Application of Project and Change Management techniques to Amazon Self-driving vehicle development project

ME50367 Project and Change Management

Individual Assignment

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INTRODUCTION - THE PROJECT

Amazon is an American multinational technology company that specialises in e-commerce, cloud computing, online advertising, digital streaming, and artificial intelligence (About Amazon 2020). Currently, Amazon intends to strengthen its position in new markets through acquisitions and a series of investments. In September 2020, Amazon acquired self-driving technology company **Zoox Inc** and confirmed a project to develop self-driving vehicles in two years (2020-2022) to operate an autonomous delivery and ride-hailing service with the goal of using these autonomous vehicles to deliver goods and save on associated costs, as well as to enter a new market and build profits. Along with the project sponsor Brian T Olsarsky (Chief Finance Officer of Amazon), a team of thirty people from different departments across these two companies will be responsible for the utilisation and commercialisation of self-driving cars for Amazon (Project choice: Amazon Self-driving Technology Development, n.d.).

PROJECT MANAGEMENT - IMPORTANCE AND CHALLENGES

Project management can be defined as the process of controlling the achievement of the project objectives. Using the company's existing organisational structures and resources, it attempts to manage the project using a collection of tools and techniques while minimising disruption to the company's normal operations (Munns & Bjeirmi, 1996). Because projects are frequently complex and involve multiple stakeholders, having a project manager to lead the initiative and keep everyone on track is critical to project success. In fact, PMI discovered that organisations that use any type of project management methodology perform better in terms of budget, timely delivery, scope, quality standards, and expected benefits (Top 6 reasons why project management is important, 2019).

To properly operate and guide the autonomous vehicles (AV), the overall AV market takes advantage of multiple emerging technologies and heavily relies on GPS, artificial intelligence, 3D imaging, LIDAR and RADAR, and advanced sensor technology. There is a great deal of

complexity in programmes and projects that must integrate all of these technologies while putting people's lives and safety at risk (Coleman, 2020). With so many sensors in play for the Zoox self-driving vehicle, it's critical that their data is accurately stitched together to create a true and self-consistent picture of everything going on around the vehicle at any given time. Moreover, Zoox subjects these vehicles to harsh real-world conditions. Shock and vibration, as well as thermal events, can all cause changes in sensor positioning. Today's Advanced Driver Assistance Systems (ADAS) are progressing to higher levels of autonomy. Organising processes for development, testing, and verification becomes extremely difficult as a result, further increasing the complexity of the software development process for autonomous vehicles. These are a few of the challenges the project team will face and where using project management techniques can be advantageous. Project management can assist in realistically and systematically planning tasks while keeping a clear focus on objectives, and ultimately delivering a quality autonomous vehicle at the end.

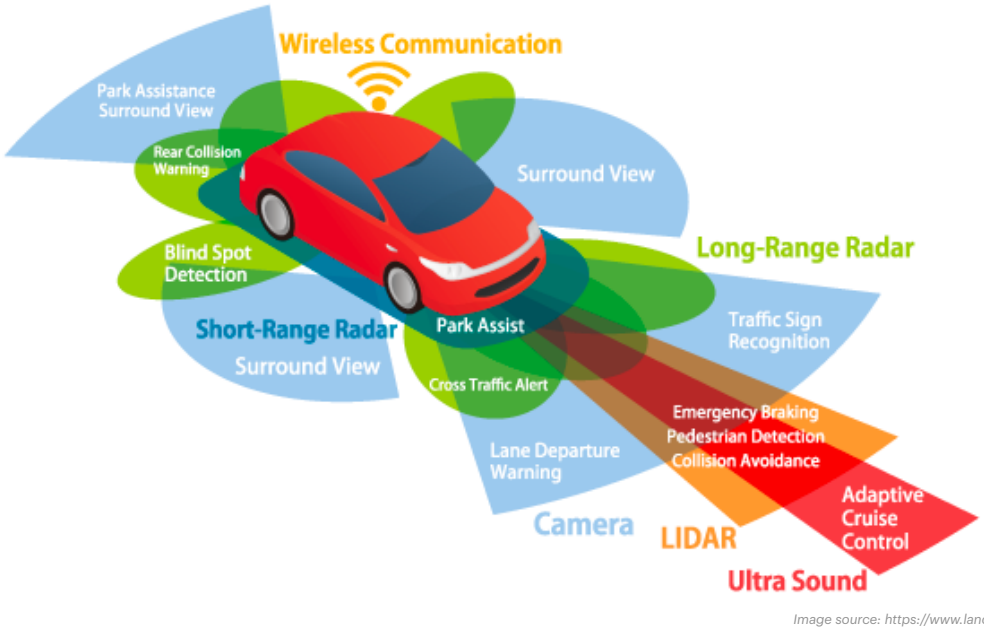


Image source: https://www.landmarkdividend.com/self-driving-car/

Fig. 1 Self-driving Car Technology

CHANGE MANAGEMENT - IMPORTANCE AND CHALLENGES

A systematic approach to dealing with the transition or transformation of an organisation's goals, processes, or technologies is known as change management. The goal of change management is to implement strategies for creating change, controlling change, and assisting people in adapting to change (Lawton & Pratt, 2022). Change management is critical in the development of an organisation because it provides stability by studying internal and external changes. Change management also provides the organisation with a good culture and a sound working system; it also develops top-down approaches to facilitate and promote the need for a culture (Hashim, 2013).

In relation to the project, because autonomous vehicles will impact many aspects of human activity, there is a need to conduct a thorough assessment and develop new policies. It is also necessary to evaluate and quantify future profits from new technologies in order to determine which social groups would benefit the most and who might lose. It is obvious that autonomous technology has the potential to enhance a variety of societal wellbeing factors, despite having many problems and threats. However, the road to getting there and realising technological promises is not predetermined. In the field of autonomous driving, numerous other change management issues have been identified, including: automated commercial vehicle operations, cyber security and resiliency, data ownership, access, protection, and discovery; energy and environment; human factors and human-machine interaction; infrastructure and operations; roadworthiness testing, certification and licensing (Todorovic et al., 2017).

The change management team must have a creative vision and be able to address the cultural issues that arise as a result of such a dramatic paradigm shift. The team will require tactical as well as strategic awareness. Because the knowledge base is constantly expanding, a capable leader must be knowledgeable in a wide range of subjects or be able to form collaborative, cross-discipline teams for the project (Caswell et al., 2020).

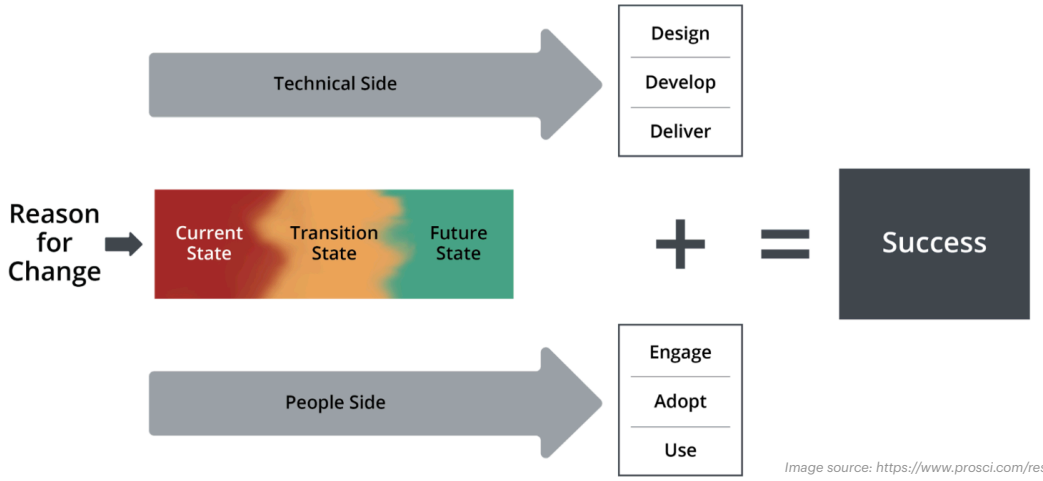


Image source: https://www.prosci.com/resources/articles/definition-of-change-management

PROCESS ELEMENT - PROJECT CHARTER

The PMBOK® Guide, 3rd Edition defines a project charter as "a document issued by the project initiator or sponsor that formally authorises the existence of a project, and provides the project manager with the authority to apply organisational resources to project activities" (PMI, 2004, 368). The purpose of the project charter is to provide an understanding of the project, the reason it is being conducted, and its justification, as well as establish early on in the project the general scope (Albrecht, 2018). The project charter is crucial for formalising the project's intent and outlining its key components for stakeholders, the project committee, and any other individuals giving approval or oversight (McAbee, 2021).

In relation to the project, the project charter will specifically outline why Amazon-Zoox desires to develop a self-driving car, the main objectives and outcomes the company is aiming for, and any assumptions and risks that may arise when creating and utilising driverless cars for ride-hailing and delivery of goods.

Partial Project Charter

Project title:

Utilisation and commercialisation of self-driving cars for Amazon

Revision date:

Date: 31-09-2020

Project purpose:

The purpose is to build and utilise self-driving vehicles for ride-hailing service and autonomous delivery for Amazon within a period of two years. As an outcome, the company aims to increase its operational efficiency, scale and eventually result in substantial cost savings across its distribution network and to enter in a new market and build profits.

Project objectives:

1. The manufactured self-driving vehicle operates safely in congested urban areas and in adverse weather conditions with the help of its sensor technology, reducing crash risks by at least 50% in a period of 2 years from launching
2. All relevant documentation for obtaining official permission from the local government to use manufactured driverless vehicles for ride-hailing business and automated package delivery is completed by end of 2022
3. The manufactured autonomous vehicle successfully delivers goods at day & night and thus reduce the company's shipping costs by at least 20% at the end of first year
4. Testing of the manufactured driverless vehicle on public roads is successfully completed before the project deadline

High level project description & key deliverables:

Amazon plans to expand into new markets through acquisitions and a series of investments. It also intends to automate most of its business activities, such as package delivery, by using autonomous vehicles instead of hiring human drivers, thereby lowering Amazon's shipping costs. The other outcome is entering a new market and increasing profits. In order to accomplish this, Amazon acquired self-driving technology company Zoox Inc in September 2020 and launched a project that aims to use and commercialise self-driving vehicles for ride-hailing and automated package delivery within two years. The company will have enough resources and experiences to compete with others in automotive industry. Amazon may also change the daily life of current and future customers in the future.

Key deliverables:

- Fully autonomous vehicle capable of carrying passengers and goods for delivery
- Project Management Plan
- Development of the self-driving software stack, the on-demand ride-sharing app
- Completion of tested simulation-based training solutions and training module
- Completion of legal documentation for obtaining government permit

Summary milestone schedule:

- Project started - Sept 2020
- Design of vehicle and planning phase - Feb 2021
- State-of-the-art sensor architecture and calibration for vehicle- June 2021
- Completion of vehicle interiors - Sept 2021
- First-hand map data collection using same sensor technology as original vehicle - Jan 2022
- Finalising semantic maps for vehicle by adding Information to recorded 3D maps - April 2022
- Creation of Road Network Monitor to determine whether the actual road environment has differed from the semantic map data - July 2022
- Completion of the new fully autonomous vehicle - Sept 2022
- Development of the self-driving software stack, the on-demand ride-sharing app - Sept 2022

• Start testing vehicle on semi-private courses - Sept 2022 • Vehicle testing complete on semi-private courses and start testing on public roads - Oct 2022 • Completion of legal documentation for obtaining government permit - Oct 2022 • Vehicle testing complete on public roads - Dec 2022 • Project closure - Dec 2022
Key assumptions:
• The manufacturing cost of the driverless vehicle will be less than the total budget allocated for the making of the vehicle • First-hand map data collected using different vehicle but having same sensor technology will successfully sync with the original self-driving vehicle • The legislature will willingly accept this change and will permit the use of driverless vehicles for ride-hailing and automated delivery service • The company's total operating machines are sufficient to handle the volume of computation and testing data involved in the project • Training and Testing will be conducted internally with no additional training costs incurred
Project sponsor:
Project sponsor: Brian T Olsarsky - Chief Finance Officer of Amazon

PROJECT CHARTER - CRITIQUE AS A TOOL

Project Charter is created at the very start of the project, when the selling of the project's goals and ideas needs to begin (PMI, 2004, 368). It gives a clear picture of what the project is about as it includes key objectives, outcomes, stakeholder information, assumptions and risks etc. It serves as a legally binding document that prevents team members from straying from the project's scope and synchronises the effort with the organisation's goal (Usmani et al., 2022).

However, if a project charter is not written with sincere consideration and effort, it may be of little use. At the start of a project, a project charter might be created, signed, and then filed away without being opened again. Its infrequent use can turn the entire process into a waste of time. The charter might not always be specific enough to confirm certain issues, which could sometimes cause ambiguity (Richards, 2016).

A partial project charter was produced as part of this report. Since accurate cost prediction of this project requires historical datasets, detailed resource availability, and real-time tracking, and since this information is kept private and is not made available to the public, cost and resource estimation is not included in the charter. Typically, a project charter is a project management tool that is created at the beginning of the project to provide an overview of project deliverables, outcomes, stakeholders, risks, and assumptions, among other things. The project charter, for example, simply lists the key risks but does not include a risk response plan, which is included in the risk register, as the purpose of a risk management plan is to identify and mitigate potential risks (Saffin and Laryea, 2012). The project charter includes a list of key stakeholders, but it does not specify how the team should plan and manage the goals and expectations of key stakeholders throughout the project lifecycle. Nonetheless, a project charter is an important marketing tool that should be created at the start of any project in order to achieve good results.

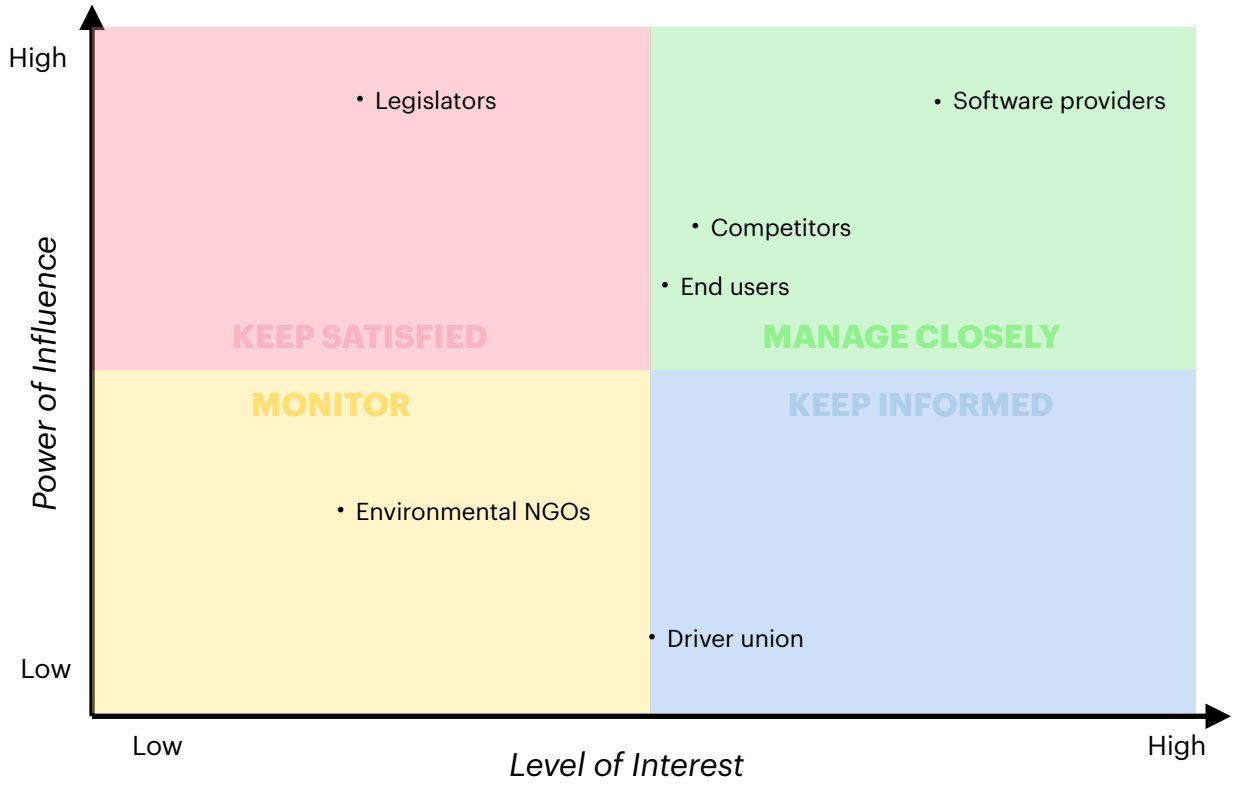
PEOPLE ELEMENT - STAKEHOLDER MANAGEMENT

Stakeholders : Stakeholders are individuals or organisations (e.g., customers, sponsors, the performing organisation, or the general public) who are actively involved in the project or whose interests may be affected positively or negatively by the project's performance or completion. Stakeholders can also have an impact on the project, its deliverables, and project team members. (PMI, 2008).

Stakeholder Management : The process of identifying, prioritising, and engaging stakeholders throughout the product development process is known as Stakeholder Management (ProductPlan, 2021). Identifying various salient stakeholders, managing robust relationships with them, making decisions that satisfy stakeholder objectives, and leveraging the resources required to achieve the objectives all contribute to project success. Therefore, stakeholder management is crucial because it keeps everyone on the same page, helps manage expectations, calms nerves, and lessens the desire to micromanage (Assudani & Kloppenborg, 2010).

POWER-INTEREST MATRIX

The power-interest model is most likely the most important project stakeholder tool (Horton & Pilkington, 2014). The matrix in a project context helps to categorise various stakeholders involved in the project based on their power and interest in the project. People in positions of power must be kept satisfied, while those with vested interests must be kept informed. When a stakeholder has both, the project management team ensures that his or her expectations are closely managed (Every, 2020). However, in order to place the stakeholders on the matrix, the team must first identify the key stakeholders involved. End users, software providers, driver unions, legislators, competitors, and environmental NGOs are some of the shortlisted key stakeholders in this project. They are arranged on the matrix in the following way:



RATIONALE

Legislators : Legislators have the considerable power because they are in charge of establishing the laws and specific conditions for the implementation of self-driving vehicles in ride-hailing or autonomous delivery services. Promoting automated driving will put pressure on the legislators to create regulations, as well as remove potential roadblocks to the development of this technology (Korbee et al., 2021).

Software Providers : Software providers are placed at high-power high-interest segment as they provide platforms that enable the intelligent operation and optimisation of automated mobility services, as well as the management of fixed-route and on-demand services. If this technology is used commercially, it will benefit them. Because an automated system cannot function without a proper software platform, software providers are critical stakeholders (Korbee et al., 2021).

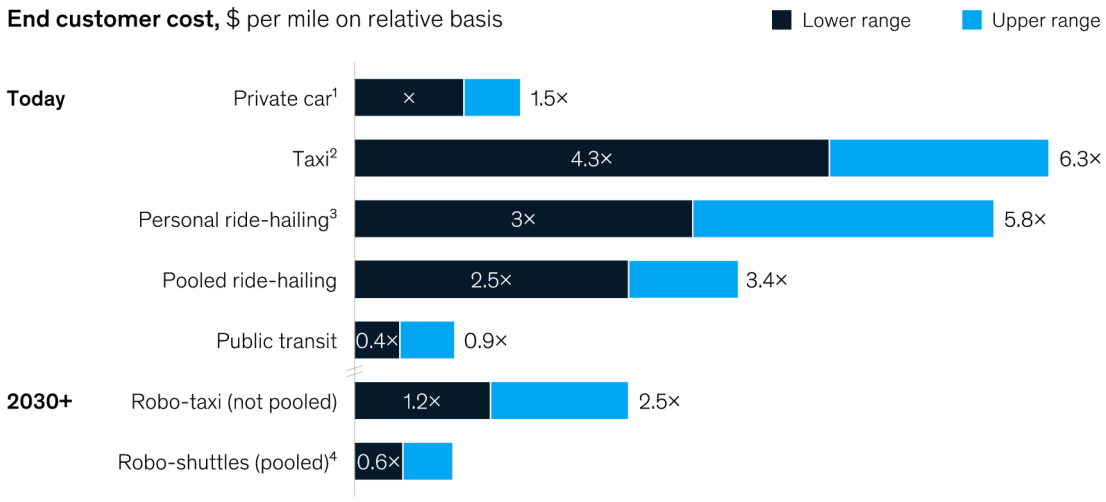
Competitors : Competitors are placed at slight above medium power and interest as they share similar objectives and try to gain consumer's trust by offering innovate mobility systems. Changes in competitors' approach or technology can trigger a change in this project as the company might need to re-evaluate their strategy. They have high interest because competitors are always curious about what others are doing in the same industry.

Driver Union : The driver union has a medium level of interest and power. Many drivers will lose their jobs if autonomous vehicles are used for ride-hailing or automated delivery services. As a result, drivers are opposed to the change, but they have little control over the project or the change and must accept and live with it (Korbee et al., 2021).

Environmental NGOs : The ENGOs want to promote a more efficient and environmentally friendly mobility system than the current one. ENGOs make policy recommendations in order to achieve their goals. There is currently insufficient data to predict whether self-driving vehicles and autonomous delivery will be a simple yes or no for ENGOs. The ENGOs require more solid science and knowledge about the effects of scaling up automated vehicles in our transportation system (Korbee et al., 2021).

End users : Potential users are placed at slight high power and interest. Public's support is critical for the system's successful implementation. Safety, comfort, technology trustworthiness, effectiveness, accessibility, and price are all important factors in building public support. Customers may have to pay less in the near future if they use self-driving vehicles instead of private hired taxis. However, they are concerned about the safety and reliability of Artificial Intelligence (AI)-based technology and hence can't comment about their firm stand currently (Korbee et al., 2021).

Mobility costs could decline in the coming decade as robo-taxi services emerge at scale.



Early robo-taxis will be more expensive, comparable to ride-hailing costs, but costs will decline quickly.

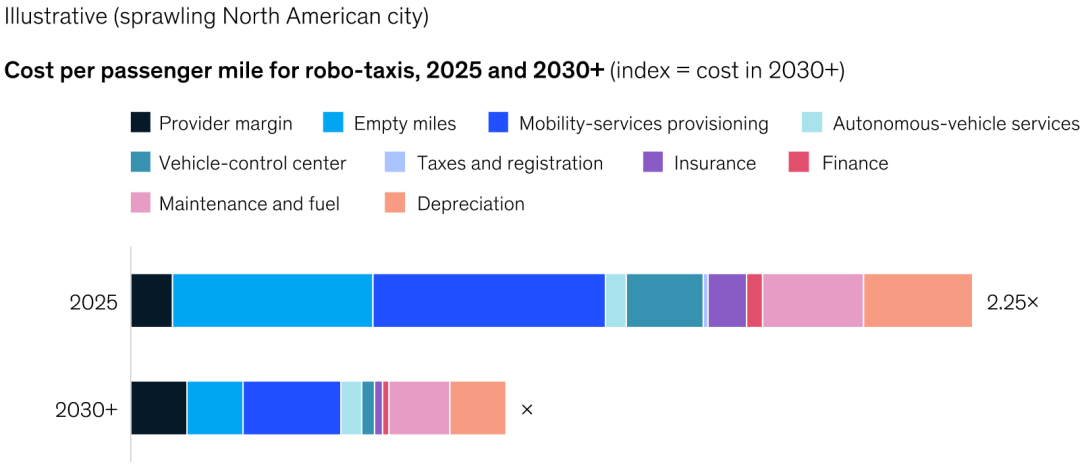


Image source: McKinsey & Company

Key Stakeholder	*Communication channel*	*Reasoning*
Legislators	• Press release • Television	Citizens are kept informed about projects that affect their taxes and their lives through community engagement. Television and press release are the most effective because the majority of people can access and obtain information through them.
Software Providers	• Face to face • Video conferencing	Because an automated system cannot function without a proper software platform, software providers are critical stakeholders who must communicate on the latest technology and its alignment with manufacturing vehicle requirements. As a result, face-to-face or video conferencing are the best available channels because information can be shared without confusion.
Competitors	• Tech articles and statistics • Social media accounts	The company can get knowledge about its competitor activity by online Tech articles or blogs or by following their social media handle to compare their strategies and make relevant changes if necessary.
Driver Union	• Public Rallies or talks • Online or offline Surveys	Members of the driver union who are concerned about losing their jobs can participate in public rallies and talks, as well as communicate their position through surveys.

Environmental NGOs	• Events • Website	Because face-to-face communication is so important in nonprofit work, offline events can be an effective communication channel for NGOs. Furthermore, every nonprofit organisation must have a well-designed website because this is the first place management team look when they want to know what an ENGO's position is on your project's related field.
Potential Users	• Surveys • Social media	Social media is expanding daily, and by taking into account potential users, businesses can engage with customers and learn about their stance. Customers can participate in surveys in exchange for rewards as well and companies can be benefited in knowing customer preferences.

POWER/INTEREST MATRIX - CRITIQUE AS A TOOL

The use of the model in a project context is based on the idea that if a stakeholder is enthusiastic about a project, they are less likely to cause issues, which helps the project team avoid problems and crises. It is believed that successfully influencing interested stakeholders has a strong correlation with project success. However, this strategy concentrates effort on a small group of influential, motivated people within an organisation who may have the strategic vision but may lack critical practical knowledge that can make or break a project. Thus, using the power-interest model in project planning frequently results in projects ignoring practitioners in favour of senior management (Horton & Pilkington, 2014).

CONCLUSION

Self-driving vehicles have the potential to significantly increase road efficiency, decrease traffic accidents, boost productivity, and lessen our environmental impact. They have encountered opposition from various groups, who contend that they are unsafe, present a security risk, threaten jobs, and worsen environmental pollution due to increased driving as a result of their convenience. Legislators must create sound regulations in order to take advantage of self-driving vehicle services while avoiding some of the many pitfalls (Ryan, 2019). In some cities in North America, Zoox has already started testing its vehicle on public roads. Although the current emphasis is on robotaxi, we will soon be able to experience receiving a delivery package from an autonomous vehicle!

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