DeMaMech 2005 Report

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Executive Summary (max 1 page)

I traveled TUDelft, Netherlands from 22nd August 2005 to 15th November 2005 and DTU, Denmark from 15th November 2005 to 31st January 2006. I took course in TUDelft and worked on project in DTU.

I took two courses in TUDelft. “Upper Intermediate English” and “Introduction to Micro Systems”. The course detail is explained at p. 9 – p. 10 in this report.

Research theme was “Reverse Logistics”. I’ve chosen case study as glass bottles return flow in Denmark. I went to 5 Danish companies to have meeting. The research detail is explained at p. 2 – p. 8 in this report.

Student life in TUDelft and DTU are described at p. 11 - p. 12 in this report.

Summary of the report is described at p. 13.

Travel Schedule

TUDelft: From 22nd August 2005 to 15th November 2005

DTU: From 15th November 2005 to 31st January 2006

Research in DTU

Reverse Logistics of Glass Bottles in Denmark

Reverse Logistics

Logistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.[1] Briefly saying, reverse logistics is reverse version of logistics.

Sustainability is the ability to provide for the best for people and the environment both now and in the indefinite future. Sustainability has become a hot issue in recent years, because there are many problems, which damage the ability of future generations to provide themselve. Recently, we have problems such as, global warming, depletion of ozone layer, acid rain, deforestation, desertification, decreasing species of wild life, pollution of oceans and international rivers, control of chemicals and hazardous wastes and air pollution etc. Since these problems are caused by human activity in the most cases, human have responsibility to solve the problem. If the problems get bigger, we will have difficulty living on the earth. We should find solution of these problems for both people and the environment to survive.

There are solution for these problems such as facilitating the renewal of renewable resources, conserving and establishing priorities for the use of non-renewable resources, and keeping environmental impact below the level required to allow affected systems to recover and continue to evolve. To put these solution into practice, we should think about return system of products we use everyday. There is system named “Reverse Logistics”.

Reverse logistics is the logistics process of removing new or used products from their initial point in a supply chain, such as returns from consumers, over stocked inventory,

[1] Council of Logistics Management, Oak Brook, Ⅰ 11

outdated merchandise and redistributing them using disposition management rules that will result in maximized value at the end of the items original useful life.

Though many corporations are not dealing with them yet, reverse logistics is an issue that has receiving growing attention in the last decades and concern about environmental matters and sustainable development. There is also economical reason contributing this increasing importance of reverse logistics issues. Perhaps due to the rapidly growing importance, the concept of reverse logistics has not been sharply defined and is the lack of broadly accepted consensus about the defining reverse logistic. However some aspects may be gave a partial vision, whereas in yet in others, they may become controversial.

To give an account of reverse logistics, it is easier way to give example of reverse logistics flow. Mainly reverse logistics has five key processes --- product acquisition, transportation, inspection & disposition, remanufacturing and marketing. Reverse logistics flow starts from when customer used the products and ended useful life. In the first step, the products should be collected. Then they are transported to inspection place. The collected products should be inspected to decide how to deal with the products afterward, and they are disposed to specific place or inventory. The products are fixed, reused, remanufacture, etc. in order to return the products to original specification. After inspection, it will be put on the market or directly sent back to original customers. Researching whole process of reverse logistics is very important part, too. The processes explained above are not always treated by single company, but also treated by several companies. Of course each company should understand what they are doing, but they should know state of whole flow and subject of the products. Through this process, the companies, which have relevance to the products, take advantage of remaining the products in the market.

Reverse Logistics is a new discipline in which not much theory has already developed, so the approach could be started to deal with qualitative research. The qualitative research methodologies have been adapted to case study that looks further in some certain companies. It becomes possible to explore and evaluate the reverse logistics phenomena in real world through the case study.

Case Study: Reverse Logistics of Glass Bottles in Denmark

We use many types of glassware everyday life, such as beer bottles, wine bottles, food

containers such as jars for jam etc. Reverse supply chain of beer bottles and wine bottles collected at supermarket are well established, and they are collected in high rate. Supermarkets offer the beer bottles for 1DKK deposit and collect them. Each beer company treats the collected beer bottle in their ways.

Wasted glasses

195,000 tons/year of glasses (wine bottle, food container, glassware) per year is used in Denmark. Two-third of them, 130,000 tons/year are collected, but one-third, 65,000 tons/year, is not collected at all. They are thrown away as garbage. They might be land filled and/or burned with other burnable trash.

Reuse wine bottles

Another one-third, 65,000 tons/year of glasses is reused in Denmark. They are collected, stocked, inspected, sorted and washed. 54,000 tons/year of collected wine bottles and food containers from public waste containers are transported to KROGHS Flaskegenbrug A/S. 18,000 tons/year of wine bottle are reusable, but other 36,000 tons/year are not reusable, so they are sent to glass recycle company, Rexam Glass Holmegaard A/S, and used as cullet. Reusable wine bottles are sorted and some are directly sent to original manufacturer, and some are washed and send to wine refill companies. There are six sorting companies in Denmark, which take part in inspection and/or washing process.

130,000 tons/year of glasses are collected in Denmark, and 54,000 tons/year of collected glasses are transported to KROGHS Flaskegenbrug A/S from public waste container from all Denmark. That mean 42% of collected glasses in Denmark are transported to KROGHS Flaskegenbrug A/S. Most of the glasses are from recycle center and/or public waste box from commune. 65,000 tons/year of collected glass bottles are washed in Denmark. KROGHS Flaskegenbrug A/S wash collected wine bottles from public waste 18,000 tons/year. In other words, KROGHS Flaskegenbrug A/S take 28% of glass wash in Denmark on itself. Glass bottles are transported from public glass recycle container and/or recycle center 150 tons/day. Two third of the collected wine glasses, which has damage or not reusable are crushed and sent to glass remanufacture company, Rexam Glass Holmegaard A/S. One third of the collected wine bottles, which has no damage, are washed and sent to wine refilling companies.

Recycle glasses

Rest one-third, 65,000 tons of glasses is recycled in Denmark. After inspection process by sorting companies, such as KROGHS Flaskegenbrug A/S, the cullet are crushed, melted and formed by Rexam Glass Holmegaard A/S. KROGHS Flaskegenbrug A/S transport 36,000 tons/year of cullet to Rexam Glass Holmegaard A/S.

Table. 1 Five key processes of Reverse Logistics

Processes	Explanation
Product acquisition	Obtaining the used product from the user
Transportation	Transporting the products to a facility for inspecting, sorting, and disposition
Inspection and disposition	Assessing the condition of the return and making the most profitable decision for reuse
Remanufacturing, Reusing, Fixing	Returning the product to original specifications
Marketing, Understanding of whole reverse logistics process	Creating secondary markets for the recovered products

Figure. 1 Schematic drawing of product flow to explain reverse logistics

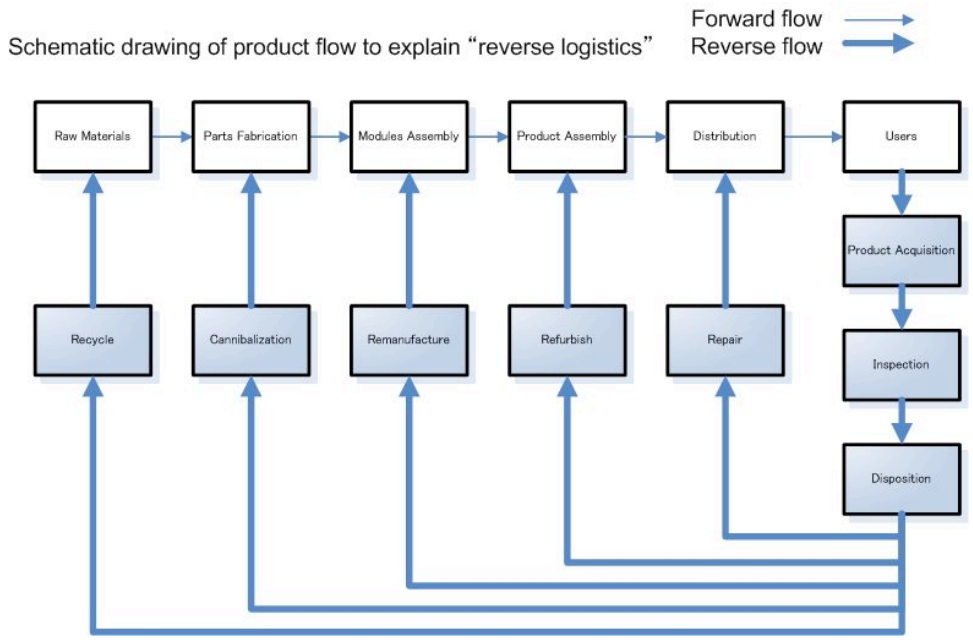


Figure. 2 Amount of Glass Reverse Flow in Denmark

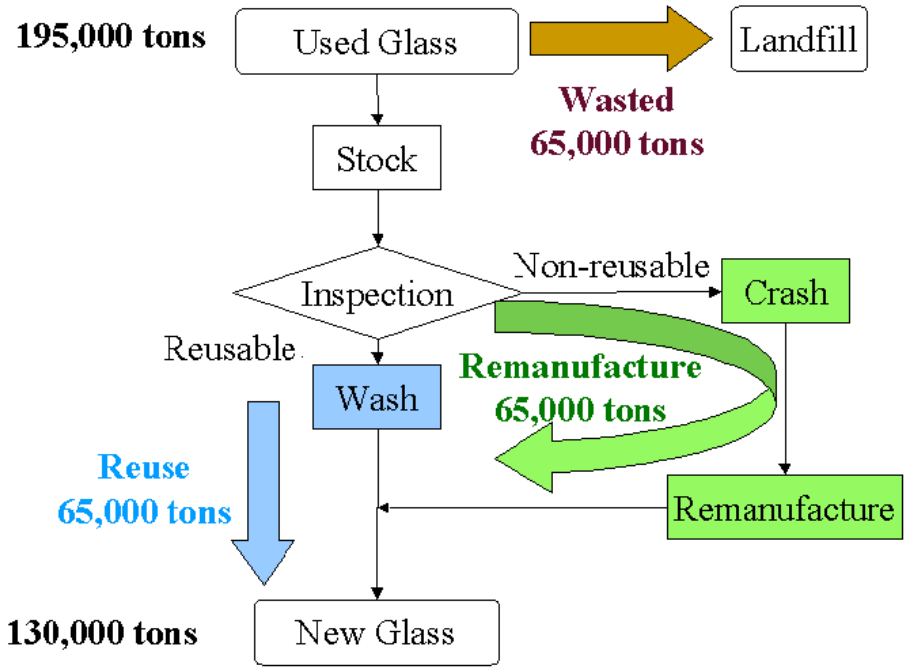


Figure. 3 Who treat each process of reverse flow of glass?

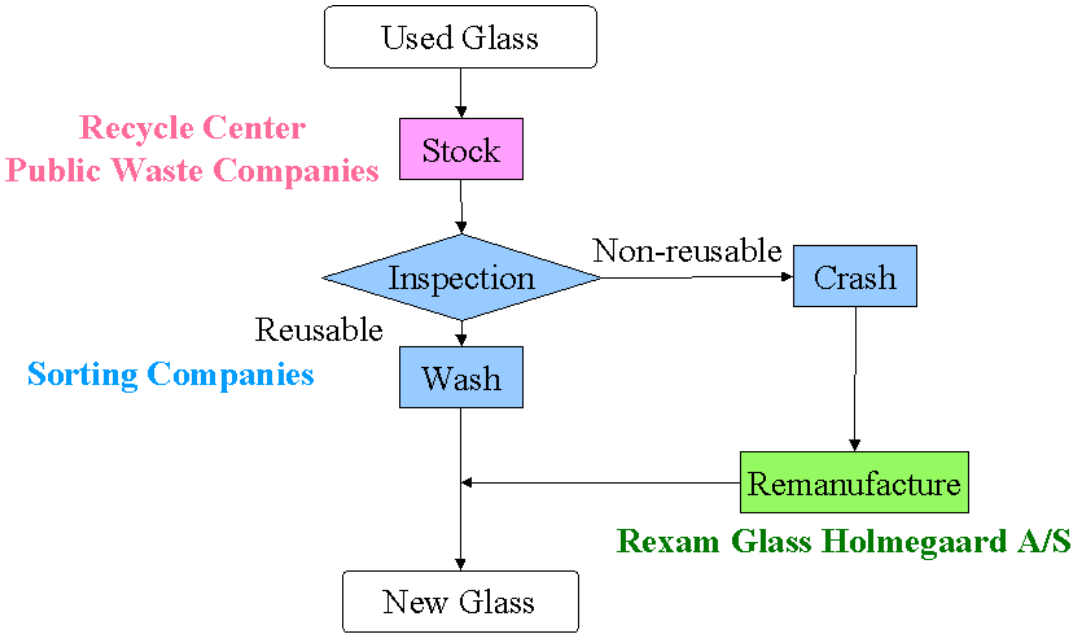
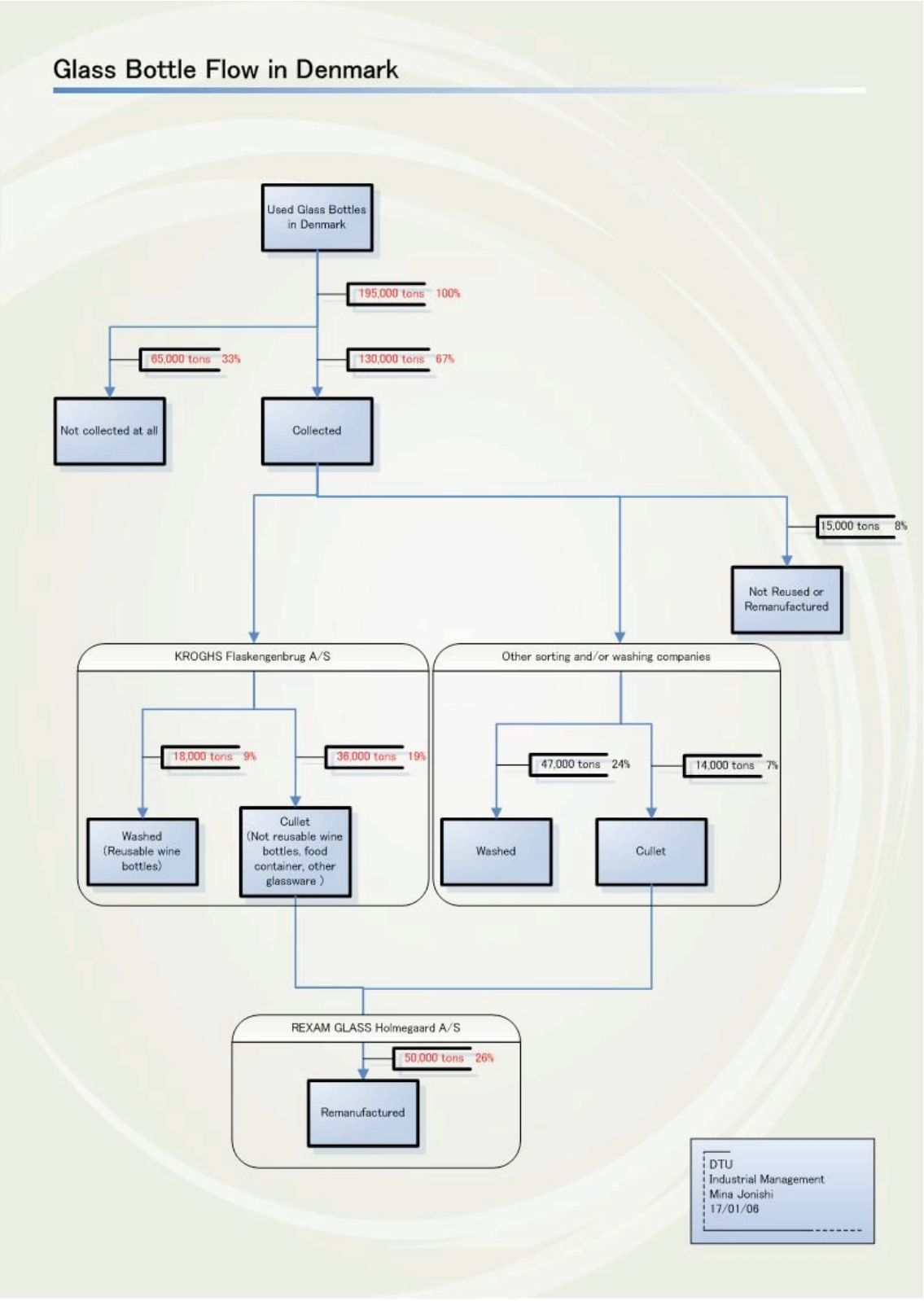


Figure. 4 The outline of glass bottle reverse logistics in Denmark



Lecture in TUDelft

Upper Intermediate English

Enrollment

TUDelft English section offers following five English courses for students --- Lower-Intermediate English course, Upper-Intermediate English course, Advanced English course, Written English for Technologists and Scientific Writing in English. Admission to all courses is via the Placement Test. I took the test in 30th August at TBM building, and assigned the upper intermediate English course based on my placement test performance. Upper-Intermediate English course is a general skills course for students with an intermediate level of English. I also applied for Scientific Writing in English but it was not accepted, because the course was for PhD students and staff only.

Impressions of the Courses

The course was based on a series of texts on different topics. We were required to study the texts in detail and our knowledge was tested each week. Listening skills was developed by listening to spoken English, oral communication skills through discussion and conversation, and writing skills through regular assignments. Each week there were also the opportunity to discuss and revise vocabulary and grammar arising from the texts we studied. In the beginning of lecture everyday, each of us were required to give a short presentation, which are followed by detailed individual feedback. My turn came in 19th September. The title of the presentation was "Introduction to Nanotechnology".

By the half semester of the course, I felt that I have improved my knowledge of and ability to use the language effectively in academic circles, my professional lives and everyday conversation. In particular, I should have learnt how to express my selves with sufficient fluency and accuracy to take part confidently in meetings and to conduct discussions. I understood spoken English reasonably well and I had learnt the basic principles of giving presentations and writing in English.

Assessment

Half of the final mark was based on the written assignments and the oral presentation and the other fifty per cent will be based on the result of the final written exam. To qualify to appear for the examination students were required to pass 7 of the 14 weekly tests. The course duration was 14 weeks from 3rd September to 19th December.

It was so pity that I left Netherlands at 15th November, so I could not attend whole autumn semester, but I asked teacher to send assignments to Denmark so that I can continue studying English. All assignments and homework are sent to Denmark and finally, I could take test in Denmark and finished course.

Prescribed textbook

Murphy, Raymond (1994, 2nd ed.). English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Students, (with answers). Cambridge: Cambridge University Press [ISBN 0 521 43680 X].

Introduction to Micro Systems

Impressions of the Course

In this lecture, introduction to Microsystems with typical sizes up to 1mm and feature sizes of a few micrometers are given. Overview of applications such as sensors, actuators, structural components and signal conversion, manufacture techniques, reliability, modeling, etc. relevant to Microsystems design are given. Furthermore the physics involved in such small systems and how this differs from systems of a more traditional scale.

The course built awareness and feel for Microsystems, their application, manufacture and the design aspects of these microscopic systems.

We visited Microsystems laboratory and saw clean room and equipment such as lithography equipment, SEM (Scanning Electron Microscope).

Assessment

Final mark was based on the result of the final written exam. The course duration was 14 weeks from 6th September to 20th December. It was so pity that I left Netherlands at 15th November, so I could not finish the autumn semester.

Prescribed textbook

None. Handouts during lecture.

Exchange student life (max 2 pages)

Student life in TUDelft

Location and history of Delft

The city of Delft is situated half-way between Rotterdam and the Den Haag. It is the "Randstad", an urban agglomeration consist of Amsterdam (the capital as well as the financial and cultural center), Den Haag (seat of government), Rotterdam (largest harbour in the world, petrochemical industries and world oil center) and many small cities. The Randstad forms a semi-circle with aradius of about sixty kilometers. The center of this semi-circle is agricultural; the various cities each of which has a unique character specialise in trade, industr and services. With 4.5 million inhabitants, the Randstad is one of the most important urban agglomerations in Europe. As a result of TU Delft, Delft is one of its maineducational and research centers.

In the granted city rights by the Count of Holland. The medieval town was protected by strong walls and 8 gates. Today only the "Oostpoort" (East Gate) remains. Also in the 13th century, St. Hippolytus Church, known as the "Old Church" was built. In the 14th century and 15th century, St. Ursula Church, also known as the "New Church" was built.

Route to TU Delft

TU Delft lies at the heart of the coastal urban conurbation less than 15 km from Rotterdam, 8 km from the Den Haag, and 60 km from Amsterdam. There are rail connection between Schiphol Airport (Amsterdam) and Delft, running both day and night. If you are coming from Amsterdam Central Station, you can take a train directly to Delft from platform 1 (direction Haarlem/Breda).

TU Delft Sports Center

The TU Delft Sports Center promotes an extensive program of competitive and recreational sporting activities. I took part in Mixed Move, Body Shape, and Steps courses to lose weight.

Student life in DTU

My supervisor arranged meeting with him and prepared an office for me soon after I arrived DTU. The DTU facility was excellent. There were communication room with coffee maker in the same floor and I could have coffee anytime I want. Mainly I studied at the office and at home. The DTU library was very good, too. We could use scanner and printer for free in the library. I also liked coffee, which is available in every building on the campus. The professor at DTU who I met is very helpful.

Since the housing situation in Copenhagen makes it very difficult to find accommodation, we signed up for our housing program. Accommodation office of DTU chose DTU campus village container as my 3 months stay accommodation in Denmark. There were 8 people lived in one container. We became good friend and made snowman and snow house next to accommodation together. It was really fun. Through these activities we exchanged each person's sense of values. Now we are very good friends and keeping in touch even after I came back to Japan.

Snowman and me in front of DTU campus village container

Summary

I traveled TUDelft, Netherlands from 22nd August 2005 to 15th November 2005 and DTU, Denmark from 15th November 2005 to 31st January 2006.

I took lecture in TUDelft. "Upper Intermediate English" and "Introduction to Micro Systems". I intended to take two other courses, however, one was canceled and another was lectured in Dutch, so I gave up to take the two courses. The Introduction to Micro Systems course duration was 14 weeks from 6th September to 20th December. It was so pity that I left Netherlands at 15th November, so I could not finish the autumn semester. The English course duration was 14 weeks from 3rd September to 19th December. I could not attend whole autumn semester, but I asked teacher to send assignments to Denmark so that I can continue studying English. All assignments and homework are sent to Denmark and finally, I could take test in Denmark and finished the course.

My research theme was "Reverse Logistic". Reverse logistics is the logistics process of removing new or used products from their initial point in a supply chain, such as returns from consumers, over stocked inventory, outdated merchandise and redistributing them using disposition management rules that will result in maximized value at the end of the items original useful life. Reverse Logistics is a new discipline in which not much theory has already developed, so the approach could be started to deal with qualitative research. The qualitative research methodologies have been adapted to case study that looks further in some certain companies. I researched "Reverse Logistics of Glass Bottles in Denmark" and studied Reverse Logistics through this case study. I visited 6 companies in Denmark and had meetings with consultants and/or managers. It was very good experience to visit the companies and had interview with them. Now I can explain whole used glass flow in Denmark.