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APPLICATION OF SYSTEM THINKING IN DEVELOPING OF THE PUBLIC TRANSPORTATION NETWORK IN NORWAY

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Ebrahim Qaredaghi

- Education:
  - Master student in System Engineering at USN
  - Process Technology - Master in 2019 at USN
  - Chemical Engineering - Bachelor in 2006

- Experience:
  - 10 years of engineering experience as a process system engineer and process/project engineer. Work in different phases of projects from design, interfaces, design review, tests, installation and commissioning.

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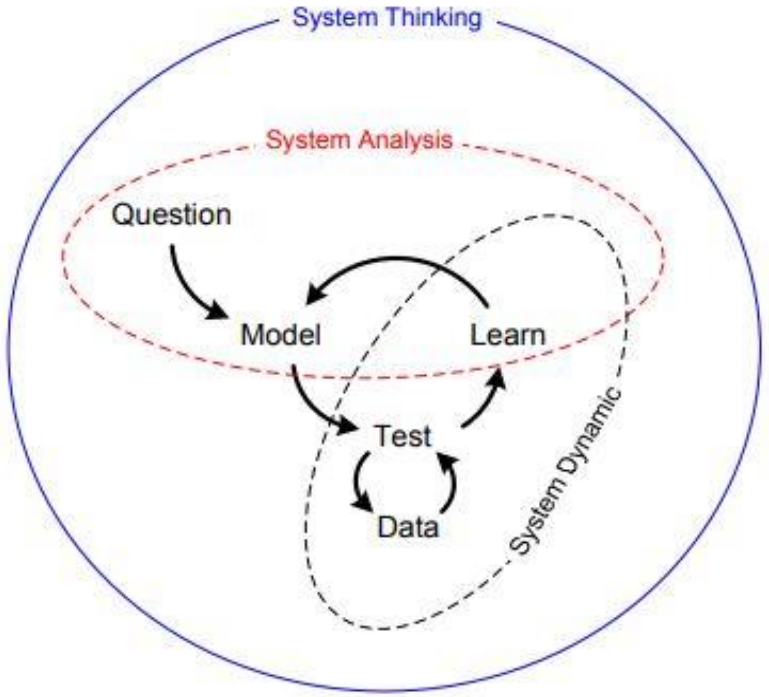
Introduction

- Systems thinking can be defined as a method to a problem or issue that considers how elements within the whole system interact and operate over its lifecycle, how to optimize the design, implementation, and evaluation.
- In other words, system thinking is both science of structuring the logic, the mental modelling, asking relevant questions and practical applications through System Analysis (SA) and System Dynamics (SD).



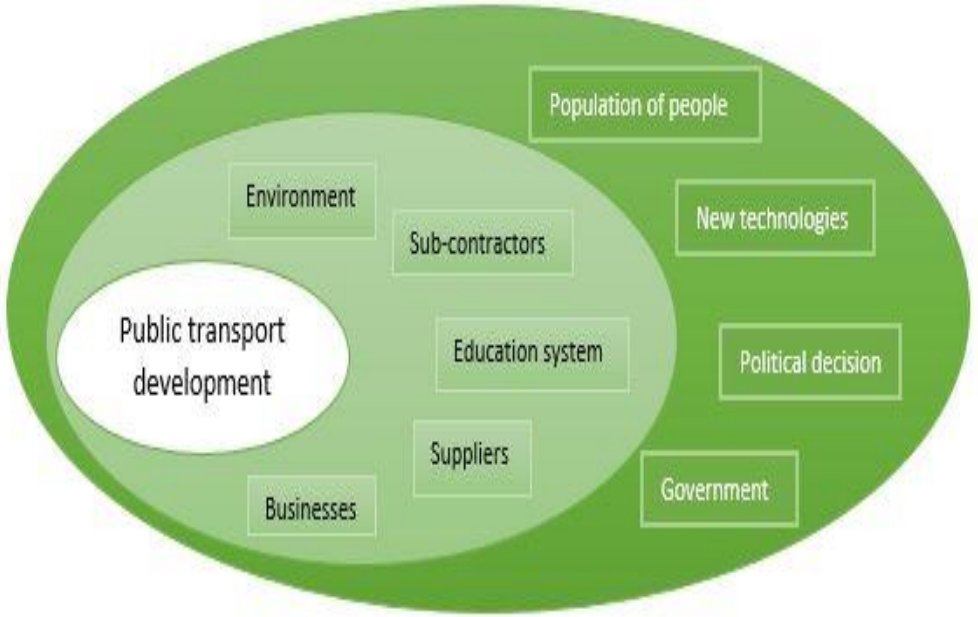
System Of Interest (SOI)

- The public transportation in Norway is the SOI:
- Main goal: Provide and develop transportation vehicles and networks for people to use them daily.
- Types of the public transportations in Norway: rail, road, water:

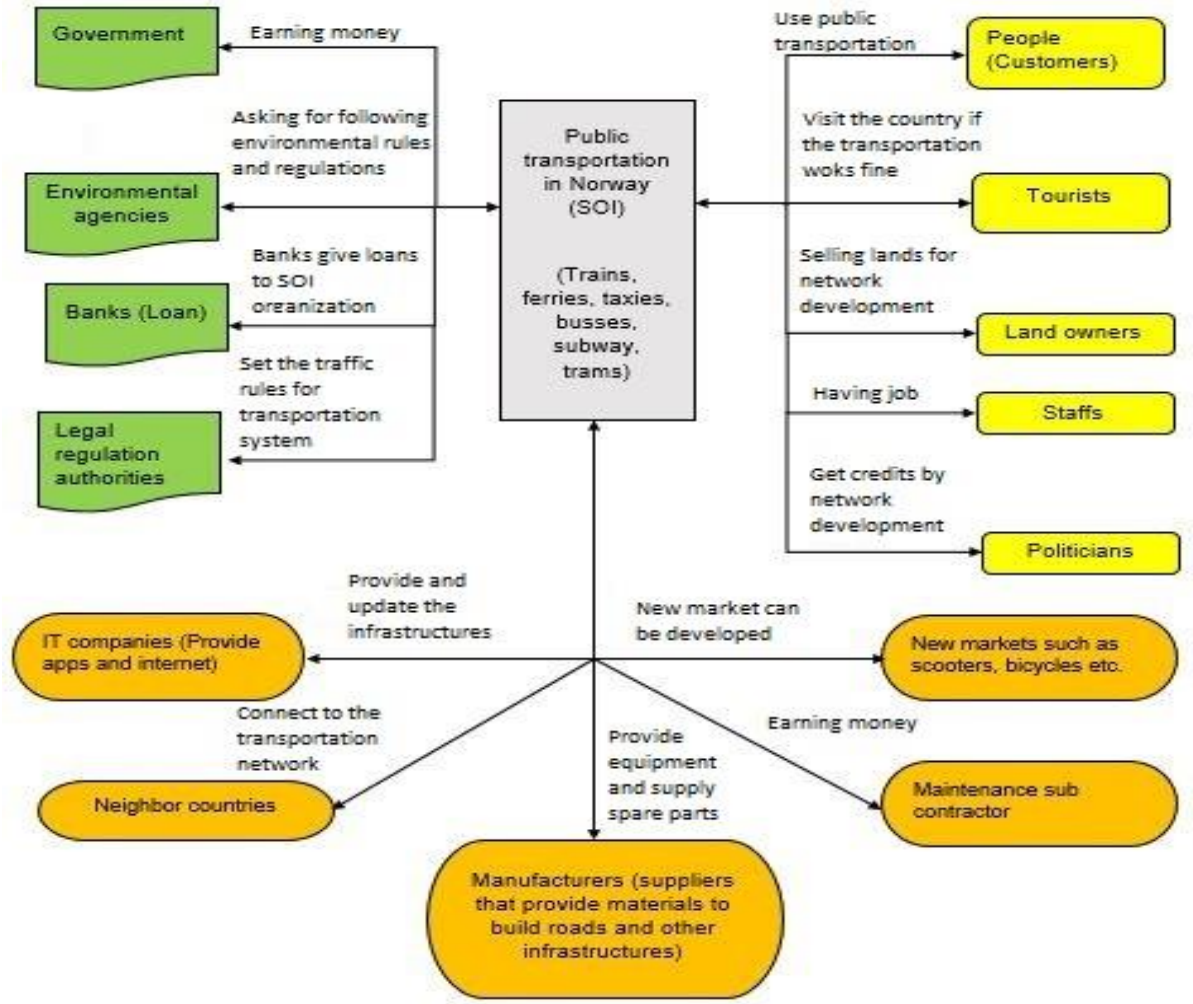
❑ Rail: Trains, trams, subway.

❑ Road: Taxis, busses and minibuses.

❑ Water: Ferries



High level Stakeholders' interest map



- The PARIS agreement:
- Based on this agreement, the countries involved in this agreement tried to find solutions to control and mitigate global warming.
- Norway as one of the European countries that involved this agreement.
- The suppliers need to develop new technologies and update the current fuel consumption system in the public transportation systems which cost them as well.

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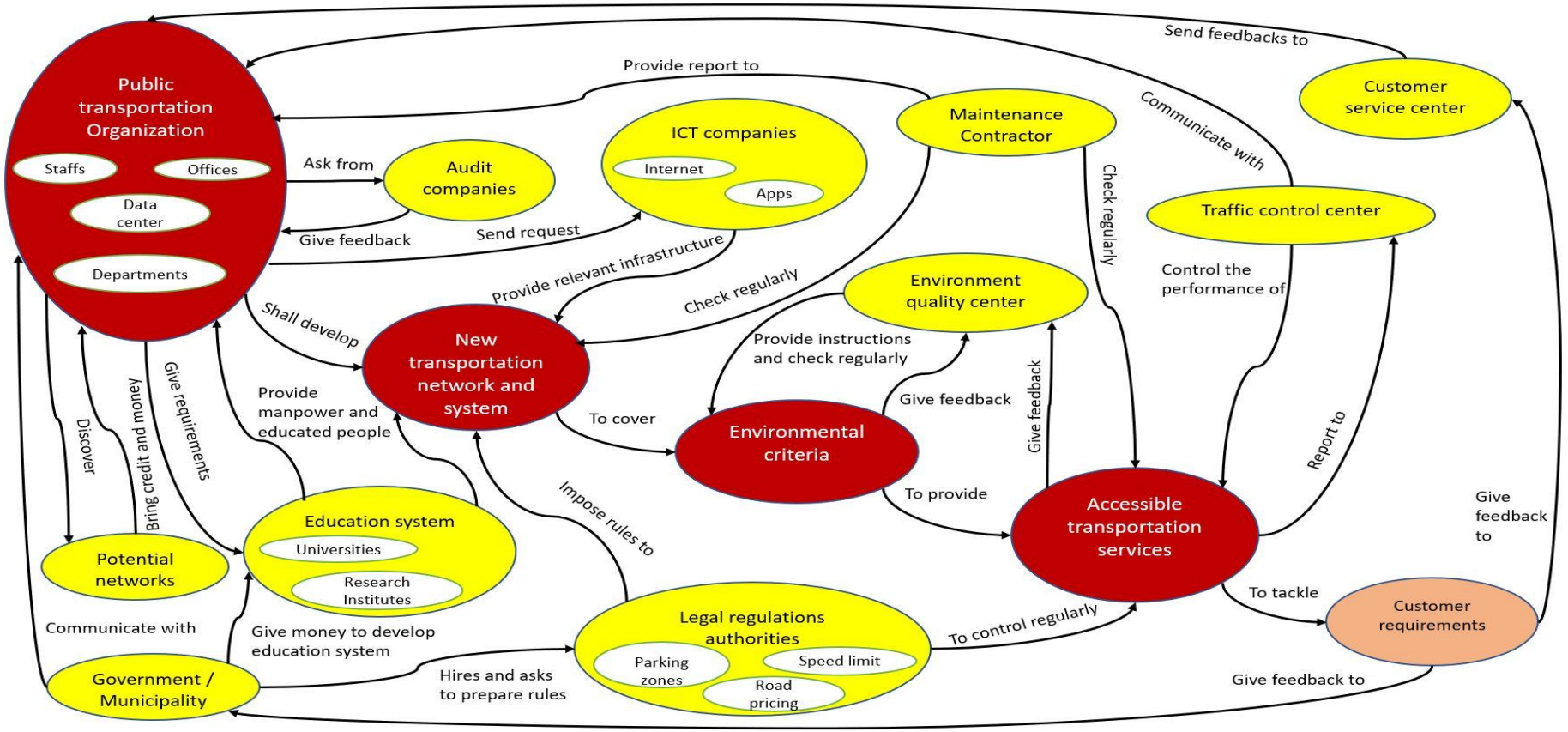
Systemigram method

- Systemigram is a system thinking tool that the stakeholders can use it as a tool to help them learn about each other's perspectives and to identify organizational and communicational bottlenecks of their interrelation, which results in more effective and efficient decision-makings.
- The evaluation of it, may be recognized in three phases:

1. First, its development as a structure of visual language.
2. Second, its development as a procedure for business architecture.
3. The last is its modification as a grateful learning system.

The system (SOI) systemigram



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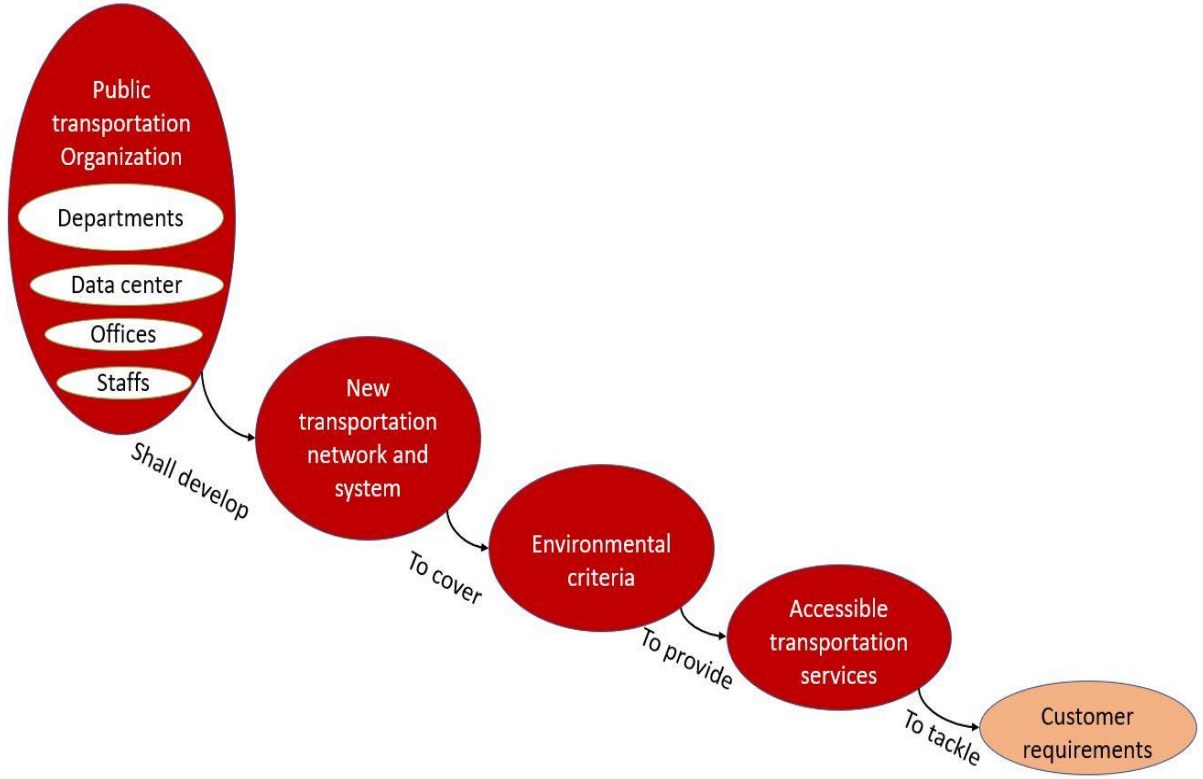
The Mainstay (The purpose of the system development)

Public transportation organization shall develop the new transportation network and system to cover environmental criteria to provide accessible transportation services to tackle customer requirements.



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1.The Regulation Agencies

- Environment quality control centers

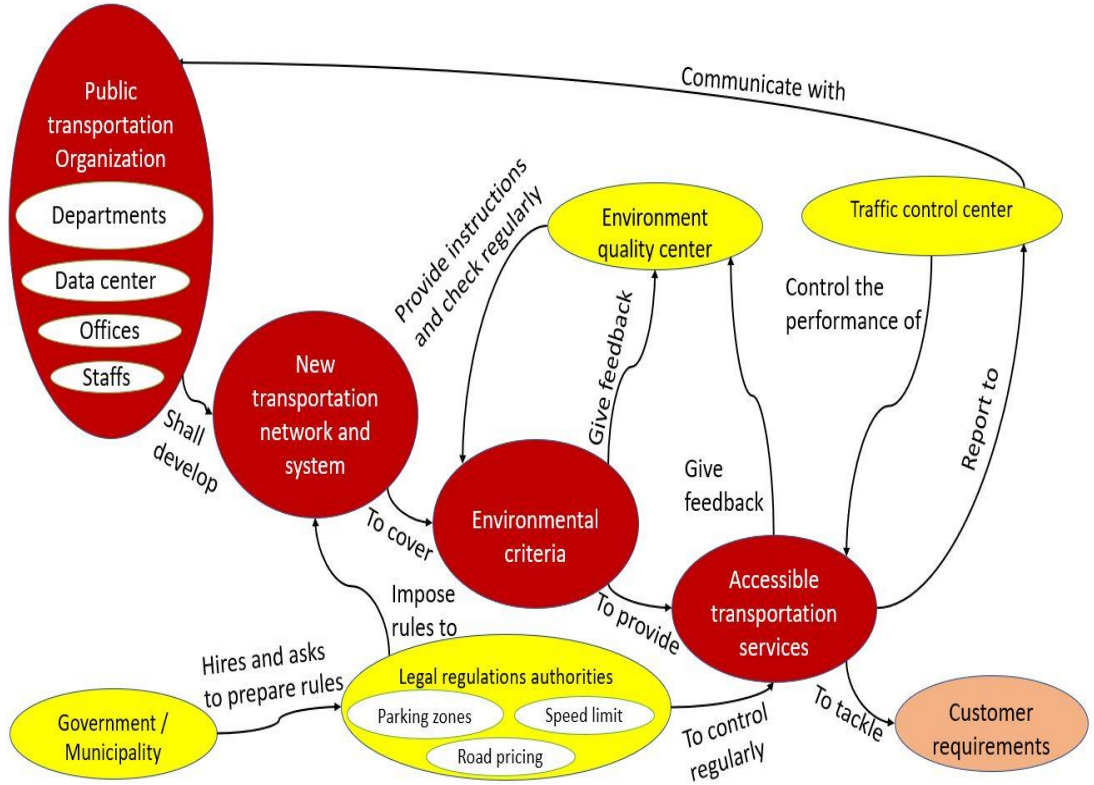
Sets environmental rules and standards

- Traffic control center

How to tackle traffic jam, network development and improvement

- Legal regulation authority

Set the driving rules such as, speeding control, parking zones, road pricing, road taxes etc.



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2.The Subsytems and Sub-contractors

- Education systems

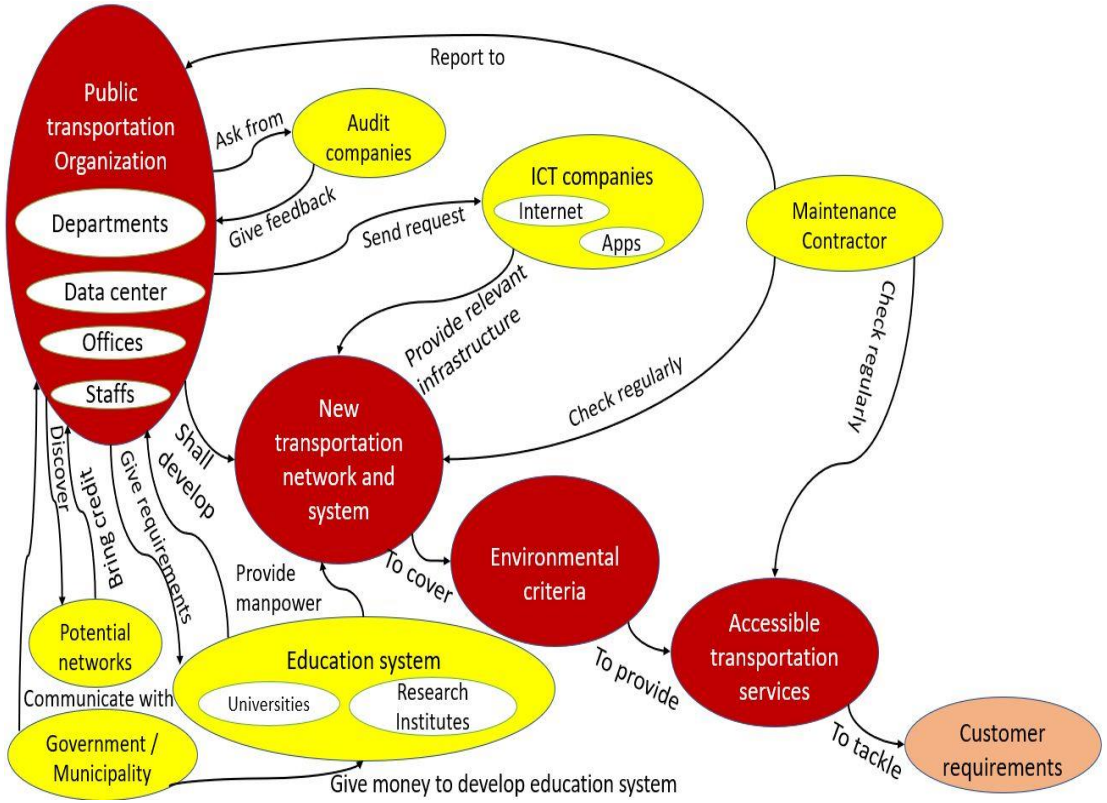
Perform the research based on the public transportation system order or they provide educated people to help the transportation organization with their knowledge.

- ICT companies

Keep the SOI updated in terms of online services and opportunities such as, Apps and available internet networks

- Audit companies

Perform audits for the transportation organization based on the standards to issue certificates for companies.



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2.The subsytems and sub-contractors

- The potential market

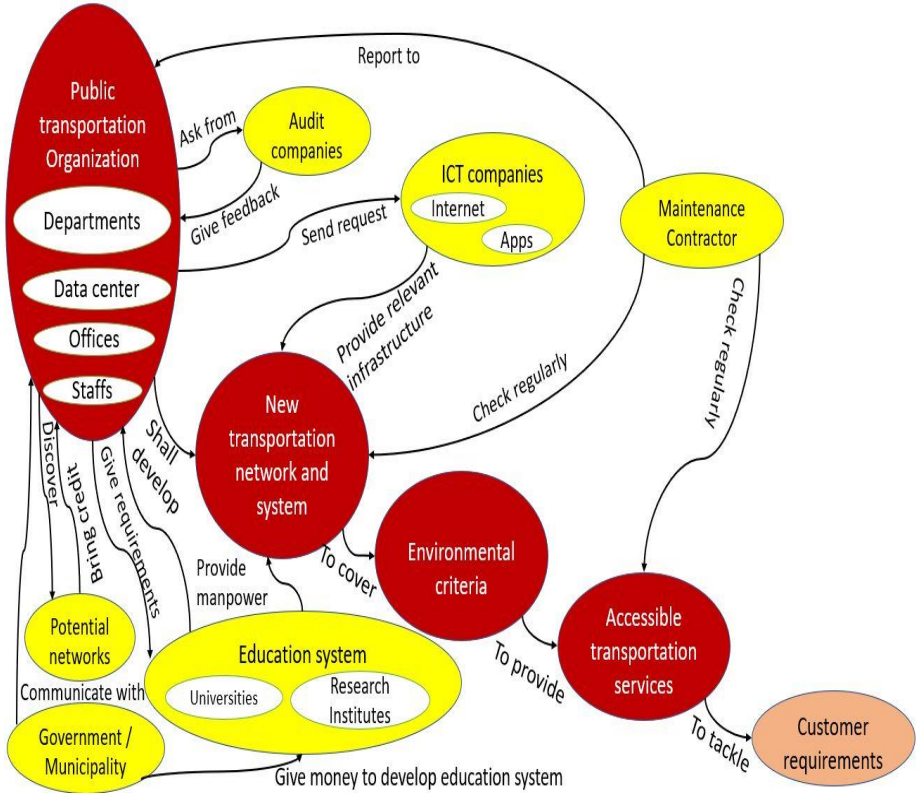
Could be improved by the public transportation network

- Maintenance contractors

Fix any damage or possible damage to have high quality system.

- Government

Communicate with the SOI organization to order the requirements



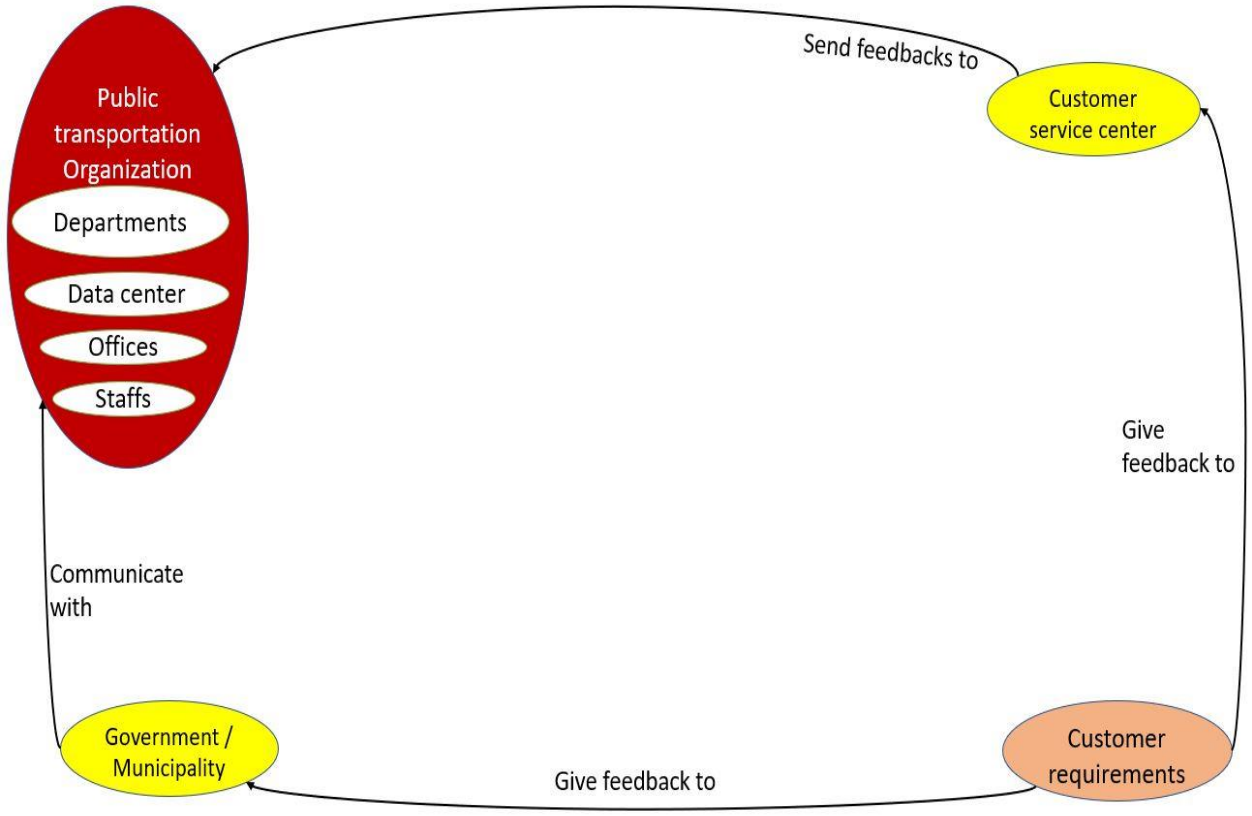
3.Customer service

- Customer service

By call, email or online chat directly to the SOI

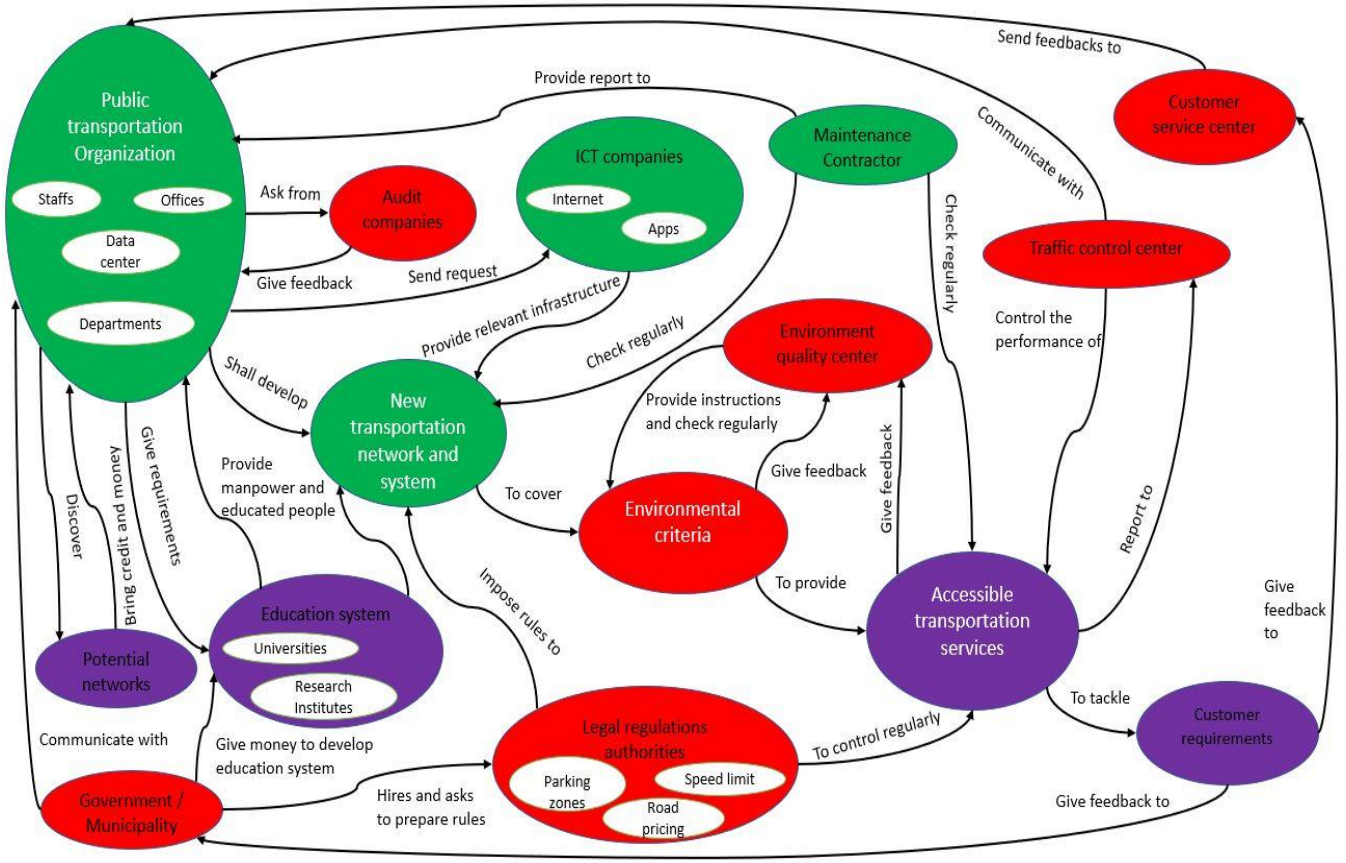
- Government

Feedback send to government through political parties



Openness principle

- Control → green color
- Influence → purple color
- Appreciate → red color (we cannot control or influence them)



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Conclusion

- By using the sistemigram tool, we analyzied the stackholders' requirements.
- Developing the transportation network is complicated and sometimes there is a conflict between the stakeholders.
- The openness principle is used to analyse the stakeholders' interest and if we can put them in control, influence or appreciate groups or boundaries.
- The environment criteria play significant roles in the SOI development.

Thank you for your attention ☺