1. INTRODUCTION

1.1 Background to Unilever Sri Lanka

Unilever's association with the country, Ceylon at the time, began in the early 1900s with brands such as Sunlight, Lux and Pears Rose being available for sale in the local market. In 1927 imports and distribution was organised with the appointment of a sole agent Sankar Aiyars. In 1938, with the sales of Sunlight reaching 2000 tons and Lux reaching 200 tons Lever Brothers Ceylon Limited was incorporated. This was followed with the establishment of a soap factory in Grandpass Colombo in April 1940. Bakery fats and Margarine manufacture commenced in 1941 and in 1958 the company established its own selling and distribution organisation (Sankalana, 2009).

Over the years the organisation expanded and the business activities of Unilever were managed through Lever Brothers Ceylon Limited, Lipton, Brooke Bond, Ceytea, Lever Aqua Products and Premier Foods. The organisation was restructured in 1991 to bring all legal entities under the umbrella of Unilever Ceylon. Since then the business was managed by two divisions namely Consumer Division and Tea Division.

Since 1996, the consolidated business entity is known as Unilever Sri Lanka Limited (USL) with its head office and main food and home and personal care (HPC) factory in Grandpass, Colombo. This plant manufactures a large range of fast moving consumer goods such as toilet soaps, hard soaps, washing powders, shampoos, toothpaste and margarine. This site employs around 1270 permanent employees. Non soap detergent (NSD) plant, hard soap packing plant and the distribution centre are located at the Lindel industrial site in Sapugaskanda, about 15 km away from the Grandpass office.

1.1.1 Current Operation

Today, Unilever is home to 17 strong brands that are leaders in all the categories that they operate. Sunlight, Lux, Signal, Rin, Astra, Marmite, Knorr, Sunsilk, Vim, Pears, Ponds, Lifebuoy, Lipton, Fair and Lovely, Surf and Dove are the brands. USL, attempts to **commit to helping people look and feel good** about themselves and to add vitality and enjoyment to

their everyday life by addressing their needs of hygiene, beauty and foods through branded solutions that comes from innovation, research and development.
(Unilever Srilanka, 2008)

1.1.2 Working Environment

The staff at USL is a team of motivated individuals committed to achieving unstoppable growth. The company takes pride in team dynamics that operate at all levels of the company. Brand teams consisting of cross functional colleagues are empowered and made accountable to both nurture the brands and deliver agreed targets. Brand teams are recognised and rewarded for their outstanding contribution to the company. Each month a brand team is publicly applauded for their commitment and achievement. A quarterly growth champion award has also been initiated to reward the brand with the highest growth of the quarter.

One of the highest priorities is work place safety. Creating a safe work environment is being done through awareness, induction and training. The production lines in the factories are run by **autonomous work groups.** In addition to operational aspects, the company also takes responsibility and accountability for safety, quality and good house keeping. The company has embarked on behavioural safety (employee behaviour on safety) among all employees across the total company to achieve zero accidents at work place while having all processes, procedures and systems for the prevention of accidents. The company continues to win much recognition at the **National Safety Awards**.

To help achieve the growth targets USL has adopted the Japanese system of **5S** and **Total Productive Maintenance (TPM)** in its working environment. 5S aims to create a neat and orderly workplace, where every necessary item has a designated place. This allows swifter retrieval of items which leads to greater efficiency. TPM is a system that aims at achieving zero losses and increased productivity in the work place. The lines that have adopted TPM have achieved tremendous improvement in efficiency and effectiveness. In 2007, the company won the National 5S award for the Large Manufacturing category. At the same time company won the TPM level 1 award, awarded by Japanese Institute of Plant Maintenance (JIPM) too. This is the first time in history that a Sri Lankan factory won this prestigious award.

Safeguarding the environment for future generations is something USL takes very seriously. The effluent treatment plant treats more than 350 tons of effluent daily, thus having zero discharge to the inland surface water stream from the factory. Treated water is reused for factory requirements. The Grandpass plant was also awarded International Standard Organization (ISO) 14001 certification in 2002. The company has become a model for authorities and educational institutes.

USL has to follow and work in accordance with the Safety in Manufacturing and Supply (SIMAS) unit when the company wants to introduce a new technology or any process modification. The SIMAS unit consists of a team of experts from different disciplines who carry out the entire approval procedure for new technology or process changes. This is a unique system all Unilever companies practice when new technology or process changes are introduced to their system. One major disadvantage of this system is that it only addresses the safety and quality aspect. Currently USL follows this system, for lack of a better one, when the company wants to acquire new technology for its operation.

1.1.3 Workforce

Unilever can be considered one of Sri Lanka's premier employers, with a current workforce of over 500 permanent employees in the factory. In addition, nearly 200 casual workers are employed within the site. The wide spectrum of career opportunities available at the organisation draws in specialists of various fields and thus forms an enriched work environment.

USL is a company that values its employees and their customers. This is demonstrated by the various community service projects organised by the company and the various training programs organised for its workforce.

1.1.4 Financial Situation

The company at the moment is pursuing a target of Rs. 30 Billion turnover for the year. This is projected to be achieved by more aggressive marketing and sales procedures. The growth is also pushed by the various cost cutting measures which increase the companies competitive cost advantage. In a time of increased competition this company is still making enormous financial progress.

1.1.5 Structure of the Manufacturing Facility

USL has the manufacturing capabilities for 95% of its products and remaining 5% constitute imported finished products through global sourcing network. Local production overview is as follows.

Product Categories - HPC Products & Foods

Brands Produced - Sunlight, Lifebuoy, Astra, Lux, Pears Baby, Flora, Sunsilk, Signal, Vim, Ponds, Rin

Production Plants - Edible Fats Refinery & Finishing, Pan Room, Glycerine, Toilet Soaps, Hard Soaps Drying, Personal Products, Soap Powder, Bulk Material Department

Site Area	-	10.5 acres
Total built up area	-	66%
Total no of Plants	-	7
Capacity	-	85,000 tons per annum

Total manufacturing facility is carried out in four different locations in Sri Lanka.

1.1.6 Brands and Product categories

Home and Personal Care

Category	Products
Laundry	Sunlight
Personal Wash	Lux, Lifebuoy Gold Soap, Pears Baby Toilet Soaps
Oral Care	Signal –Toothpaste
Skin Care	Pond's Lotion, Pears baby Creams,
Hair Care	Sunsilk, Lifebuoy and Pears Baby shampoo

Foods

Category	Products
Yellow Fats	Astra and Flora Fat spreads
Bakery	Bakery Fats, Margarines

Industrial Range

Brand	Uses	Characteristics
Lux Hotel Pack	Guest soap for hotel guestrooms.	Superior quality guest soap for personal wash.
Hyco	Bread and bread rolls	A bakery compound which increases the yield and quality.
Beehive	Quality cakes	A robust cake margarine with good creaming properties.
Superfine	Superior quality cakes	A quality cake margarine, for better eating quality.
Masterpuff	Puff and shortcrust pastries	A quality pastry margarine for light and flaky pastries.

1.2 Background to Present Problems

The Fast Moving Consumer Goods (FMCG) industry caters to millions of people around the world to fulfill their day to day needs such as household cleaning, personal care etc. With the large volumes of products manufactured in the FMCG industry on a daily basis, it is crucial to select and transfer proper technology for its operations.

USL being a Europe based multinational company; most of its technologies are from the European countries such as United Kingdom, Germany, Denmark and Italy. Soaps manufacturing and finishing Technoware was from Italy. Refrigeration Technology was obtained from Denmark. Most of the packing machines were from Germany. Engineering services technology such as Air compressors, Steam boilers were from the United Kingdom (UK).

Unilever has preferred suppliers in most of these technologies hence, has a good bargaining power due to their global network. In most technology transfers, Technoware Specific Infoware (TSI) was transferred very smoothly due to the good relationship between the two parties. For some technologies, Technoware Attribute Infoware (tai) was licensed for Unilever and the information pertaining to the technical specifications of the Technoware obtained from the transferor as well as from the Unilever Engineering excellence team in the UK. This Engineering excellence team comprises of experts from various fields like Process Engineering, Mechanical Engineering and Control and Automation Engineering. Technoware Operating Infoware (toi), which includes all the information pertaining to operating the plant and machinery, was handed over to the local company even before the commissioning. The

training on operation is also given to local team by the commissioning team of the transferor. Under Technoware Maintenance Infoware (tmi), the transferor's commissioning team trained the maintenance team of the local company on key maintenance functions and provided a set of spare parts also with the initial package. Unilever companies have similar Technoware Performance-enhancing Infoware (tpi). As a result any performance development achieved in one site was replicated to other factories with the help of the Engineering excellence team. Similarly, Technoware Design Infoware (tdi) which contains all the engineering drawings of the technoware and design specifications was also transferred to USL through the regional technology team.

However, in the last few years Technology Transfer (TT) has not occurred properly in USL due to various reasons. This is more evident in the recent past. Several new machines purchased for USL have given countless problems such as not being able to achieve the specified speed, the required quality and at the same time many issues related to breakdowns. Furthermore, quality of products also seems to be unsatisfactory due to poor performance of the above machines and this in turn leads to market share drop for certain USL products in the local market.

1.3 Significance of the study

Although Unilever is a multi national company, the Technology Transfer Assessment (TTA) process is very important for the local operations. This study is useful to identify the critical areas which are not favorable for effective TT. It will help to identify the strategies to overcome the barriers and propose suitable methodologies to effectively transfer Technology in the future. The final outcome and recommendations of this study would be useful to USL in order to overcome many issues faced by the company at present in maintaining competitive advantage.

Basically, the importance of the study is to identify to what extent the TT has been currently happening in the organization. The company requires identification of an appropriate mechanism for effective transfer and to find barriers for TT and recommend ways to over come these barriers. The recommendations of the study and the developed model will be a guideline to USL in order to overcome barriers on TT. These findings would be beneficial in

the current context since Unilever is undergoing one of its largest relocation projects in Sri Lanka named project MORPH.

1.4 Objectives of the Study

Choosing proper technologies appropriate for Sri Lankan industry and acquiring them with suitable transfer mechanisms would resolve the problems mentioned previously. In addition, barriers which prevent us from acquiring proper technologies within required time frame through technology transfer must be looked into carefully at different angles. This involves finding answers to the following aspects.

1. Identification of the technology capabilities and technologies practised at USL;
2. Assessing the mechanisms used for TT;
3. Identifying and analysing factors affecting TT; and
4. Identifying and analysing the barriers for TT.

This research project is undertaken to understand contributory factors and to evaluate the TT, benefiting both the company as well as the individual workmen. The choice of appropriate technologies suitable for Sri Lanka and acquiring them through a correct TT Mechanism would solve many problems that USL faces today.

The objectives of the research are therefore;

1. To analyze the problems faced by Unilever Sri Lanka when transferring new Technologies and identify the factors affecting the Technology Transfer.
2. To propose a suitable Model for better Technology Selection and more effective Technology Transfer.
3. To highlight the importance of Technology Choice concept a National award wining project.

1.5 Scope and Limitations

Technology transfer has taken place in various forms to provide high-quality solutions for different types of customers. However, this study focuses only on the technology which is relevant to USL. Since USL is a multi national organization, there are many limitations the researcher has to overcome in gathering required information. This is because every employee is bound to the ***code of business principle*** which restricts employees declaring confidential information related to USL. At the same time, it was found that extracting relevant data within the large amounts of information USL has, was a tedious task faced by the researcher. Further, meeting the experts and arranging discussions to complete the questionnaire was another tiresome task the researcher had to complete. Similarly, the researcher has further found that to assess the TT experiences and analyse the problems faced, only a few personnel were available in USL. To overcome these issues, he has used the most important Value Engineering workshop organized by the company with the regional team. This was a four day workshop where all the relevant managers and engineers participated. Regional technology team and regional engineering teams also added great value to this workshop. Day 4 was used to conduct the survey which was followed by a discussion. The researcher also had to undergo many difficulties with regard to the time factor and tight schedule due to the activities of project MORPH.

1.6 Methodology Adopted

A comprehensive literature survey from various sources such as books, journals, research publications and websites, which explain the TT for different industries in different countries, was carried out and analyzed in this research. Widely used "seven factor model", Technology Component Concept of Ramanathan (2008) and the model developed by Hussain (2005) were combined with a few modifications in the analysis of this research. The key elements in the study are how the initial technology components of transferor were transferred to transferee thorough some selected mechanisms and the identification of the capabilities required for the transferee to acquire new technologies. A questionnaire survey among engineers and managers at USL was conducted to acquire the necessary information to ascertain the current situation after the Value Engineering workshop. Most importantly, the formal discussions

conducted with the senior managers were utilized to determine the standard of the expected technology levels for the selected areas while using the same questionnaire.

1.7 Organization of the Dissertation

Chapter 1: This contains the introductory part which explains the brief history of USL and its operations. It also demonstrates key factors of the research such as significance and the objectives of the study, scope and the methodology.

Chapter 2: This chapter is entirely focused on the literature survey and review of earlier studies and concepts. The literature review examined the necessary facts and key words related to this research on TT. A review is done in depth on concepts, theories, various models developed by experts and examples. Different definitions related to TT have also been discussed. Finally a newer model for technology transfer recently released by Ramanathan known as the "Technology Transfer Life Cycle" is discussed.

The latter part of this chapter is mainly focused on the topic "Technology Choice". This is an integrated approach for the choice of appropriate technology.

Chapter 3: This chapter focuses on the research design and methodology. The research model, data collection method and data analysis are discussed in detail. The questions for each element are grouped together to get the average figure for each capability and components based on the seven factor model and each element in the model is discussed. Furthermore, the ranking for each group is categorized from pre-assigned weightages for each question.

Chapter 4: This chapter briefs about the research findings after a systematic data analysis. Technological capabilities and technology components of USL have been evaluated quantitatively. Results are analyzed and further fine-tuned with information gathered during interviews with experts. Finally the graphical interpretation of capabilities and component level has been clearly displayed under relevant segments.

Finally, the researcher has selected one technology which was transferred to USL recently. A comprehensive analysis on this project has been conducted for the purpose of the dissertation using the Technology Choice concept.

Chapter 5: This chapter provides the research outcome with the final conclusion and recommendations along with suggestions for further research. The main focus in this chapter is to suggest and recommend guidelines for problems and barriers discussed in previous chapters. Also the researcher emphasizes the pros and cons of the proposed approach. The conclusion draws the summary of the study and how the results will support to remove identified barriers and problem in an economical way.

Questionnaire and the complete data analysis are included in the Appendices.