University of Castilla - La Mancha

The new era of Business Intelligence Applications: building from a collaborative point of view – Experimental Material

Technical Report # DIAB-18-04-2

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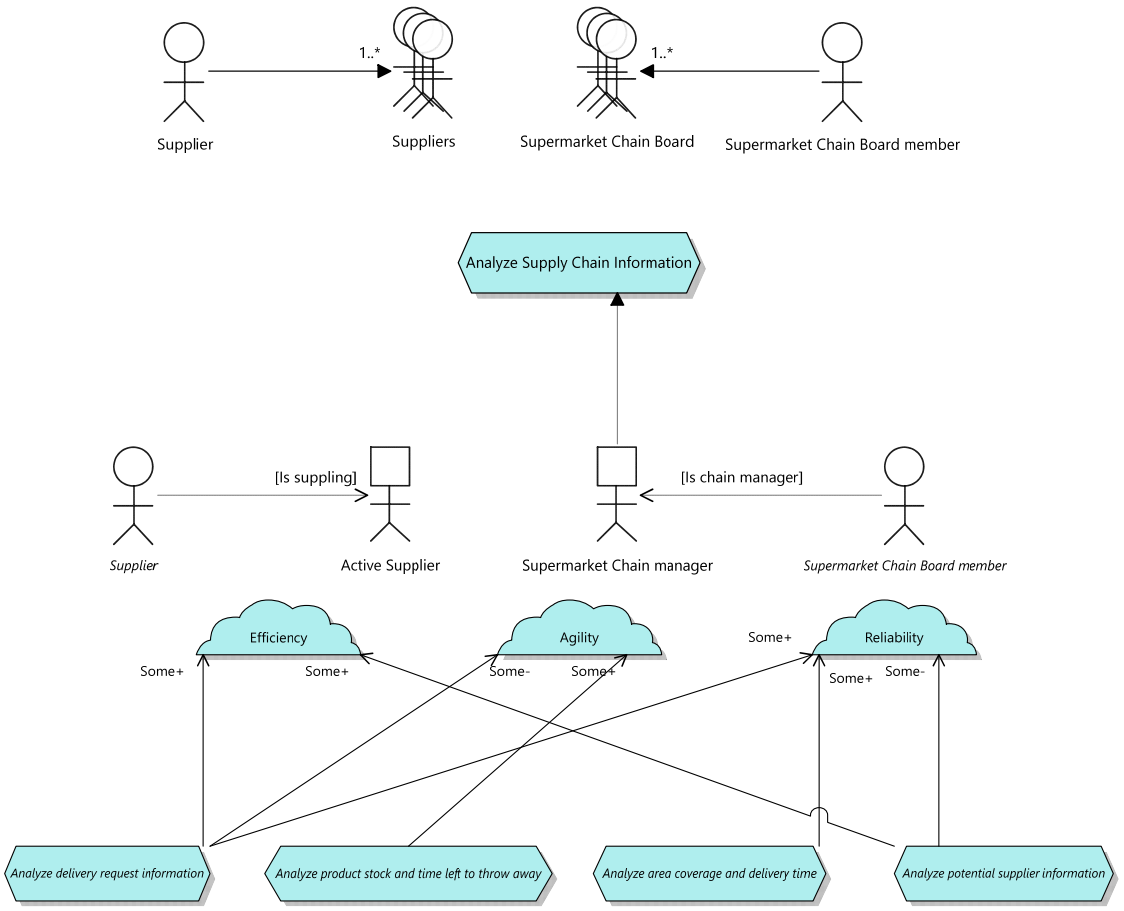
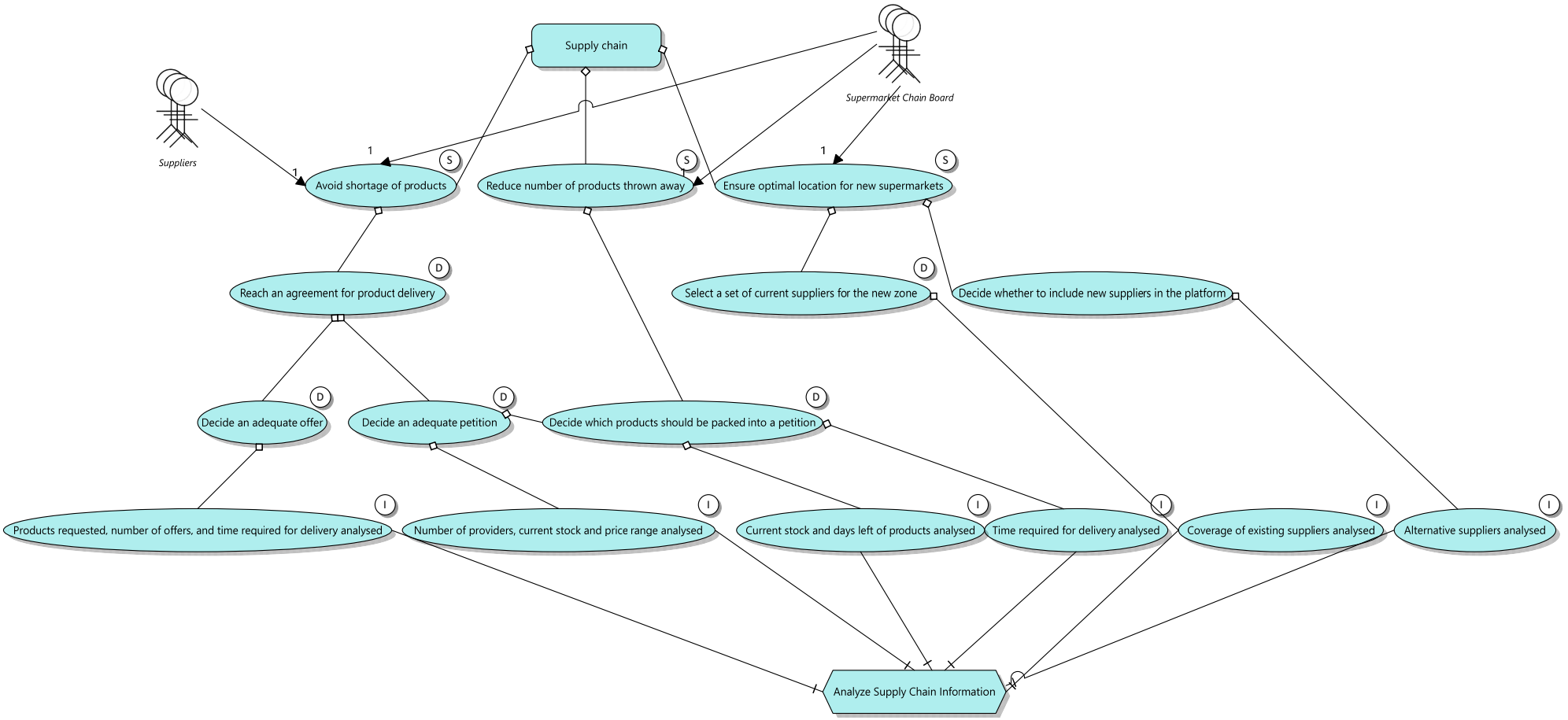
April 2018

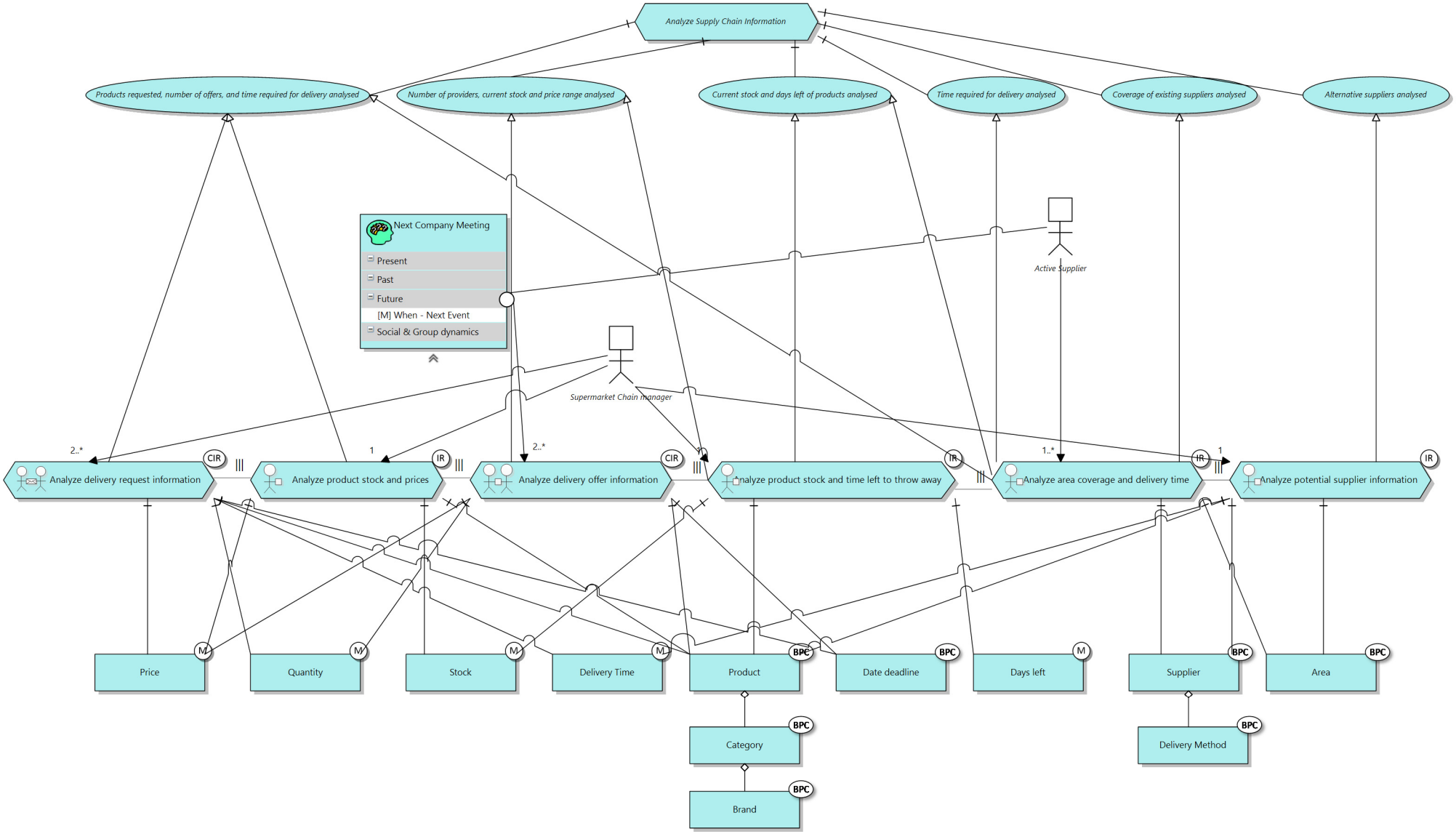
PROBLEM DEFINITION: Collaborative Business Intelligence (BI) is being widely embraced for enterprises as a way to make the most of their business processes. However, decision makers work usually in an isolated way without the knowledge or the time needed to obtain and analyze all the available information for making decisions. RELEVANCE: Unfortunately, collaborative BI is currently based on interchanging e-mails and documents between participants. As result, information may be lost, participants may become disoriented, and the decision-making task many not yield the needed results. METHODOLOGY: We are proposing a framework aimed at modeling and elicitating goals and information needs of participants of collaborative BI systems. This approach is based on innovative methods to elicitate and model collaborative systems and BI requirements. A controlled experiment was performed to validate this framework. RESULTS: By using the framework we propose in this work, a clear view can be provided regarding: (i) collaborative tasks, (ii) their participants, and (iii) the information to be shared among them. MANAGERIAL IMPLICATIONS: By using our approach to design collaborative BI systems, practitioners may easily trace every element needed in the decision processes, avoiding the loss of information and facilitating the collaboration of the stakeholders of such processes.

1. Experimental Models

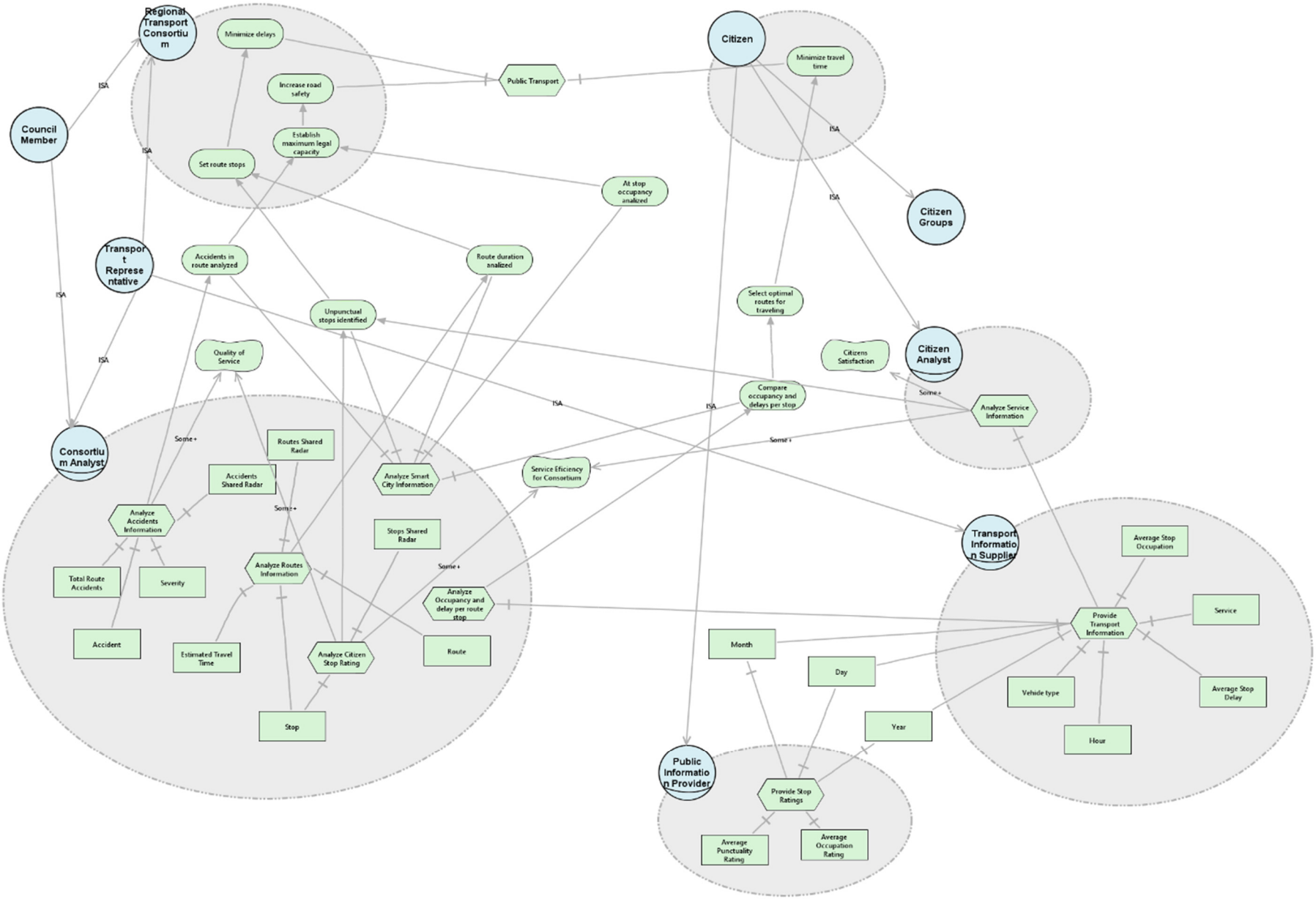
Group 1 – Model 1



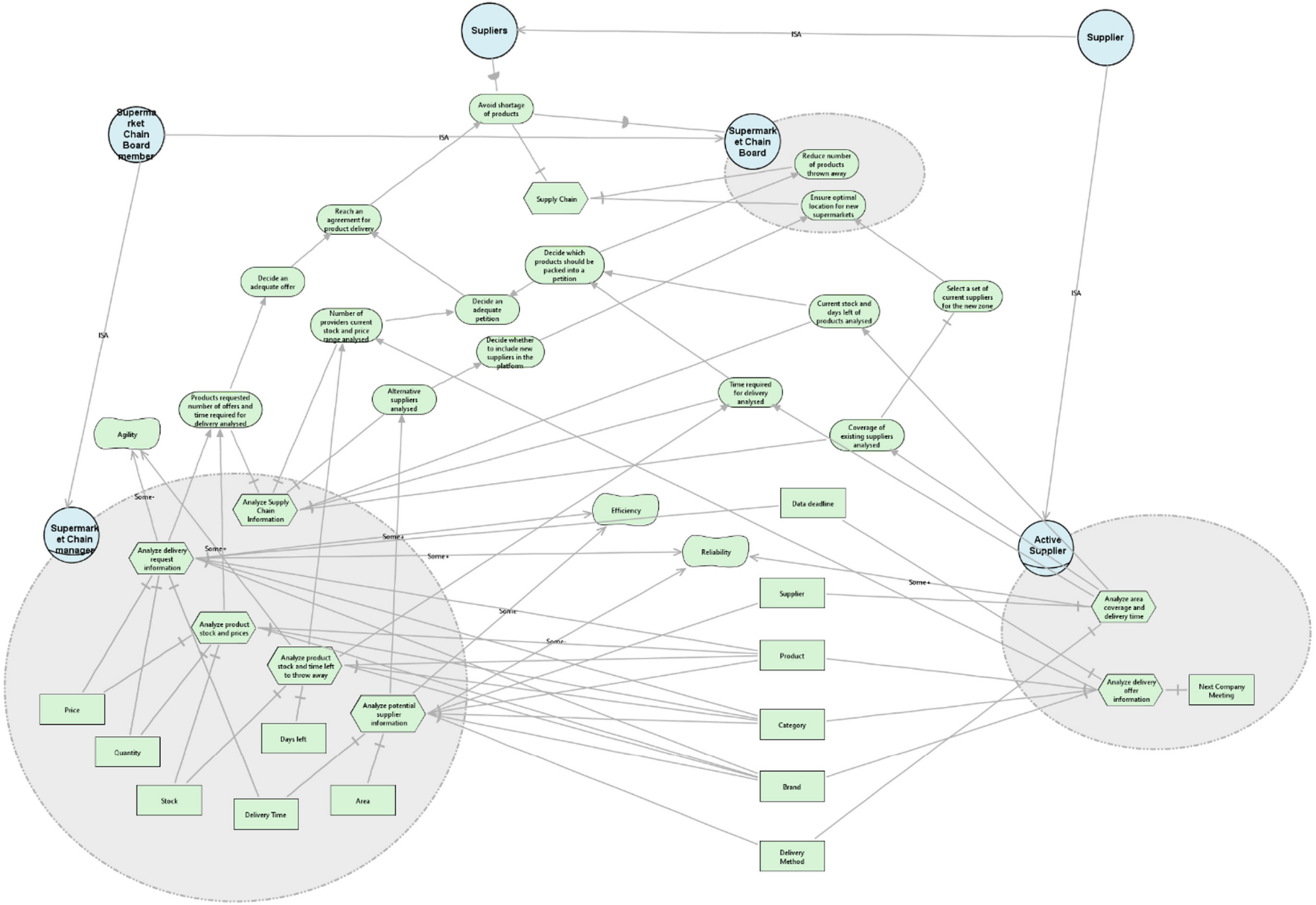

Supply chain
Suppliers
Supermarket Chain Board
1
1
1
S
S
S
Avoid shortage of products
Reduce number of products thrown away
Ensure optimal location for new supermarkets
D
D
Reach an agreement for product delivery
Select a set of current suppliers for the new zone
Decide whether to include new suppliers in the platform
D
D
D
Decide an adequate offer
Decide an adequate petition
Decide which products should be packed into a petition
I
I
I
I
I
I
Products requested, number of offers, and time required for delivery analysed
Number of providers, current stock and price range analysed
Current stock and days left of products analysed
Time required for delivery analysed
Coverage of existing suppliers analysed
Alternative suppliers analysed
Analyze Supply Chain Information


Analyze Supply Chain Information
Products requested, number of offers, and time required for delivery analysed
Number of providers, current stock and price range analysed
Current stock and days left of products analysed
Time required for delivery analysed
Coverage of existing suppliers analysed
Alternative suppliers analysed
Next Company Meeting
Present
Past
Future
[M] When - Next Event
Social & Group dynamics
Active Supplier
Supermarket Chain manager
Analyze delivery request information
Analyze product stock and prices
Analyze delivery offer information
Analyze product stock and time left to throw away
Analyze area coverage and delivery time
Analyze potential supplier information
CIR
IR
2..*
1
1..*
Price
Quantity
Stock
Delivery Time
Product
Date deadline
Days left
Supplier
Area
Category
Brand
Delivery Method
M
BPC

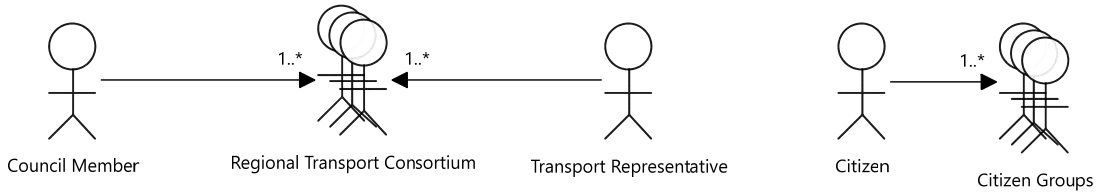
Group 1 – Model 2

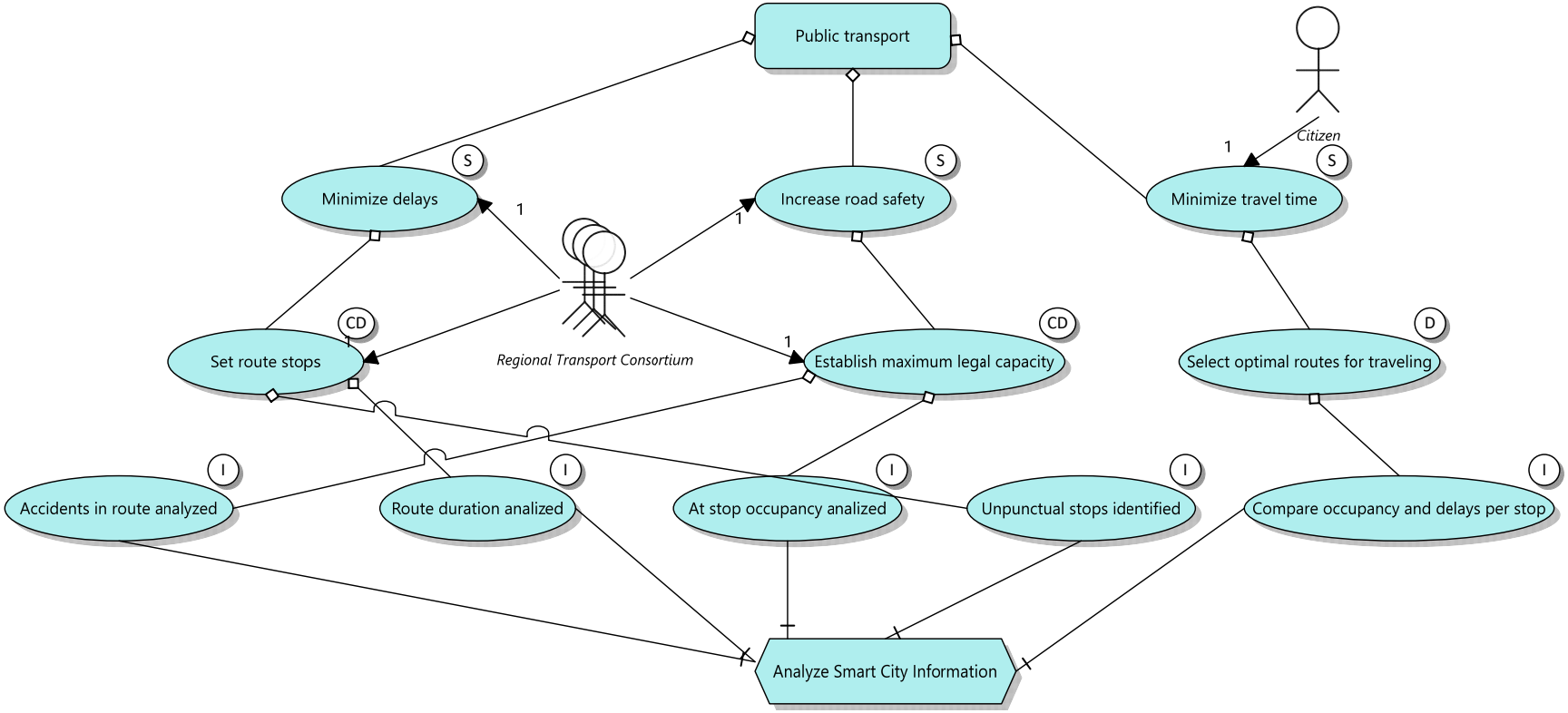


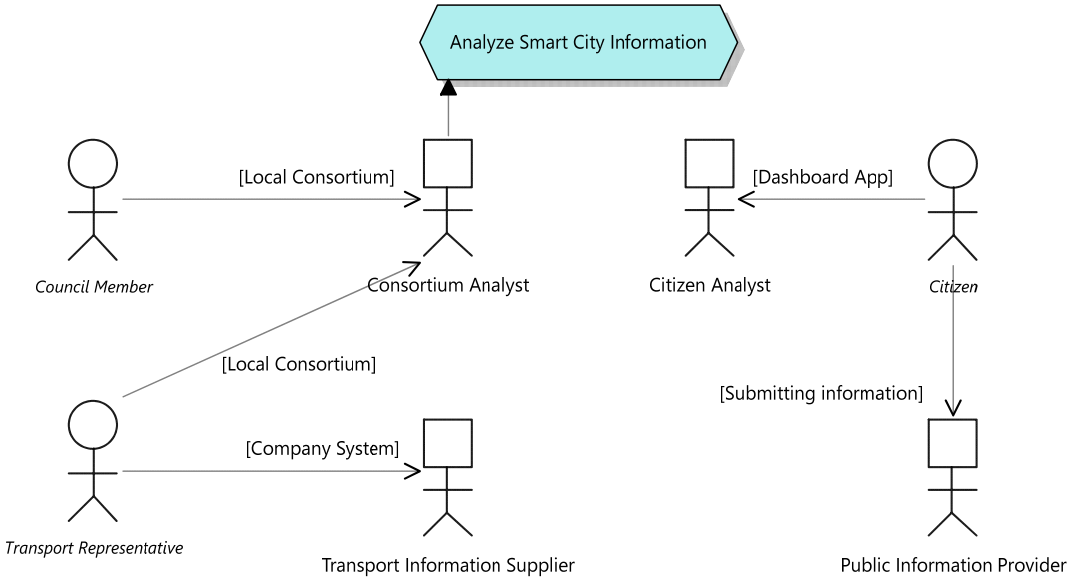
Group 2 – Model 1

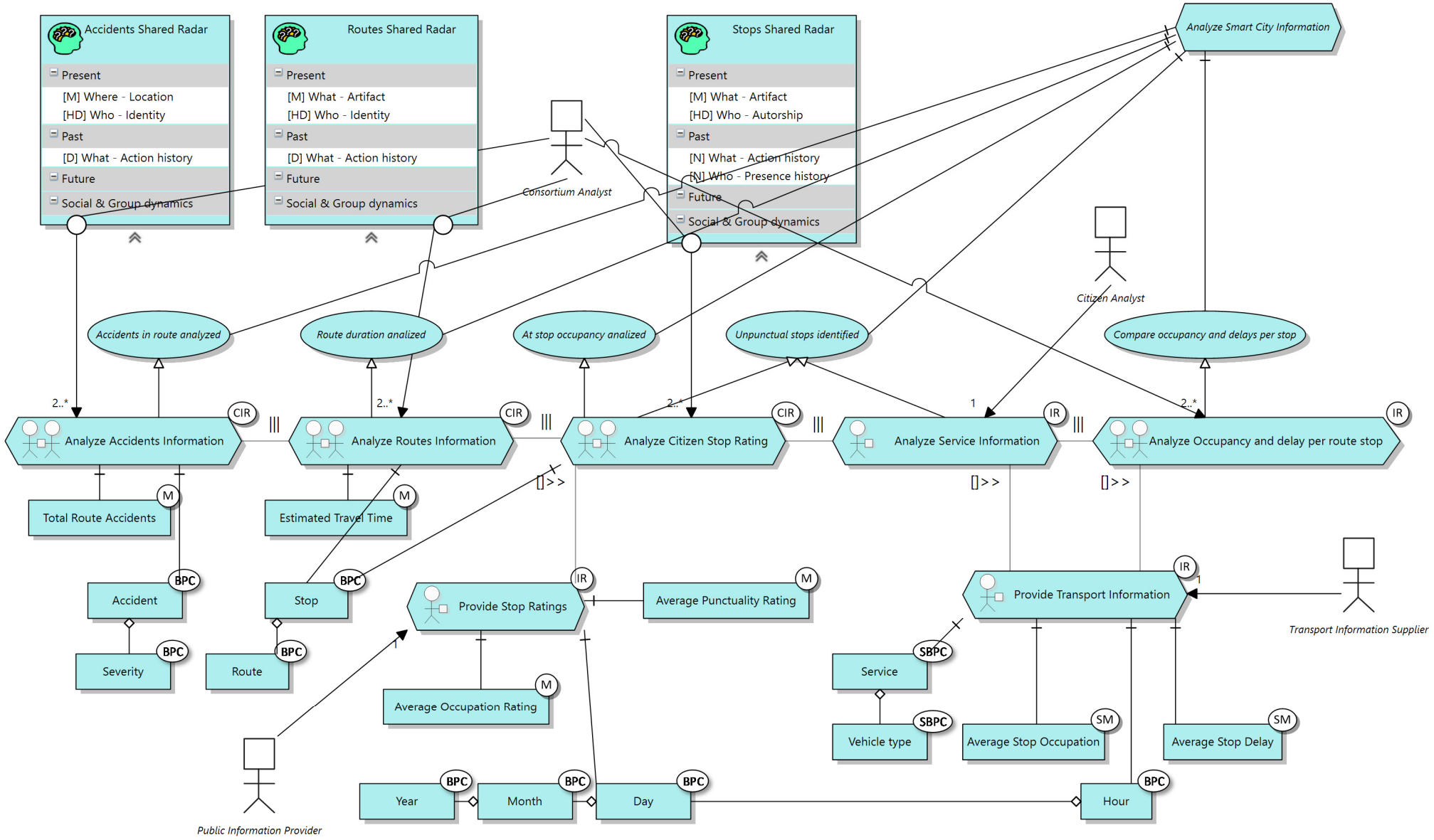


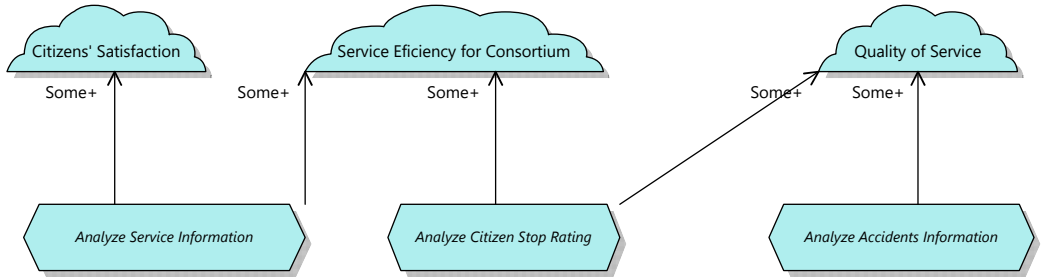
Group 2 – Model 2






Analyze Smart City Information
[Local Consortium]
[Dashboard App]
Council Member
Consortium Analyst
Citizen Analyst
Citizen
[Local Consortium]
[Submitting information]
[Company System]
Transport Representative
Transport Information Supplier
Public Information Provider


Accidents Shared Radar
Present
[M] Where - Location
[HD] Who - Identity
Past
[D] What - Action history
Future
Social & Group dynamics
Routes Shared Radar
Present
[M] What - Artifact
[HD] Who - Identity
Past
[D] What - Action history
Future
Social & Group dynamics
Stops Shared Radar
Present
[M] What - Artifact
[HD] Who - Autorship
Past
[N] What - Action history
[N] Who - Presence history
Future
Social & Group dynamics
Analyze Smart City Information
Consortium Analyst
Citizen Analyst
Accidents in route analyzed
Route duration analized
At stop occupancy analized
Unpunctual stops identified
Compare occupancy and delays per stop
Analyze Accidents Information
Analyze Routes Information
Analyze Citizen Stop Rating
Analyze Service Information
Analyze Occupancy and delay per route stop
Total Route Accidents
Estimated Travel Time
Accident
Stop
Severity
Route
Provide Stop Ratings
Average Punctuality Rating
Average Occupation Rating
Provide Transport Information
Transport Information Supplier
Service
Vehicle type
Average Stop Occupation
Average Stop Delay
Public Information Provider
Year
Month
Day
Hour


Citizens' Satisfaction
Service Eficiency for Consortium
Quality of Service
Some+
Some+
Some+
Some+
Some+
Analyze Service Information
Analyze Citizen Stop Rating
Analyze Accidents Information

2. Questionnaire

PARTICIPANTS DATA

Group:

1 ☐ 2 ☐

Age: ___

Gender: M ☐ F ☐

Do you have expertise in Requirements Experience? Yes ☐ No ☐

Do you have expertise in *i**? Yes ☐ No ☐

Do you have expertise in CSRML4BI? Yes ☐ No ☐

MODELS

Analyze both models and check that you understand every symbol

Current time at the end of analyzing the models: ___ : ___

MODEL 1

Answer the questions regarding model 1. There is only one correct answer per question:

1. To participate in the task *Analyze delivery offer information*, an *Active Supplier*:
   - ☐ Must use the task *Next Company Meeting*
   - ☐ Must be aware of *Next Company Meeting*
   - ☐ *Analyze delivery offer information* must be decomposed into *Next Company Meeting*
   - ☐ It cannot be answered with the information shown in the model

2. The group *Supermarket Chain Board Member* belongs to is involved in:
   - ☐ Three goals
   - ☐ Two goals
   - ☐ Three information requirements
   - ☐ It cannot be answered with the information shown in the model

3. A *Supplier* can play the role of *Active supplier*:
   - ☐ Always
   - ☐ Never
   - ☐ Under one condition
   - ☐ It cannot be answered with the information shown in the model

4. An *Supermarket Chain Board Member* playing a role, participates into:
   - ☐ Three individual tasks in which it does not collaborate with other actors
   - ☐ Five individual tasks in which it does not collaborate with other actors
   - ☐ Six individual tasks in which it does not collaborate with other actors
   - ☐ It cannot be answered with the information shown in the model

5. How many *Chain Managers* must collaborate to carry out the task *Analyze delivery request information*?
   - ☐ One
   - ☐ Two
   - ☐ Two or more
   - ☐ It cannot be answered with the information shown in the model

6. How does one of the tasks in which *Active Supplier* participates affects to *Reliability?*
   - ☐ Negatively
   - ☐ Positively
   - ☐ Does not affect
   - ☐ It cannot be answered with the information shown in the model

7. The group *Supermarket Chain Board* consist in:
   - ☐ Two *Supermarket Chain Board member*
   - ☐ One or more *Supermarket Chain Board member*
   - ☐ Two or more *Supermarket Chain Board member*
   - ☐ It cannot be answered with the information shown in the model

8. Agility will be negatively affected by a task in which on of the participants is:
   - ☐ A *Supermarket Chain Board member* playing a role
   - ☐ A *Supermarket Chain Board member* not playing any role
   - ☐ A *Supplier* playing a role
   - ☐ It cannot be answered with the information shown in the model

9. Considering the tasks *Analyze delivery request information* and *Analyze delivery offer information*:
   - ☐ *Analyze delivery request information* must be carried out after *Analyze delivery offer information*
   - ☐ *Analyze delivery request information* must be carried out before *Analyze delivery offer information*
   - ☐ *Analyze delivery request information* can be carried out while *Analyze delivery offer information* is being carried out
   - ☐ It cannot be answered with the information shown in the model

10. What is the main Business Process / Task / Goal that this model specifies:
    - ☐ *Analyze Supply Chain Information*
    - ☐ *Avoid shortage of products*
    - ☐ *Supply chain*
    - ☐ It cannot be answered with the information shown in the model

Indicate on a scale of 1 to 5, the difficulty of answering this questionnaire:

	Very difficult 1	Difficult 2	Normal 3	Easy 4	Very easy 5
Answer:					

Current time at the end of this questionnaire: ___ : ___

MODEL 2

Answer the questions regarding model 2. There is only one correct answer per question:

1. What is the purpose of *Routes Shared Radar*?
   - ☐ Make *Consortium Analyst* aware of the *Route* to perform the task *Analyze Routes Information*
   - ☐ It is used after the task *Analyze Routes Information*
   - ☐ Depends on the task *Analyze Routes Information*
   - ☐ It cannot be answered with the information shown in the model

2. The group *Transport Representative* belongs to have:
   - ☐ Eight goals
   - ☐ Two goals
   - ☐ Four goals
   - ☐ It cannot be answered with the information shown in the model

3. A *Transport Representative* can play the role of *Consortium Analyst*:
   - ☐ Under any condition
   - ☐ Under certain condition
   - ☐ Only *Council Member* is not playing such role
   - ☐ It cannot be answered with the information shown in the model

4. The role played by *Council Member*:
   - ☐ Uses three resources to be aware of the information required to participate into three tasks
   - ☐ Participates into five collaborative tasks
   - ☐ Both previous answers are correct
   - ☐ It cannot be answered with the information shown in the model

5. How many *Public Information Providers* participate in the task *Provide Stop Rating?*
   - ☐ None
   - ☐ One
   - ☐ One or more
   - ☐ It cannot be answered with the information shown in the model

6. Which actors can participate into tasks that contribute positively to *Service Efficiency for Consortium*?
   - ☐ *Citizen*
   - ☐ *Council Member*
   - ☐ Both previous answers are correct
   - ☐ It cannot be answered with the information shown in the model

7. What is the minimum number of actors required to create the group *Regional Transport Consortium*?
   - ☐ One
   - ☐ Two
   - ☐ There is no minimum
   - ☐ It cannot be answered with the information shown in the model

8. *Quality of Service* improves thanks to tasks whose participants must be aware of:
   - ☐ No resources
   - ☐ Two resources
   - ☐ More than two resources
   - ☐ It cannot be answered with the information shown in the model

9. The task *Provide Transport Information*:
   - ☐ Can be carried out while *Analyze Service Information* is carried out
   - ☐ Provides information to *Analyze Service Information*
   - ☐ Both previous answers are correct
   - ☐ It cannot be answered with the information shown in the model

10. *Severity* is used by a task that:
    - ☐ Contribute to the goal *Increase road safety*
    - ☐ Contribute to the goal *Select optimal routes for travelling*
    - ☐ Contribute to the goal *Route duration analyzed*
    - ☐ It cannot be answered with the information shown in the model

Indicate on a scale of 1 to 5, the difficulty of answering this questionnaire:

	Very difficult 1	Difficult 2	Normal 3	Easy 4	Very easy 5
Answer:					

Current time at the end of this questionnaire: ___ : ___

PERSONAL OPINION

In a scale from 1 to 5, rate both models according to their features:

(1) Supply Chain Model	Nothing 1	Little bit 2	Somehow 3	Quite 4	A lot 5
It is readable					
It is scalable					
It is understandable by a non-expert					
It is easily modifiable					
It is traceable					
It is expressive in this domain					

(2) Smart City Model	Nothing 1	Little bit 2	Somehow 3	Quite 4	A lot 5
It is readable					
It is scalable					
It is understandable by a non-expert					
It is easily modifiable					
It is traceable					
It is expressive in this domain					