and implementation plan. For the weekly plan, I need the instructor's confirmation and comments so that I can draw lessons for this research project.

The plan weeks have been designed by me based on the following timetable:

1. **Milestone 1 [17/9]:** Get Feedback from The Tutor About Research Proposal Form and Complete

2. **Milestone 2 [20-26/9]:** Get Feedback on Literature Reviews from Tutor

3. **Milestone 3 [26/9-04/10]:** Make Up Qualitative and Quantitative

4. **Milestone 4 [4-10/10]:** Analyse Research Results and Data

5. **Milestone 5 [10-15/10]:** Get Feedback from Primary Research and Complete

6. **Milestone 6 [15-22/10]:** Get Feedback from Secondary Research and Complete

7. **Milestone 7 [22/10]:** Review Assignment 1 Draft by Tutor

8. **Milestone 8 [8/11]:** Submit Assignment 1

9. **Milestone 9 [13/12]:** Review Assignment 2 Draft by Tutor

In addition, the project plan allows me to track progress in each phase on a regular basis without unnecessary duplication. It helps me to identify which tasks I have not completed or which tasks I have obtained incomplete data, from which I will determine the remedial measures to help the research project achieve the results the best.

5. Present result

To clearly show the research data, I have selected some data as follows for presentation, these are statistical data from research methods based on interviews and surveys. The information and content will be analyzed and presented below by me:

For the interview form:

Question	Answers	Evaluate
1. How often do you drive?	'Yes, I drive every day" – **Pham Hoang Minh** "Sometimes when I go far away, I will drive, but usually not." – **Pham Duc My | Student**	*Most people give the answer, yes and they use transportation every day.*
2. What do you think if there is a vehicle that automatically moves and joins traffic?	"If so, that's a good thing for the community, which is what all technologies need to develop and implement these days." **Đao Viet Anh | Tech Taxi Driver**	*Everyone feels that the development that has it brings great benefits to society.*
3. Do you think it is safe for everyone?	"Most people think that automatic vehicles that enter traffic already sound unsafe, I will feel a bit scared if I sit in that car and move. Actually, I don't really believe it." **Pham Hoang Minh | Taxi Driver**	*For everyone, because this is a new technology product that has not been tested many times, they do feel not very confident in its safety.*
4. Does it matter if an automatic car enters traffic?	"For me, of course, there is a problem, for a taxi driver like me, using an automatic car makes me lose my job, of course, I wouldn't want that." **Nguyen Van Manh | Student**	*Everyone is excited when everything becomes automated, but taxi drivers feel their jobs are being shaken by upcoming technologies.*
5. Do you wish and think that this automatic car will improve the quality of life as well as more convenience?	"I also hope that autonomous vehicles will become more common, and I look forward to using them in the future." **Nguyen Quoc Huy | Student**	*Most people are looking forward to the results of automated vehicles being announced and put into use in life.*

In the interview method, we also found that the benefits and risks that they receive are quite clear, and the answers are viewed from different angles to give us the right judgment in the interview process. research. Of course, when applying technology and life, the benefit they bring to us is being able to use it comfortably, easily, and conveniently in life. However, besides AI technology IoT has also caused many people to lose their jobs, which is threatening the jobs of many people.

For the survey form:

Next, I surveyed primary research, in this study, I found positive feedback from users. Below will be my statistical results for 11/25/2022.

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Do you think automotive safety regulations are strict enough, or could be improved?
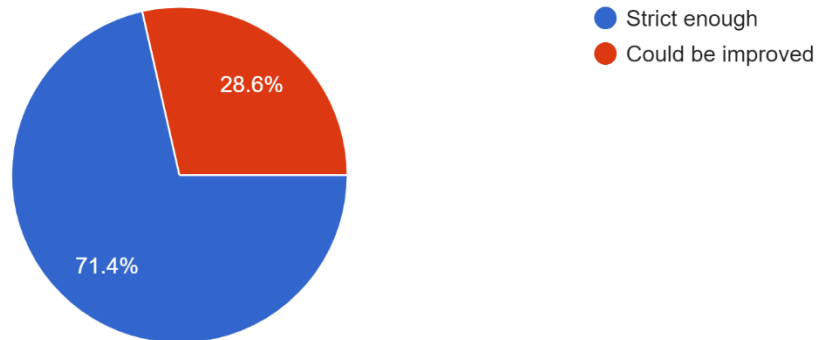
21 responses

Figure 2 Google Form Q1

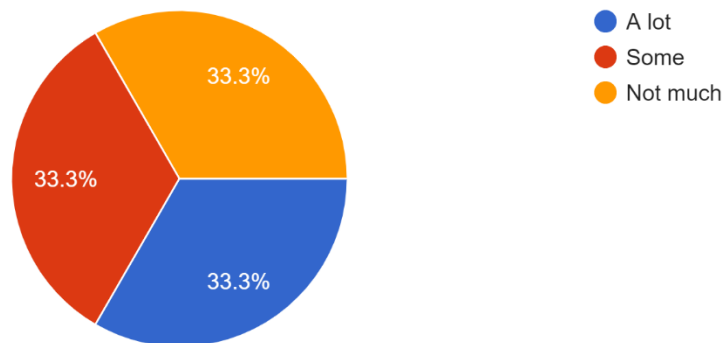How much have you heard about self-driving cars?

21 responses

Figure 3 Google Form Q2

How safe would you feel being a passenger in a self-driving car?
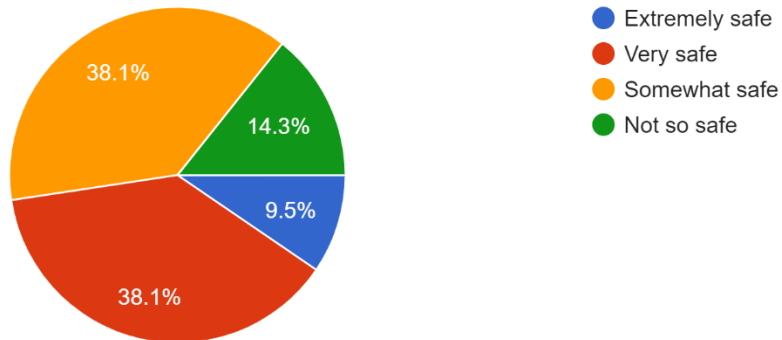
21 responses

Figure 4 Google Form Q3

How likely are you to purchase a self-driving car once the technology is fully developed?
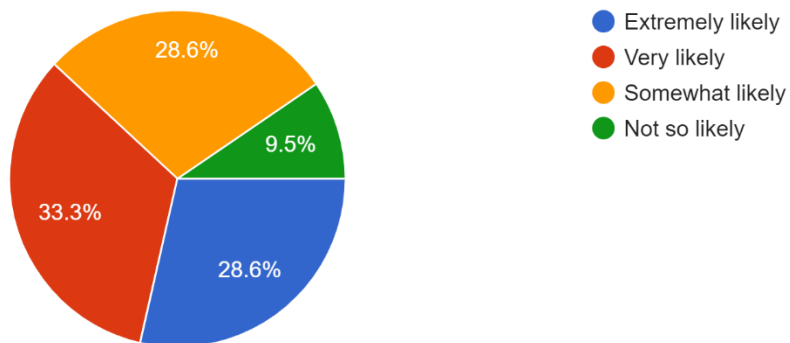
21 responses

Figure 5 Google Form Q4

Do you think using automated vehicles will help in the future?   Please rate on the scale below from 1 to 5 with your satisfaction level.
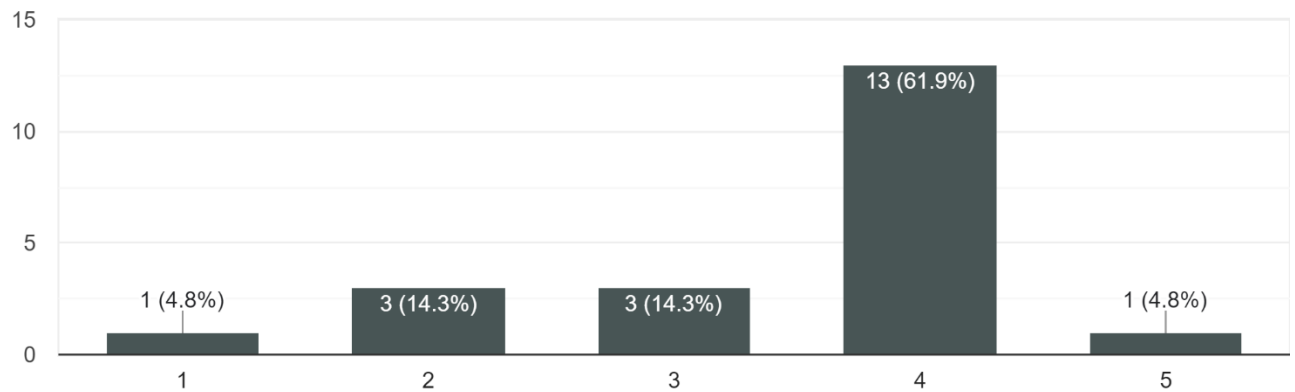
21 responses

Figure 6 Google Form Q5

What factors do you think would make an automated vehicle the most useful?
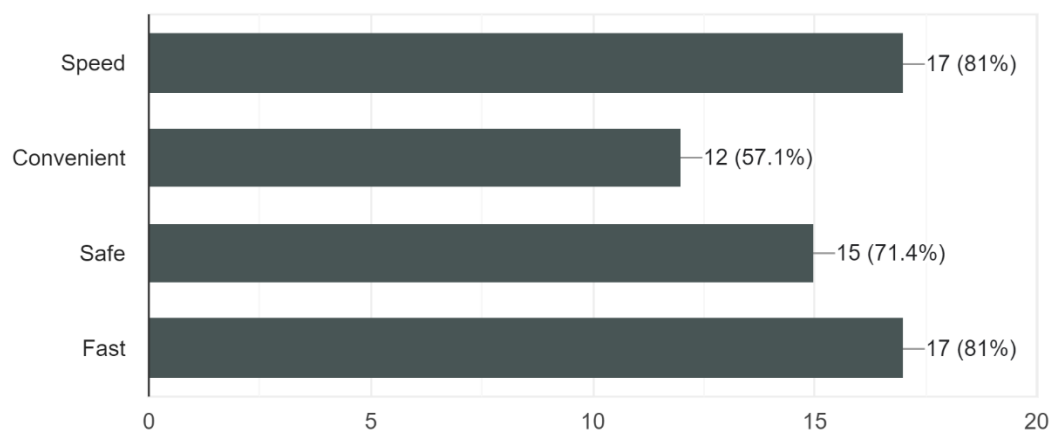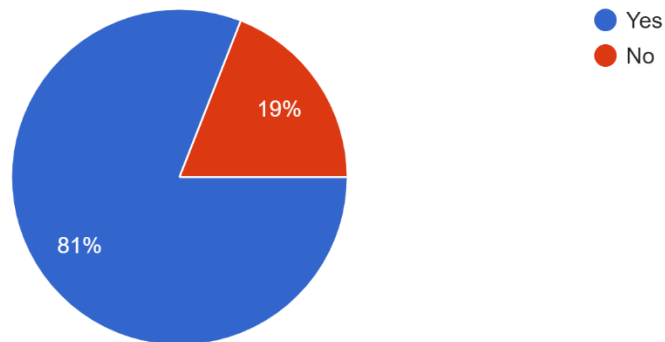
21 responses

Figure 7 Google Form Q6

Do you expect that automated vehicles will become more common in life?

21 responses

Figure 8 Google Form Q7

According to the general assessment, I found that the above feedback results have achieved a very high reputation, the survey participants were selected by me very carefully and they gave me their experiences or objective opinions. surname. Among the participants, there are a few people who have experienced autonomous vehicles in other countries such as Beijing - China.

I have thoroughly explained and analyzed the data in Assignment 1, with this section I will provide more objective information, this data collection has been assessed as relatively authentic, but it may be There are different ways of seeing and feeling between people, we can make an objective assessment of the research and conduct of research.

Presentation of the results I have chosen to present with a combination of charts and tables to present the necessary and outstanding information that can be easily accessible to the listeners and the viewers, which will help the part Information is easier to convey.

6. Method research

To complete the above research, I watched videos that explored the applications of AI in IoT. The videos are directly quoted by me from research in Vietnam with FPT Software Corporation. In this video, I hypothesized, is my research feasible? How will this plan be implemented in the future?

Link research video: https://www.youtube.com/watch?v=aF1sQqy-yKk&ab_channel=FPTSoftware

The researcher must actively participate in the data collection process when performing primary research. In primary research, instead of depending on previously gathered data, the researcher collects first-hand information to use as study materials for the methodical examination.

Even though primary research typically takes a while, using Google Forms to quickly collect data has been quite helpful. Because it served as the foundation for my entire study project's evaluation, this was significant during the research process.

A type of research approach known as secondary research depends exclusively on already published research materials rather than the researcher physically gathering data for the study. This technique of research takes less time and money than primary research.

My secondary research has successfully searched for and chosen reliable papers in cyberspace, as well as being used in conjunction with primary research. Due to time constraints, I was only able to read and evaluate two articles that shared the same study topic as the IoT device.

P7. Consider alternative research methodologies and lessons learnt in view of the outcomes.

1. Some improvements research in the future

This poll has a few issues that should be resolved in the future, in my opinion. Because of my tardiness, better attention had to be taken with the problems right quickly, and my education suffered as a result. Choosing a research topic was difficult for me because there wasn't much available. We had a brief conversation because I didn't have much time to chat to the tutor. When performing secondary and primary research, I encounter a variety of problems, such as gathering too much information and data, which makes it difficult to decide what to focus on.

If I wish to study more effectively in the future, I must significantly enhance my preparation techniques. It should be simpler to locate subjects that are pertinent to my field of expertise. Use the following approach to resolve this problem: I should conduct additional research before deciding on the finest study topic. When the time is right, the teacher will create a plan for me. Make and reach your goals. The most crucial aspect of my research is how well I can combine and assess data. With the aid of this, I might be able to comprehend how to use some of the data analysis tools better.

In the new research in the future, AI technology in IoT will be very developed, and we will have more resources to research, in the future I will carefully explain the features as well as clarify the analysis of AI in IoT. More specifically, I will define an in-depth analysis of autonomous vehicles, their limitations, and the advantages of AI design and use. How will artificial intelligence validate the information and use images to analyze data, how data will be processed and analyzed, and used? I will try to be as specific as possible.

The benefits of artificial intelligence will be applied in human life as well as its conveniences. The analytical information of AI will be one of the analytical methods to identify and predict the best cases. That is my opinion on artificial intelligence.

2. Alternative research methodologies

If I have more time and resources to spend on my studies, I'll employ some of the research techniques covered in assignment 1 to carry out more in-depth research, including process research and data gathering.

The process research strategy will assist us in avoiding omitting important data, completing two primary and secondary research methodologies, and ultimately evaluating the success of the research while also highlighting its limitations and offering suggestions for further research.

The process of gathering, computing, and evaluating precise study findings while adhering to agreed, validated criteria is known as data collection research procedure. For the research to make data-driven decisions, it is essential that accurate and reliable data are collected for statistical analysis.

To get better and more objective results for each age group, industry sector, or residential region, I will also mix interleaving interviews.

 In the future I will use case studies to develop and analyze my research.

A case study is an appropriate research design when you want to gain concrete, contextual, in-depth knowledge about a specific real-world subject. It allows me to explore the key characteristics, meanings, and implications of the case.

Case studies are often a good choice in a thesis or dissertation. They keep your project focused and manageable when I don't have the time or resources to do large-scale research.

I can use just one complex case study where you explore a single subject in depth or conduct multiple case studies to compare and illuminate different aspects of my research problem.

In the case study I will define in 04 steps:

- Step 1: Select a case
- Step 2: Build a theoretical framework
- Step 3: Collect your data
- Step 4: Describe and analyze the case

M4. Provide critical reflection and insight that results in recommended. Actions for improvements and future research considerations.

In the future, I will try to develop and research more deeply and try to exploit the information provided. The research problems will be mined with research information with clear objectives, specific plans, specific problems to be explored, and research and project expectations. What can specific research and development and comparison be? Next, the information and data will expand with many other forms instead of using two methods such as interviews and surveys. The information will be controlled based on the emails, and the questions asked will be arranged in a matrix format to determine whether the user has filled in the information indiscriminately or selectively. In addition, I will expand and deepen with other secondary research papers in a verified manner. The information is carefully selected, and charts are used to represent it. In the selected data, I will use additional tools and platforms for data analysis such as the "Tableau" tool with Python for data classification.

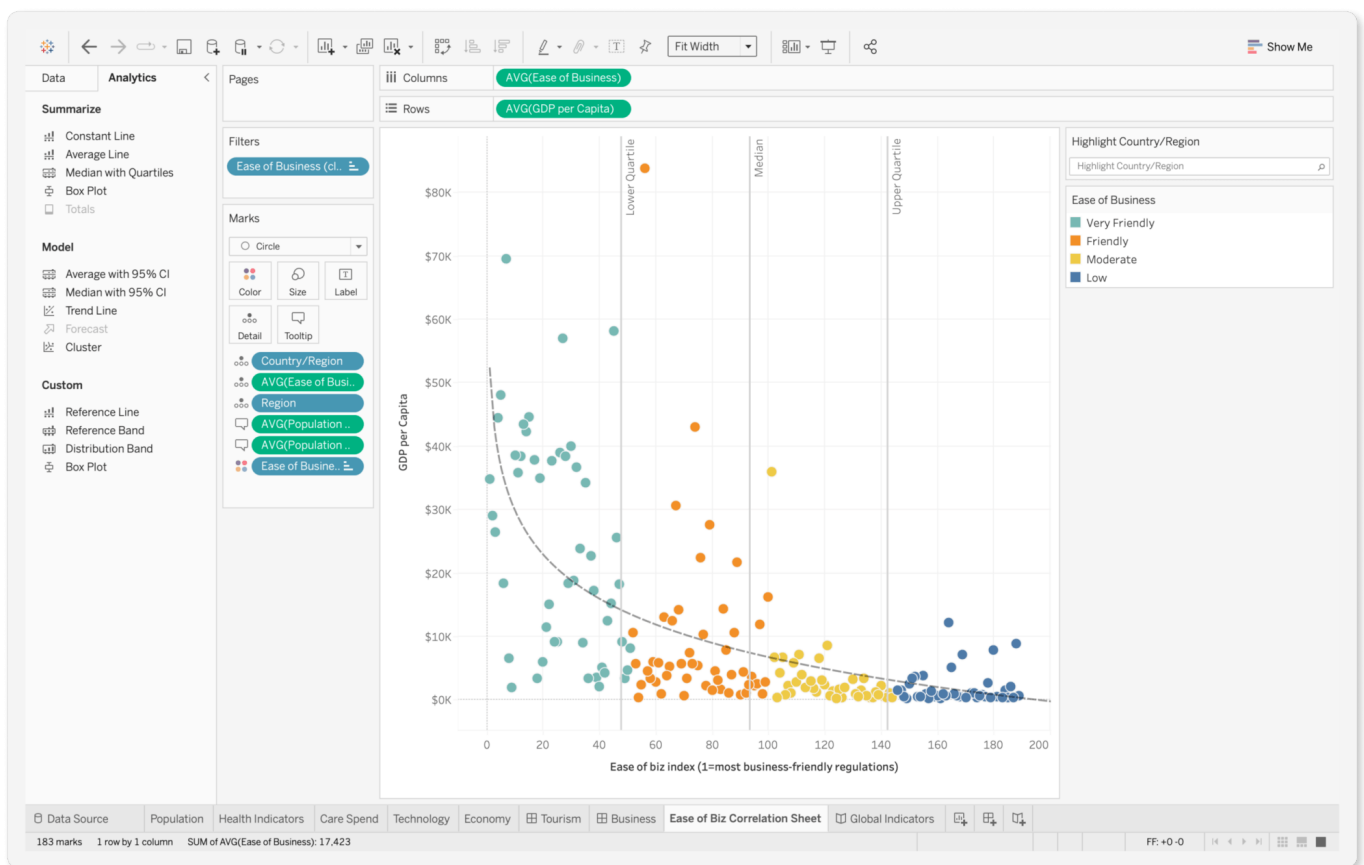Those are some of the information I share so I can try to improve and implement them in future research projects.

Figure 9 Tableau

Conclusion

I have recognized my weakness and plan to fix it next time. In the following report, I will handle and work more comfortably, and at the same time I will point out the shortcomings of the study. I think this research paper will help people understand how to write a research report.

II.   References

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Available at: https://www.inria.fr/en/autonomous-vehicles-future-mobility
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