Chapter-6

Conclusion
The conclusions are separated into two parts. First, the findings for the SimConT model, followed by the findings of the implementation of the model of the current Indian transport system. Finally, suggestions for future research are given.

6.1 SimConT - model

The model was developed for SimConT decision support for combined transport in India. As stated in the determination of the potential for combined transport in India, the model is well suited to its purpose.

One goal was to build a flexible model. The model structure does not limit the size or geographical area (for example other countries) of the model. The input and output data can be changed easily processed and analyzed using the Microsoft Access database, without requiring the user advanced computer skills. Not only the large data sets can be performed, but the models can also be used with small data sets, for example, for an individual train route or a single combined transport operator. The model could also be extended to other modes of transport. In particular, the shipment would be interesting to add to the model. From the point of view of modelling, modelling principle is the same. A long-haul transport mode is simply a representation of the loading capacity, costs and transport times, which might as well be a ship or an airplane like a train. Lines are very flexible and versatile and can be used in many different situations.

The SimConT can be used by decision makers to evaluate and examine the possibilities of intermodal transport and also to test the effect of changes to the system, for example, taxes, cost trends, new technologies, new infrastructure, etc. The transportation industry can use the model to develop new transport systems and improving existing systems. The model can also be used as a calculation tool for calculating performance, costs and the environmental impact of a given transmission system.

The scan paths and models made with SimConT model in determining the potential of combined transport in the current system of transporting Indian stressed the importance of being familiar with the model and the assumptions made during the testing and analysis model. Several parts of the output data can be explained by the way the heuristic model works. This shows that a model user must be very well acquainted with a model before
attempting to use it. This gives the user the ability to separate the effects of technology on the model of the effects of the studied system.

6.2 The potential of combined transport

Both the model showed that there is great potential for combined transport in India. Business economic costs and environmental effects can be reduced by using the combined transport more. It can also be seen that combined transport almost always economically competitive if the transport distance is long enough. Thus, the main challenge for combined transport is not the cost, but the realization of competitive pickup and delivery in relation to transport any way.

There are two main strategies to achieve this: the creation of a speed advantage for combined transport or to influence the attitude of the Transmission Customer to allow further deliveries and / or early pickup. Strategies take time to implement, but already it is possible to begin to influence the transport service because each individual transport customer help achieve potential. Delivery times more relaxed and pickups greatly increase the potential for combined transport. This does not mean that times / pick-up delivery should be more uncertain than they are with all road transport, but that flexibility in setting deadlines agreed should be higher. One possible way to convince the transport customer is to use cost reduction gained by using combined transport in order to reduce the shipping price. The advantage of the speed can be achieved either by improving combined transport speed or reduce the speed of all road transport. Increasing traffic congestion points that we are likely to see a reduction of road transport possible. At the same time, technical development in the rail sector indicates that the speed of combined transport will increase. In addition, a rail transport sector more market-oriented with the potential entry of new players is likely to put pressure on the combined transport actors to streamline their operations. The transport sector is therefore likely to move towards the use of combined transport more, however, actions are needed to ensure this development. In particular, the attitude of the transmission is a customer key factor in increasing the share of combined transport.

The potential gain to society from the use of more combined transport is also important. In particular, the environmental impact of transport can be reduced by increasing the combined transport. Specifically, the CO2 emissions are a major concern for today's
society, taking account of climate change and greenhouse gases. It is important for the company to maintain its high interest in intermodal transport to support and facilitate a modal shift to achieve a sustainable society. In addition, the rail industry must continue to use electrical energy from renewable energy sources to maintain its environmental benefit.

The transportation industry, too, can gain an advantage of using the cost advantage by using combined transport. Competition in the transport sector is fierce and cost savings resulting from the use of combined transport can be used as a competitive advantage. Major transport operators could operate their own trains to fully utilize the cost advantage.

6.3 Future research in progress and suggested

Many new ideas emerged during the work on the model and the input data set. Some were incorporated into current research, but others were left for future research. Some research projects on how to expand and further develop the model also have already been funded and launched.

6.3.1 SimConT - model

The models could be improved and developed. It is particularly important by adding the ability to include other modes of transport in the model. The most interesting mode would be shipping. In addition, some more control options can be added to the model. Among the opportunities identified as attractive is for different time windows and gaps to be used for arrival and departure, to allow the application to choose between several devices to expand the possibilities of direct environmental optimization, d expand the possibilities to allow trains to run loops between multiple devices (eg, from terminal A to B to C to D to A ...), add a time delay to allow terminals and to the model to determine the processing capacity of the terminals. None of these extensions are expected to cause significant difficulties to add to models.

Usability models could also be improved, for example, by extending the Microsoft Access database interface, and development of user manuals. This will allow others to use the model, for example to government bodies and enterprises. However, it is important to remember the need for a thorough understanding of the model and heuristics to properly
analyze the output data. A judicious compromise between the user friendless and understanding of the model must be made.

The inclusion of geographic information systems (GIS) could also improve usability and design analysis capabilities. This would allow the input and output data to be displayed graphically on a map, which would facilitate the collection of data, since most of the data has a geographic link.

Random input data and random perturbations may be used in the models. However, this could be expanded to better study the sensitivity of the proposed transport system. Both devices can be used together in an evaluation process in two stages where the output data will be connected to the simulation model where further sensitivity analysis can be performed. This iterative procedure is repeated until a satisfactory result and analysis.

6.3.2 Modelling and input data

Some improvements in the input data and other assays can be performed. Bases of more complete and detailed data for transport demand and the cost structure should be developed. It is in particular the need to continue developing the database of the application. Creating a more detailed application database is a very difficult and important project, but it is of great interest for many actors, for example, other researchers and government agencies. An extensive cooperation project with several stakeholders could be a recommended strategy to develop the database. This could include studies of specific traffic flows which should perhaps, or should not, be considered potential combined transport products such large flows of existing transport and well-managed in some industries.

Cost estimates for rail transport could also be made more detailed. The model outputs a rail transport system suggested that we could further analyzed to benefit from economies of scale, for example, the more effective the process loops using engines and cars to several train lines and manoeuvre between trains. This new estimate of costs could be returned to the models to improve cost estimates in the model and all input data could be revived with new cost estimates.
The level of detail in the modelling of international transport could also be extended. International flows have been largely simplified in the current dataset. To improve the level of detail out of India could be fruitful; however, this would require new sources of data. Model runs can be done to test various measures to promote intermodal transport. Of particular interest are the future scenarios for combined transport system, due to the expected strong increase in demand for transport. Time was identified as the most important factor for a successful combined transport system. However, many other factors also influence the success, like transport direction to the terminal, the total volume of goods on the train route, the distance between the terminals, the balance in the flow of goods, etc. These models can be used to further study these factors and how they interact.

The overall advantages of intermodal transportation model can be used for

1. Identification of routes for delivering desired volume.
2. Identify options for delivering things with minimum cost.
3. Utilize minimum resources and delivering maximum volume.
4. Total cost can be derived which is been incurred in delivering the material from origin to end user.
5. Used by decision makers to evaluate and examine the potential for intermodal transport and test effect of changes to the system.
6. Export industry can use model to develop new transport system and improve existing system.
7. Used as calculation tool to calculate the performance, cost and environmental impacts.