

E BUSINESS STRATEGIES

TRAFFIC MANAGEMENT

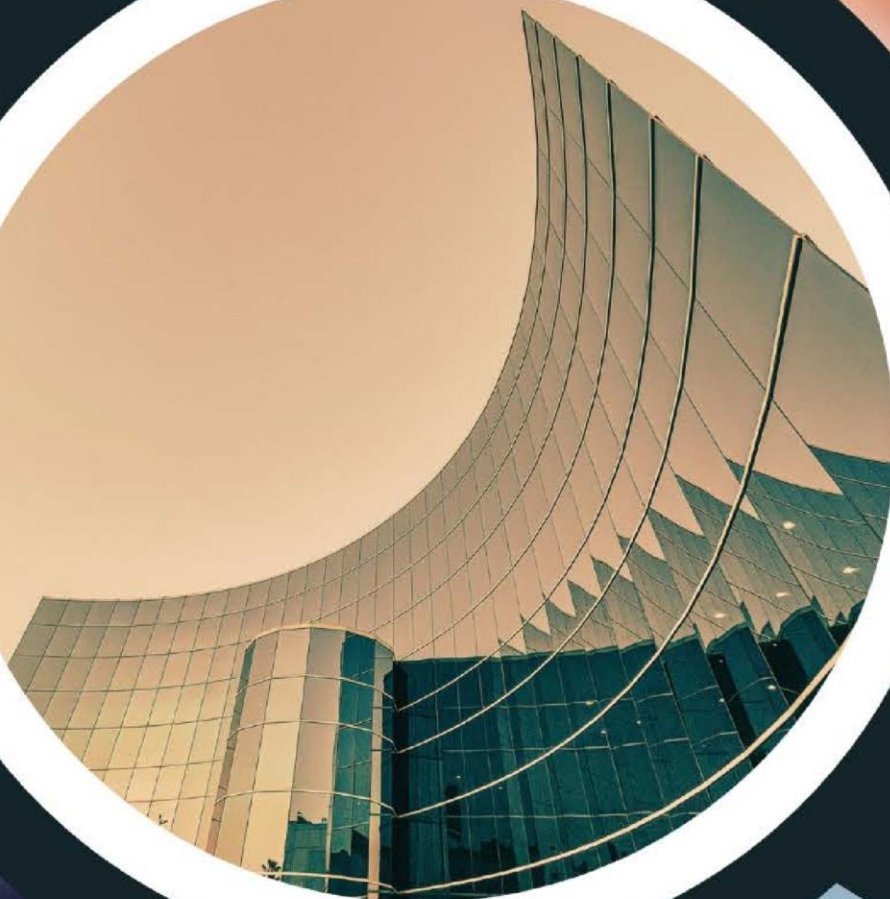


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Company Profile

The need for smart cities that can effectively manage their resources and offer their residents a good quality of life is growing as the world's population and urbanization continue to rise. Traffic management is one of the most important parts of smart city management since it can have a big impact on people's quality of life in general.

The use of traffic lights to govern the flow of automobiles and pedestrians is one of the most obvious and crucial parts of traffic management. The current colour-light traffic management system has been in operation for many years and has proven to be a dependable way to manage traffic flow. The system is not without its flaws, especially when it comes to how ineffectively it can manage traffic in a flexible and dynamic manner.

The fact that the current colour light system operates on a fixed-time basis, with a specified duration for each side of the road, is one of its main inefficiencies. This indicates that the system does not account for elements that may cause congestion and delays, such as variations in traffic flow or pedestrian activity. For instance, the fixed-time system won't change to accommodate an unexpected increase in traffic on one side of the road, causing congestion and delays.

The colour light system's inability to take into account various vehicle kinds is another area of inefficiency. No matter the size or speed of the vehicle, the system treats all of them the same. Especially for larger or slower-moving vehicles like buses or trucks, which may take more time to cross the intersection, this might cause inefficiencies and safety hazards.

Furthermore, the current colour-changing lighting system can increase energy use and carbon emissions because the lights are frequently left on for long periods of time, even when there is no traffic or pedestrian activity.

This paper covers all the information regarding the suggested solution, which is a smart colour light system, that would address the aforementioned issues. To count the number of vehicles that pass through the intersection, the system is equipped with sensors that are mounted on the road. As a result, the system is able to dynamically modify traffic signals to enhance traffic flow while taking into account the amount and direction of present traffic.

Especially during high traffic hours, the system's capacity to dynamically modify traffic signals based on the number of cars present helps to decrease traffic congestion and delays. The technology automatically modifies the length of each traffic signal phase to account for variations in the volume of cars passing through the intersection.

This technology is able to detect vehicles that violate traffic laws, such as speeding or running red lights, in addition to controlling traffic flow. The offending vehicles' owners are then assessed a fine for breaking traffic laws after the system employs cameras and sensors to gather photos and data about them.

We propose a mobile application that the owner of the car can download and register each vehicle as an additional feature for the aforementioned system. Vehicle owners can use the app to keep track of the fines they have pending as well as other information about the nearby traffic signals.

SWOT Analysis



Strengths:

- Based on real-time traffic data, dynamically modifies traffic signals to alleviate congestion and delays.
- Vehicles that violate traffic laws can be detected by sensors, enhancing overall road safety.
- Can be used with other smart city technologies to create a system that is more complete and effective.
- Offers a more environmentally friendly solution by reducing energy consumption and carbon emissions

Weaknesses:

- May be expensive to implement and maintain, potentially requiring significant investment
- In order to install the sensors and other necessary components, the current infrastructure might need to be significantly changed.
- Relies largely on technology and is potentially susceptible to cybersecurity breaches or system breakdowns

Opportunities:

- Expandable to incorporate other features like interaction with public transportation systems and pedestrian detection
- Can be used with other smart city technologies to create a system that is more complete and effective.
- Gives the private sector a chance to invest in smart city infrastructure

Threats:

- May encounter opposition from citizens or government representatives who are dubious about the advantages of smart city technologies.
- Alternative traffic management systems, both conventional and modern, could pose a threat.
- As newer and more sophisticated systems are created, they might be susceptible to technical obsolescence.

Porter's Five Forces

Porter's Five Forces	
Threat of New Entry	There is currently no efficient smart system for managing traffic congestion and reporting accidents in Sri Lanka. It is challenging for new entrants to compete due to the high capital investment required to develop and install the built - in sensors, cameras, and other software. Additionally, government regulations and safety standards also create barriers to entry.
Threat of Substitutes	Although traditional traffic management methods like manual traffic control and fixed-time traffic signals still exist, they cannot be considered as direct substitutes for smart traffic light systems. The advantages of the smart traffic light system, such as better traffic flow and increased safety and efficiency, are expected to make it challenging for traditional methods to compete.
Bargaining Power of Suppliers	The suppliers of in-built sensors, cameras, and other components required to build a smart traffic light system have some bargaining power since it is essential for manufacturing. However, there are many suppliers in the market for these types of technical components, which in this case reduces their bargaining power.
Bargaining Power of Buyers	Government agencies or transportation departments are the primary buyers of smart traffic light systems, and they typically have a high bargaining power. Moreover, the smart traffic light system is a public infrastructure project, which means that it is subject to public scrutiny and accountability.
Competitive Rivalry	These types of public infrastructure projects are often awarded through a competitive bidding process which is carried out by the government, as a result it increases the competition among suppliers. However, the unique features and benefits of the system may offer a competitive advantage.

Other Tools for Analysis

PESTEL Analysis

Political:

- Government policies and regulations governing traffic control and data privacy may have an effect on the solution's implementation and operation.
- Implementation will necessitate approvals and permissions from government organizations when collecting fines and data related to traffic violations.
- Government funding and support may be required to develop and implement the solution on a large basis.

Economical:

- The expense of developing and implementing the solution may be high.
- The possibility of higher revenue from fines and fees may be economically beneficial.
- Reducing traffic congestion, increasing fuel efficiency, and reducing travel times provide significant benefits.
- Economic conditions may have an impact on the lack of funding and resources required for the solution's development and implementation.

Social:

- Societal views towards the use of technology for traffic management and data privacy could impact the acceptance and adoption of the solution.(Some people may believe that their privacy is being violated, whereas others may see the system as a means to enhance safety and reduce traffic accidents.)
- The user interface and solution design may need to take into account the requirements and preferences of drivers from various backgrounds and demographics.
- The solution may have a positive effect on public safety and traffic congestion, which may be well received by society.

Technological:

- Technological advancements in data analytics, computer vision, and artificial intelligence may improve the solution's efficacy and efficiency.
- The possibility of technical failures, glitches, or hacking could pose a substantial danger to the solution.
- The solution could serve as a catalyst for further innovation and growth in the traffic control and transportation industries.

Environmental:

- The approach may benefit the environment by reducing traffic congestion and associated emissions.
- The solution may require the installation of hardware, which, if not properly managed, could have negative environmental consequences.

Legal:

- The solution must adhere to all applicable laws and rules concerning data privacy, traffic control, and penalties for traffic violations.
- Legal challenges to the use of technology for traffic management and data privacy may have an effect on the solution's implementation and operation.

Ethical:

- Ethical considerations such as data privacy, discrimination, and bias may have an effect on the solution's creation and implementation.
- Fairness, transparency, and accountability must guide the development and implementation of the answer.

Proposed Strategies Based on Porter's Five Forces

- **Differentiation** - Continuously improving the system's sensors, algorithms and technology to provide advanced traffic management solutions that stand out from others in the market or from the parties that try to enter into the market.
- **Strategic partnerships** - Forming strategic partnerships with the government to establish long-term relationships and offer customized solutions that meet their specific requirements.
- **Spreading Awareness** - To increase awareness about the advantages of the smart traffic light system, different methods can be utilized such as social media platforms, workshops and seminars, educational campaigns, and local media to spread the word.
- **Continuous Research and Development** - Investing in research and development to continuously enhance the functionality, technology and features of the system. This can involve integrating machine learning algorithms, expanding the capabilities of sensors, and exploring new potential applications for the technology to meet the ever-evolving needs of the market.

eBusiness Models and Justification

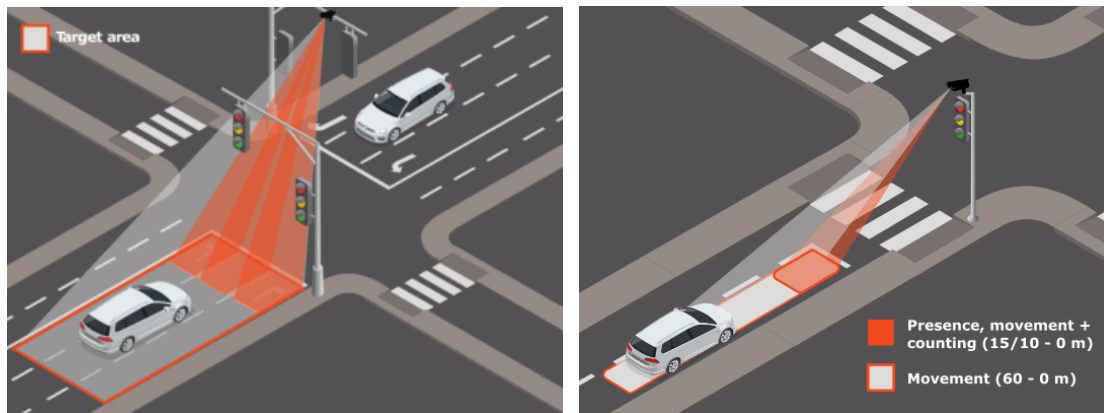
Some eBusiness models that can be proposed for inefficient traffic controlling via traffic lights and imposing fines for traffic light violations:

1. Traffic signal synchronization: Develop an eBusiness platform that synchronizes traffic signals to minimize traffic congestion and delays. This platform could be based on real-time traffic data, using sensors and cameras to track traffic flows.
2. Mobile app for traffic monitoring: Create a mobile app that allows users to monitor traffic flow in real-time, receive alerts about traffic congestion, and suggest alternative routes. The app could also allow users to report traffic light violations.
3. Traffic violation reporting and payment: Introduce an eBusiness platform that enables drivers to report traffic violations, and pay traffic fines online. This would make it more convenient for drivers to settle their fines, and could also reduce the number of drivers who ignore fines.
4. Predictive traffic analytics: Use predictive analytics to analyze traffic data and predict traffic patterns, which could be used to optimize traffic signal timings, reduce congestion, and improve safety on the roads.
5. Education and awareness campaigns: Develop an eBusiness platform to offer traffic education courses and awareness campaigns to help drivers better understand traffic regulations and safety practices.
6. Intelligent transportation systems (ITS): Develop an eBusiness platform that integrates different transportation systems, such as traffic signals, road sensors, and public transportation. This platform would help reduce traffic congestion and improve the overall transportation system.
7. Partnership with local authorities: Partner with local authorities to ensure the successful implementation of the eBusiness model and to collaborate on further improvements to the traffic management system.

By implementing this eBusiness model, traffic management can become more efficient and effective, resulting in reduced congestion, improved traffic flow, and increased compliance with traffic regulations.

Prototype of the Strategies proposed and incorporated.

In our system, we are using vehicle detection sensors and cameras which are installed on the road surface, traffic light or under the pavement to detect the presence of vehicles. They can be used to determine the volume of traffic, the speed of vehicles, and the direction of travel. By analyzing this data, we can optimize traffic light timings to reduce congestion and improve traffic flow.



Explaining the features of the system;

- Collect real-time data on traffic conditions and adjust traffic light timings accordingly. If a particular direction of traffic is experiencing heavy congestion, the system may give that direction a longer green light phase to allow more vehicles to pass through.
- Counting vehicles using sensors and cameras and dynamically adjusting the traffic signals to reduce waiting times and improve traffic flow.
- Provide real-time information to drivers about real-time traffic status that may affect travel time via an application. By providing drivers with accurate and up-to-date information, they can make better decisions about their travel plans, which can help reduce congestion on the roads.
- Detecting vehicles that break traffic rules using sensors, cameras and the vehicle owners are then charged a fine for violating traffic rules. From the application they can easily find information about their violation history and pay the fine.

Log In

Sign up

NIC Number

Full Name

Mobile Number

Vehicle Number

EX; ABC

EX; 1234

Chassis Number

Password

By clicking register, you agree to our [Terms](#), [Privacy policy](#). You may receive notifications from us.

Register

Cancel

Already have an account? [Login here](#)

Sign Up

Log In

NIC Number

Password

Forgot Password?

Log In

Cancel

Don't have an account? [Signup here](#)

Explore Traffic Light Status of the Next Junction

Remaining time: 00:59

G4

Y4

R4

Road 4

Remaining time: 00:59

G2

Y2

R2

Road 2

Remaining time: 00:59

R1

Y1

G1

Road 1

Remaining time: 00:59

R3

Y3

G3

Road 3

Violation History

Last Week

Vehicle was behind the stop bar while the light is red

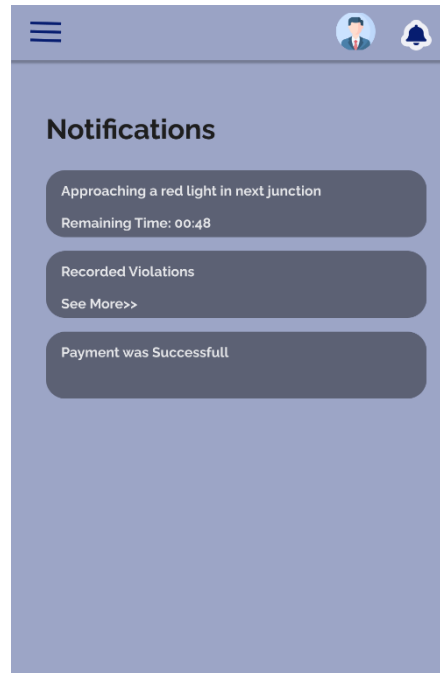
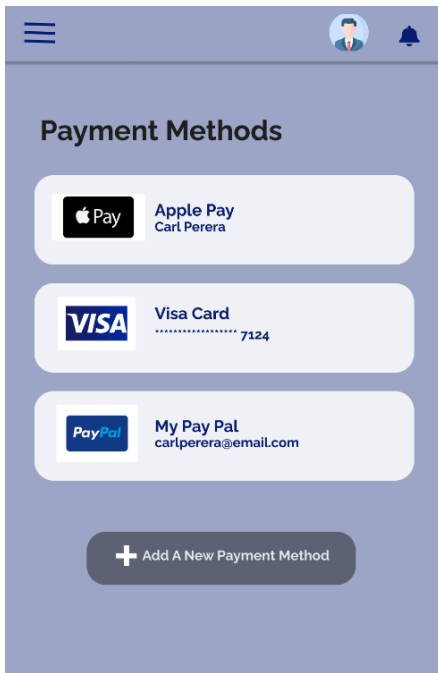
Fine: 10\$

Paid

Last Month

No Recorded Violations

13



7 E Model

1. Environmental Analysis:

The first step is comprehending international business and IT trends as well as the strategic context of the Sri Lankan government. To determine the existing condition of Sri Lanka's traffic control systems and possible areas for development, a complete industry study is done. To determine the advantages, disadvantages, opportunities, and threats related to adopting the new e-business strategy, a SWOT analysis is also done. As well, we have done a PESTLE analysis to identify and understand the Political, Economic, Sociological, Technological, Legal and Environmental factors that affect our traffic control system.

2. eBusiness Goals and Strategies:

Our E-business objectives and strategies are designed to obtain the strategic advantage in traffic control systems based on the results of the environmental study. To create e-business strategies that complement the goals of the Sri Lankan government, we applied Porter's forces.

3. eReadiness:

To identify significant obstacles and problems with change management, the Sri Lankan government's level of e-readiness must be evaluated. Before implementing the new e-business strategy, the evaluation can shed light on the major issues that need to be resolved. The seven aspects of eReadiness are,

- Business process
- Applications & Infrastructure
- Web presence
- Skills
- Executive management
- External connectivity
- Future directions

4. eTransformation Roadmap:

Based on the e-readiness assessment, a specific step-by-step path can be developed to proceed with the e-transformation process. An e-transformation roadmap we created the following roadmap with the key milestones and deliverables.

1. Development of the technology infrastructure including software and hardware
2. Government outreach
3. Demonstrations and pilots
4. training of staff
5. Convergence
6. New process

In the convergence model we will create a corporate data repository with Finance, links to suppliers, interactive websites, human resources, and production.

5. eTransformation Methodology:

To guarantee that the e-transformation is successfully implemented, an iterative strategy may be employed when modeling, re-engineering, implementing, and training on business processes. You may utilize the evolutionary e-transformation technique to make sure the process is responsive to environmental changes and flexible.

6. eSystems:

This phase entails the traffic control system's post-implementation support, including the creation of IT policies, security precautions, and support and maintenance processes. The system may be checked and assessed to make sure it is working properly and satisfies the specifications set out by the Sri Lankan government.

7. Evolution – Change Management:

The last step entails handling the evolving changes that occur during the e-transformation process. The McKinsey 7S model for organizational change management may be used to handle changes in structure, systems, style, strategies, values, personnel, and skills. As a result, the employees will be properly taught and prepared to handle the new traffic control system, which will be easily integrated into the current infrastructure.

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[2] <https://www.slideshare.net/ADEEBANADEEM/vehicle-counting-for-traffic-management>