Chapter 1: Introduction

The chapter covers the general background and the motivation behind in selecting the area of study for the dissertation. It also covers the problem statements, problem justification, research objectives, significance of the study, scope of the research, data collection and analysis and concludes with an overview of the dissertation.

1.1 Background of Tile Industry

Ceramic tiles as a manufacturing segment in the world have shown a significant growth in production. The potential seems great, especially as housing, retail, IT and BPO sectors have seen an unprecedented boom in recent times. In India, the field of ceramic tiles has had a healthy growth of 12-15% regularly in recent years. The main product segments are the Wall tiles, Floor tiles, Vitrified tile, and Glazed porcelain tiles. (ICCTAS n.d.).

1.1.1 Sri Lankan Context

Ceramic tiles industry in Sri Lanka has over 34 years long history in manufacturing and distribution of tiles all over the country as well as exporting many foreign countries in the world. According to the annual reports of each company, the tile industry shows continues growth of profits in parallel with net sales.

According to the BOI Sri Lanka website, one of the main strengths of the ceramics industry in Sri Lanka is the availability of local raw materials such as kaolin, ball clay, feldspar, silica quartz and dolomite. They are available at a very reasonable cost and purity and quality of these materials contribute to product quality. The other distinct advantage of Sri Lanka is the availability of labor is highly skilled and literate at reasonable wages. Availability of talented designers, chemists, technicians and engineers to contribute to high standards and internationally recognized products. According to the International Trade Center, Sri Lankan market share in glazed ceramic tiles is 0.19%.
1.1.2 Players in the Market

Currently there are three main manufacturers dominating the ceramic tiles industry in Sri Lanka, namely Lanka Waltiles PLC (LWPLC), Lanka Tiles PLC (LTPLC) and Royal Ceramic Lanka PLC (RCLPLC). In addition to that, there are many tile importers play in the market. Besides this, there are many hundreds of dealers and distributors as downstream partners and over two hundred direct suppliers as upstream partners in the supply chain process in the ceramic tiles industry.

Lanka Waltile PLC (LWPLC)

LWPLC is a premier ceramic wall tile manufacturer in Sri Lanka. It was incorporated in 1975 as an export oriented joint venture with Japanese collaboration at Balangoda. In 1978, 92% of the total output was exported. The rapid growth of business both in the domestic and export markets led to the commissioning of a second factory at Meepe using state of the art Italian technology and exclusively equipped with universally acclaimed SITY machineries. They have a capacity to produce three million square meters of tiles annually (LWL n.d.).

Lanka Tiles PLC (LTPLC)

LTPLC is a public quoted company, which is listed on Colombo stock exchange. LTPLC, the pioneer floor tile producer in Sri Lanka was incorporated in 1984 with the manufacture of Ceramic Glazed Floor Tiles as its core business. With the growth of the business over the years and winning a significant market share in the floor tiles industry, LTPLC is looking forward to increase its services to customers. Lanka Tiles PLC is a member of Ceylon Theatres Group and its parent company is Lanka Walltile PLC holding a 55% stake in LTPLC. The company has two fully own subsidiaries – Lanka Tiles Trading (Pvt) Ltd., and Ceradec (Pvt) Ltd., which are involved in selling subsidiary products and in manufacture of tiles, producing a part of company’s current output. It also has an associate company Parquet (Ceylon) PLC, which is in the business of wooden flooring, wooden ceiling, adhesives, grout etc. Lanka Tiles marketing and distribution is done jointly with Lanka Walltile PLC., through a large network of direct dealers, franchise dealers, sub dealers and distributors covering a wide geographical area around the country.
Lanka Tiles are produced in a variety of different textures to suit customer preferences, matt, rough, gloss, stone, marble and terra-cotta finishes in a range of self-colours or shades. The factory currently has a capacity to produce 3.4 million square meters of floor tiles per annum.

The Company’s main focus is its local marketing network, which market the larger portion of production volume as much as possible. Company’s present export markets are Australia, USA, Japan, India, New Zealand, Maldives, Pakistan, Fiji Island and Singapore. And the main market is Australia.

**Royal Ceramic Lanka PLC (RCLPLC)**

According to Rocell website, RCLPLC was incorporated in 1990. Rocell (then known as Royal Ceramics Lanka Ltd) has focused its efforts on being a brand leader in its industry. In less than a decade the organization realized its goal through innovativeness and excellence in design. Glazed ceramic tiles and ceramic porcelain tiles are manufactured at the Company’s two production facilities in Sri Lanka. Rocell originally created plain tiles and speckled tiles with either a matt or light transparent glazed finish. Over the years the Company has graduated to producing polished tiles, non-slip rock and studded tiles.

The Company is focused on creating a range of tiles which can compete with the best in the industry. To ensure that its collections are internationally acceptable Rocell’s tiles are designed by firms that are global leaders in this specialized field. The Company’s marketing operations are supported by a strong distribution network comprising 40 showrooms and 3 warehouses located in strategic areas in Sri Lanka.

**1.1.3 Behavior and Attributes of Ceramic Tile Industry in Sri Lanka**

In ceramic tiles industry, most of the upstream and downstream partners are very essential to the supply chain process to ceramic tiles industry in Sri Lanka. According to the views of supplies manager, there are several essential items that are supplied to all tile manufacturing companies by a few suppliers. As an example, LP gas, fuel, electricity, raw material such as ball clay, feldspar, etc are essential items for tile industry and supplies of those items are totally rely on one supplier or a few suppliers. Some items such as fuel, LP gas can be kept in stock for a few days due to the large
consumption and limited storage capacities. When there is delay in supply there can be a huge impact to the tile manufacturing process. Therefore, the supplier relationship management is very important to improve efficiency in SC process in the tile industry.

Figure 1-1: Supplier chain partnerships in the ceramic tiles industry in Sri Lanka

Figure 1-1 shows the supply chain partnerships in ceramic tiles manufacturing industry in Sri Lanka. The most of the local and foreign suppliers in the tiles industry are common to each tile manufacturer and also the some of the dealers and distributors are also common. In other words, the same local and foreign suppliers supply goods and services to the three tiles manufacturing companies in Sri Lanka. Even though tile manufacturing companies compete in the market, they share information and materials when there is an emergency situation in the industry. The SC practices of these three companies and supply chain partners look almost similar. But there are little differences in manufacturing process in terms of product specifications & technology. The brand names are a key factor in determining the buying decisions of customers. Ceramic tiles are regarded as a decorative item for
homes and offices, so design generally plays an important role in influencing middle-market buyers followed by price. This does not apply to the low-end market, where pricing is the most vital factor. In this industry profitability depends largely on how well producers can control costs and improves the efficiency in the SC process.

Even though three companies use slightly different technology in their manufacturing process, the SC activities though out their business process seems almost similar. The purchases of raw materials, machinery, spare parts, fuel & LP gas are taking place from the same registered suppliers. All three companies sales their finished products to the local market as well as export market.

1.1.3.1 Purchasing and Inventory Management

Mainly Ball clay, Feldspar, Silica sand and Dolomite are the key local materials that are used in the manufacturing process. The imported materials are glaze materials for which Sri Lanka has no material or technology. The need for imports is essentially due to the inconsistency of local supplies in particular to quality, quantity or technicality.

The Inventory appears in supply chain in several forms such as Raw Material Inventory, Work-in-progress (WIP) Inventory and Finished product Inventory. In general, the ceramic tiles industry purchases of high volume and high value of raw materials and spare parts for a month. In the historical data shows there are about 10,000 inventory items maintains in the inventory ledger. Both imported items and local items are available in the inventory system. Figure 1-2 shows the local purchases value and imports value of LTLPLC for the year 2008. According to the annual purchase value, the monthly purchase value is around 146Mn rupees per month which consist of 42.2% imports and 57.8% local purchases.
According to Supply Managers, LTPLC and LWPLC procurements take place in centralized. Each company has several warehouses located strategically to optimize the operational efficiency. The companies have to maintain large volume of stock due to the significant uncertainty in quality, availability and delivery time. Lengthy delivery time cause and get benefits of economics of scale cause to hold large volume of stock.

1.1.3.2 Selling and Distribution

Tiles manufactures are selling their finished goods in the export market as well as local markets. In the local market, each company uses different distribution channels to sell their products island wide. Lanka Tiles and Lanka Walltiles use a combined strategy to sell their products through 03 showrooms, 05 consignment agents, 05 franchise dealer showrooms, 60 direct dealers and 40 distributors as direct business partners of the manufactures. The distributors are first tier partners and they distribute tiles directly to about 800 sub dealers in island wide. Royal Ceramic also has its own showrooms and direct dealers island wide. All showrooms, Consignment Agents Franchise dealer showrooms are linked to the centralized sales system and do invoicing on-line with limited access controls and limited information sharing. Even though the major part of the revenue is coming from the dealer/distributor channel, they don’t have adequate facilities to share information with the manufactures.
1.1.3.3 Tiles Manufacturing

The ceramic tile manufacturing process consists of a series of successive stages. Those stages are Raw materials milling, Spray drying, Pressing, Glazing, Firing, Sorting and packing. The manufacturing process starts from Raw material milling and end with packing. All stages are equally important to ensure the overall performance of the production cycle. However the firing stage is the most sensitive process and the bottle neck of the tile production cycle. The kiln operates on 24x7 time basis and it consumes a large volume of fuel or LP gas to fire floor tiles at about 1200 degree Celsius. The other critical factor of this stage is that the kiln cannot be shut down regularly until plan for preventive maintenance once a year or once in two years. Even though green tiles (unfired tiles) are not available to feed to the kiln, the kiln needs to be maintained at the minimum temperature (at least 800 degree Celsius) otherwise the kiln’s internal structure can be damaged. Continuous feeding of green tiles into the kiln requires maintaining steady temperature regulation in the kiln in order to maintain high productivity of the kiln. Irregular feeding of green tiles affects the tile quality and as a result, the rejection rate would increase. Out of stock situation of raw materials, spare parts, fuel and LP gas has high impact to the many areas such as cost of production, tile quality, and order delivery.

Furthermore, firing is the most important in the tile manufacturing process as most characteristics of the tiles would depend on it. These include mechanical strength, dimensional stability, chemical resistance, clean-ability, fire resistance, etc. The consistent quality of raw material is a key success factor of ceramic tiles manufacturing process. Use of inferior quality raw material increases number of defects. The most of such tile defects can be identified after the firing stage. Identified defects in tiles cannot be reprocessed after the firing stage. Therefore, inferior raw materials increases cost of production, damages and decrease the product quality, efficiency and productivity.
1.2 Motivation

Currently, most companies attempt to find ways to improve their flexibility and responsiveness and in turn competitiveness by changing their operations strategy, methods and technology, which includes the introduction of Information Technology (IT) in Supply Chain Management (SCM) (Gunasekaran and Ngai 2004, 269-295). The interface of SCM and IT is an important aspect of business to achieve long term business goals. IT provides business tools and information systems for the effective coordination of the different process and links of the supply chain. Information systems enable the integration of transaction-oriented data and business processes throughout the entire inter-organizational supply chain (Markus and Tanis 2000). Without a better understanding of the complex processes and factors affecting the differential levels of IT innovation and adoption, the desire to adopting IT will not be successful in helping to improve the competitiveness of companies (Martin and Matlay 2001).

Today's manufacturing enterprise, whether it produces consumer goods or weapon systems, must often juggle a range of conflicting demands. Smaller lot sizes, increased product flexibility, higher product quality, decreased delivery time, and smaller profit margins are typical determinants in many such organizations. Through it all, the enterprise must consistently aim for the five R's: produce the right product, with the right quality, in the right quantity, at the right price, and at the right time and it must do more than satisfy its customers; it must delight them (Srinivasan and Jayaraman 1999, 42-49). Correct and timely information provided by appropriate IT solutions is a key to meeting these goals, and IT has become an essential component of most manufacturing enterprises.

There are various types of IT solutions available to coordinate supply chain process within an organization as well as out of the organizational boundaries with its suppliers and customers. The literature reveals that many successful organizations have adopted IT solutions for improving customer services, process efficiency, information quality and cost savings. However, many businesses in Sri Lanka use the traditional ways of communication, such as manually processed documents, telephone calls and faxes seem to be the preferred way of communication for their supply chain coordination.
Furthermore, literature reveals many significant factors contributing towards the reluctance. Several factors identified as causes of inhibition can be classified as internal barriers and external barriers. The internal barriers can be resolved within the organization by the organizations themselves, while the external barriers to be addressed, either by government intervention or through the collaboration of SC partners.

This dissertation discusses about different types of appropriate information systems related in SCM and technologies that are largely used in many other industries, and the importance of these IT systems in facilitating the SCM in the ceramic tiles industry. Further it discusses the potential barriers and the factors influencing the adaptation of IT in the tiles industry. Furthermore, it explores how to overcome such barriers in the organization.

The main motivation of selecting the topic for the dissertation is that there is no any research has been conducted so far in identifying the barriers that affect the adoption of IT in the ceramic tiles industry in Sri Lanka.

1.3 Problem Statement

The problem statements are:

1. Despite the benefits of IT in SCM, to what extent Tile Manufacturing companies have effectively used IT in SCM?

2. What are the factors that affect the adoption and implementation of IT for SCM in ceramic tiles manufacturing companies in Sri Lanka?
1.4 Problem Justification

Fourteen years of personal experience in IT field in a ceramic tile manufacturing company helps author to express the views in terms of IT development and the slow progress in adopting IT solutions in the supply chain process in ceramic tiles industry in Sri Lanka. It was in 1983 that use of computers introduced to the tile industry. At the beginning, they have used computers for word processing applications and spreadsheet applications as tools of office automation to improve their efficiency. Thereafter, their internal development teams had started developing software applications such as payroll systems, inventory systems, costing systems, etc. Later on, a third party companies had developed software systems for them. Even though they have over 25 years history in using computers for business needs, the current status of use of IT for tiles manufacturing process and supply chain process in the tiles industry does not seem to be at a satisfactory level.

Another major player in the industry also has similar history in use of IT for their business process. However, each company has attempted in several occasions to implement a fully integrated ERP system, a CRM system and other third party software solutions to improve the efficiency of business process within the organization, but the attempts had not been successful due to many reasons that may be due to internal, external or both. In examining historical budgetary figures, during the last 10 years each tiles manufacturing company has allocated about 10 to 12 million rupees as capital expenditure per annum for the developments of IT infrastructures and IT solutions. As a result, the organizational IT infrastructure facility shows a significant improvement within the company. However the company’s IT usage has been limited to certain internally developed software applications and is not adequate to facilitate the present industry requirements.

Furthermore, there is no significant improvement in IT adaptation for tiles manufacturing process and supply chain process within and outside the companies. The literature shows that IT is at the heart of successful enterprises worldwide, and manufacturing enterprises are not an exception. According to Krishnamurthy Srinivasan and Jayaraman (1999, 42-49), the companies that having successfully implemented IT strategy, enabling itself to effect a significant transformation in
operations and remain in business as a viable and reliable model to both the supplier and customer.

1.5 Research Objectives

1. To identify current practices and issues in supply chain process and how far IT is used to facilitate SCM process in the ceramic tile industry in Sri Lanka.

2. To identify the potential barriers that affects the IT implementation and adoption for SCM in ceramic tiles industry in Sri Lanka.

3. To explore how best such barriers could be overcome.

1.6 Significance of the Study

This research has exposed the current practices and issues of SCM, the level of IT adaptation and the barriers of IT for SCM in ceramic tiles industry in Sri Lanka. It will help management to think about each issue and find better ways to overcome such issues. And also these findings can be used by other companies in Sri Lanka to work together or review the SCM strategies that will lead to sustainable competitive advantage and hence to improve their business performance.

The anticipated findings of this study will be applicable for most medium and large companies in Sri Lanka, and will provide valuable information on the employee’s perception about IT solutions and technologies. Therefore, the outcome of the research should be of interest and value to the stakeholders of each company.

Further the research focuses on a wide array of IT solutions that aims in improving SCM objectives. The research questionnaire highlights the appropriate solutions for the company’s situation and as well as on the tile industry.

This Dissertation contributes to the continuation of research in IT innovation adoption / diffusion in the context of medium business enterprises.
1.7 Research Limitations/implications

The scope of the research is limited to two major players in tile manufacturing industry in Sri Lanka since other player was not willing to share information for this research. Furthermore, top 30 suppliers and 32 dealers/distributors in the tile industry were participated for the research study. To maintain the confidentiality of research participants, the author used company’s names as Company A and Company B to represent the two major players.

The proposed conceptual framework provides important insights into the key factors, which enable managers or supply chain practitioners to gain better understanding of these factors impacting IT adoption and implementation for SCM in ceramic tile industry in Sri Lanka. However, the research does not go into the extent of identifying the absolute significance of each factor towards hampering to the IT adoption since this research does not have adequate sample companies to test the conceptual framework. There is a need for further research in this respect.

1.8 Data Collection & Analysis

The qualitative and quantitative data were collected for the research. Data in the qualitative study were collected through multiple enquiries, literature review and direct interviews. Data in the quantitative study were collected through three questionnaires from companies’ executives/ managers, suppliers and dealers/distributors. SPSS version 17 software tool was used to analyze the demographic information and quantitative information.

1.9 Overview of the Dissertation

The dissertation consists of six chapters. In the first chapter, an introduction to the related field is given, followed by the research objectives and the problem statements. The second chapter reveals the literature review and theories allied with research objectives. The third chapter is research design. The fourth chapter will be based on research methodology. The fifth chapter will analyze and present the empirical data and finally chapter five discusses the findings and conclusions of the study.