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UNIVERSITY OF APPLIED SCIENCES

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# Effective methods to influence logistics costs

## Case: Food services for elderly people in public homes

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Kariuki, Airine

Laurea University of Applied Sciences  
Laurea Leppävaara

Effective methods to influence logistics costs  
Case: Food services for elderly people in public homes

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Kariuki, Airine

**Reducing logistics costs Case: food - services for elderly people in public homes**

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The population in Finland is rapidly ageing the number of children and people of working age decreases. There were 255,912 at the age of 80 and over at the end of 2010 and it is estimated that by 2030 the population will rise still further. The municipality of Espoo is experiencing high logistics costs in food delivery services to public homes for the elderly and there is a need to develop more cost effective logistics methods to reduce these costs.

The purpose of this study is to analyze the performance of existing logistical systems and operators, such as those of large scale kitchens, in order to find better methods that can be demonstrated to influence foodservice logistics costs. The individuals who participated in this study included the development manager of Espoo catering, the logistic planning manager from a Wholesale trading company, the restaurant manager, and the chef from a University catering unit, and the restaurant supervisor from the Private Service home.

The theoretical section of this study provides a discussion of logistics concepts; supply chain management, logistics costs identification; various methods used to measure performance and, reduce costs, such as outsourcing, by entering into long-term relationships with suppliers, and establishing alliances. The next part presents transportation factors such as; transportation costs, physical nature of goods, mode of transportation and, ownership of transport. The last part describes food services, food industries, food service systems and the factors affecting food service systems.

The research method adopted in this study was that of qualitative research, which was chosen as a suitable means of achieving in-depth understanding of a subject area, which is still lacking in research. Data were collected through questionnaires and unstructured interviews to provide a range of views from different logistics operators. Regarding the way in which logistics operations are carried out in their organizations, how performance is measured, and the types of methods used to reduce foodservice logistics costs.

The results of this study will contribute to the Active innovation net program in order to develop better and more cost effective food delivery services for public homes for the elderly in the municipality of Espoo. This study will also be reported to the cooperating organization and collaborating universities in the Active innovation net program.

Key words     logistics costs, elderly people, service homes, outsourcing, operation systems, food service systems

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## 1 Introduction

### 1.1 Background and choice of the study

Finland has the world's fastest ageing population. The generation of post-war baby boomer is retiring, and the lengthened life expectancy will increase the size of the elderly population in the near future. More people are exiting working age than entering, and the diminishing supply of labor will cause a labor shortage. There will not be enough tax payers to support the rising number of retired people. The increasing number of elderly people does not only mean high pension expenditure but also increasing need for health care and other related elderly services. (Statistic Finland 2007)

Care services for elderly people have for some years been a particularly dynamic sector in developed countries. This is due to the fact that in Western countries and developed Asian-pacific countries the population is aging very fast. It is estimated that by 2030 this number will rise still further, leading to an ever increasing demand for elderly care services in the future. However, governments and other service providers are faced with the challenge of being more efficient in the production of these services, and at the same time they need to develop care services to meet individual needs of elderly people. (Pirnes et al. 2007, 1)

The aim of the Active project is to develop better and more cost effective elderly care services by combining Finnish and Japanese know-how, technology, and by sharing research results achieved in both countries. The main cooperating partners in the Active project are Laurea University of Applied Sciences, Helsinki School of Economics, the Cities of Espoo and Vantaa in Finland, and the Tohoku Fukushi University and Tohoku Fukushima Corporation in Sendai, Japan. The research and development of the Active network is based on an enduring collaboration between the partnering members. (Active project retrieved June 2011)

The author of this study was interested to perform a research study based on food logistics because of the limited amount of research carried out in this area. During the first meeting with the thesis instructor the research subject was discussed, whereby the instructor introduce the authors with "food logistics project for elderly people" which is part of the Asian European Active innovation net program. The main goal of this project is to reduce logistic cost occurred in food services delivery for elderly people in public service homes in the municipality of Espoo. This study has been a challenging and worthwhile endeavor, offering the author exposure to the real world of logistics services through meetings and interaction with experts in the field.

## 1.2 Purpose and implementation of the study

The purpose of this study is to examine logistics operations and the performance of existing logistical systems and operators, like those of large scale kitchens in order to find better methods that can be demonstrated to influence foodservice logistics costs. The results of this study will contribute to the Active innovation net program in order to develop better and more cost effective food delivery services for public homes for the elderly in the municipality of Espoo that is currently facing challenges in this area.

The research question is, “is it possible to influence logistics costs in food delivery services for elderly people in public service homes by examining and utilizing the existing logistical systems and operators?” to find an answer to this question the research investigates the existing logistics performance such as those of wholesaler logistics service providers, a University catering unit, a Private elderly home, and Espoo catering unit. The aim of the research is to obtain information and knowledge that contributes in reducing logistics costs in food delivery services for public homes for the elderly people in the municipality of Espoo.

The municipality of Espoo produces and organizes the food services required within the town, and the Espoo catering unit is responsible for the food services provided to elderly persons and participates in food delivery and nutrition rehabilitation. (Pirnes 2, 2007) In Finland the public sector has an important role in the organization of elderly care services of public financing. Municipalities have various roles in elderly care services; besides producing elderly care services, they also buy additional services from the private sector.

Empirical data were collected through interviews and questionnaires in order to obtain in-depth information. The individuals interviewed were, a Development Manager from a public organization, a logistic planning manager from a Finnish logistic wholesaler company operating within the country and abroad. From the University catering unit two individuals were interviewed: the restaurant manager and the chef in charge of food logistics within the University facility. The last individual to be interviewed was a catering supervisor from a private owned service home for elderly people in Helsinki.

## 1.3 Structure of the study

The study consists of eight sections. The first section presents the choice of the study and its implementation, followed by an introduction to ageing and related services in Finland. The next section includes a brief review of relevant literature in logistics and distribution, food supply chain management, logistics costs identification, performance measurements, transportation, and cost reduction methods. The fourth section presents the food services, food

industries, food service systems, and factors affecting the choice of distribution system. The fifth section of this study presents the theoretical framework of the study. The sixth section of this study describes the research approach and methodology chosen. Then data collection methods are described, and the types of interviews used. The seventh section provides a description of the organization and companies that participated in this study and the methods used in handling and interpreting the research information and the result findings. The final section presents the conclusions, and suggestions for future researchers, as well as assessment of the research. Finally, the study is concluded with a summary.

## 2 Ageing society and services

Longer life expectancy and lower birth rates will cause the population to age rapidly in all industrialized countries in the coming years. This change is particularly great in Japan and China, but also in Europe. Life expectancy in terms of years of healthy life is growing and the number of older people is increasing, while the number of children and people of working age are decreasing. By the year 2025, 12 million people will retire from work within European Union region. Immigration can only partially compensate these shortages for sometimes. If our societies don't respond to this challenge, an increase in public spending will rise, and threaten the growth of the economy. (Strategies for social protection in 2015)

Because the working age population is decreasing, working period must be extended at the beginning and the end of working life, unemployment must be reduced, and disabilities and absences from work due to sickness must be controlled. The main aim is to increase people working life by an average of three years by 2020. Working life must be increased by improving working conditions and wellbeing at work. The better people feel in the workplace and the healthier they are, the longer their working careers will be and the more productive they will become. Working conditions and responsibilities must be jointly developed by management and personnel. Employers must ensure that their employees are treated equally, and management must concentrate on the policy of wellbeing at work. Nevertheless, employees themselves have a huge responsibility for maintaining their work ability and professional competence. (Socially sustainable Finland 2020)

According to Statistic Finland, there were 255,912 persons at the age of 80 and over in Finland at the end of 2010. The number has increased five times over the last 40 years. Majority of those aged 80 and over were female, the number of male was 81,205 and that of female was 174,707. During 2010, the number of persons aged 65 and over in the population increased by 30,000 to a total of 941,041 at the end of 2010. The leading age group in Finland's population was the individuals born in 1948 (82,048 persons). The number of persons over 100 years of age was 622, of whom 93 were men and 529 women (Tilastokeskus, October 2011)

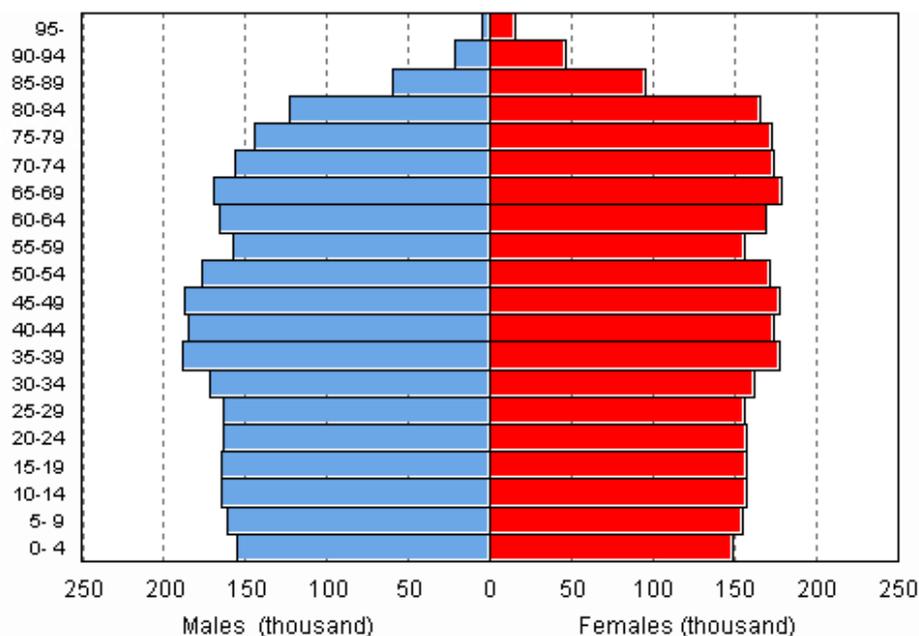


Figure 1: Population by age and gender, 2030, projection 2009

(Adapted from Statistics Finland, October 2011)

### Service homes

A service home is a residential setting where a number of older people live, usually each individual is provided with single rooms, or in some cases rooms are shared. All residents receive common services offered by the service home like, personal care, washing, dressing, feeding and giving medication. Municipalities are responsible for providing and help elderly people to find a suitable service home for themselves. Elderly persons have choices between a public service home and a private service homes but usually an assessment is performed to evaluate if the elderly person's require service care.

In service homes a personal nurse is appointed to all elderly people at the beginning of the care period. The personal nurse is responsible for arranging and planning of the care program and rehabilitation plan (or physical wellness) together with the relative of the elderly people. There is service supervisor who helps and assists the elderly person chooses suitable services available in the services homes. Service homes provide help and support in all kind of household activities in health care, nursing services and rehabilitation. Old people have independent and right to choose the kind of care they want, they are supported and encouraged in those activities that interest them. (Private Service home website, retrieved October 2011)

Usually personal belongings, cloths and items are allowed to be taken in the service homes. Health wellbeing is extremely important for everybody including spouses or relatives at service homes and at homes also. There are no restrictions on visiting old people, relatives and

friends can visit freely. Close relatives and the volunteers can help elderly people with their household work and can participate in their programmed daily activities. (Private Service home website, retrieved October 2011)

Participation of family members in service homes depends a lot on what kind of values and practices are emphasized in service home. Workers at service homes openly discuss what they wish or fear related to the care. To some individuals it can be difficult to give up taking care of their elderly relatives. In most service homes relatives are given a chance to participate in elderly people care, but arrangements are made how they should participate.

(Private Service home website, retrieved October 2011)

Municipalities and cooperation districts will carry the responsibility of providing services for older people and be responsible for the quality of the services they themselves provide or purchase from other providers. Municipalities and cooperation districts must also ensure that these services meet the required needs of older people and are of high quality and cost-effective. (Ministry of Social Affairs and Health 2008, retrieved October 2011)

#### Service to homes

In some municipalities, home nursing and home services have been administratively combined into home care. Home care is a function that helps clients who need assistance at home due to sickness or disability. Home nursing is the providing of health care services in the client's homes. Home service and home nursing employees are qualified social and health care professionals. Home service provides supportive services to help older persons cope with everyday activities. They include home delivery meal service, transportation services, and various technical securities supporting system, clothing services and cleaning services, and influencing elderly people to participation in social activities. (Social welfare in Finland 2006)

As the population of older people continues to increase there is need of social services in order to help elderly people to carry on with their life. The aim of Finland's policy for older people is to promote their functional capacity and independence, with the intention that many older people may continue to live in their own homes within familiar environments. Social welfare housing services and institutional care are also available for those who can no longer manage to live on their own with at home. (Social welfare in Finland 2006)

The new policy for older people is to be implemented both nationally and locally. The aim is for every municipality to have a strategy for older people. Municipal authorities can cooperate with third-sector bodies to promote the welfare and participation of elderly people. Individuals over the age of 80 and those with serious disabilities have the right to have social services needs assessment conducted within a specific period of time. If the case is not urgent,

an assessment is conducted within seven days after the municipal authority have been contacted. (Social welfare in Finland 2006)

If safety and accessibility are increased older people can live safely at home longer, enjoying independence of their own resources and their own way of life, while having the freedom to make their own choices and get involved in the community. Home care clients have access to 24-hour service provided by professional individuals. Elderly people and their family's sense of security can be strengthened and continuity of home care encouraged by appointing a responsible person or unit that can be contacted around the clock when necessary (high quality services for older people 2008)

Apart from basic daily activities and nursing care older people also need help with everyday issues like handling household work. This need can be achieved by ensuring sufficient home support services and providing client guidance by allowing the municipality, private sector and third-sector services to participate. If an individual seeking services does not meet the particular municipality's criteria or the municipality does not provide the services needed, elderly persons and their families must be helped and informed about other available possibilities. (High quality services for older people October 2008)

### 3 Logistics

Logistics involves the integration of information, transportation, inventory, warehousing, material handling, and packaging. When all these activities are combined they make logistics management. (Bowersox Closs 1996, 4)

Distribution has been an important function of industrial and economic life for many years, but until recently distribution has been recognized as a major function of its own. The main reason for this is probably because it is a function with many sub-systems that are considered as separate management operation. There are different names and definition that are associated with logistics and distribution, they include: Physical distribution, business logistics, materials management, procurement and supply, product flow, supply chain management, marketing logistics, demand chain management, and many others. One most widely accepted view in business world shows the relationship as follows: Logistics = Supply + Materials management + Distribution. Logistics is concerned with the physical and information flows and storage of raw material storage in warehouses through production process to the final distribution of the finished product to customer or end user. (Alan et al. 2006, 4)

Inbound logistics start with acquisition process, followed by goods delivery in the organization, whereby, packages are handled and goods are sorted out and then stored in the ware-

house. In-house logistics means materials and products handling within the organizations, not necessary leaving the organization premises. Outbound logistics involves organizing and categorizing products in the warehouses, as well as recycling services. (Ritvanen et al 2011, 20)

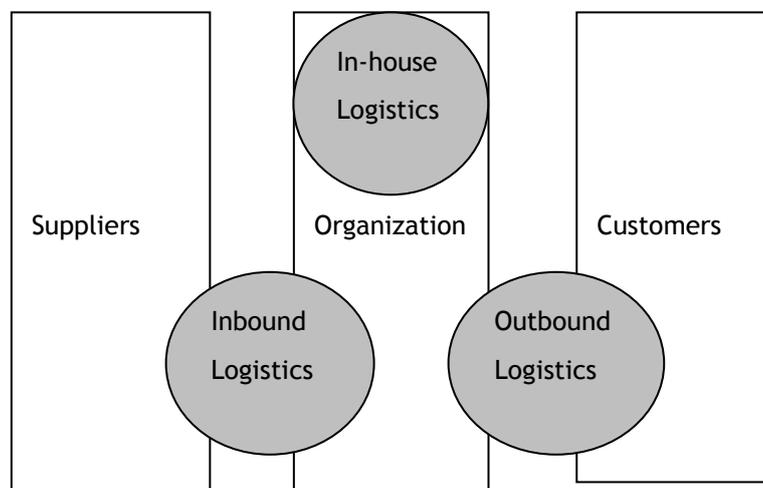


Figure 2: Inbound, in house, and outbound logistics (Ritvanen et al. 2011, 21)

Logistics have a major impact on the environment. While improvements in vehicle design, engine efficiency, reusable handling systems and building standards have reduced the impacts, and the short distances products now have to travel emphasize the problems. Environmental issues are becoming major concern for the future. This issue has become more important due to macro changes in the environment and perceptions and views over impact. The rise of awareness of climate change, environmental impact and sustainability has been dramatic. (Fernie & Sparks 2009, 31)

### 3.1 Food and supply chain management

Supply chain management 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 final consumption for the purpose of conforming to customer requirements. (Eastham et al 2001, 73)

The food and drink supply chain is sub-divided into various sectors. Agriculture, horticulture, fisheries are the primary producers, the next sector include the manufacturers who process and prepare the food ready for cooking, and the packing companies. The wholesaler, the retailer and the caterers are the end stages of the supply chain. At every stage in the chain food is passed into a new ownership and value is added to allow for the costs of processing, packaging and distribution and also to provide small margin profit. (Eastham et al. 2001, 38)

Cost cutting in supply chain management is achieved by reducing inventories of everything from finished goods to raw materials, and reducing processing time by speeding up the delivery time of goods. It requires web-based purchasing (e-procurement) just-in-time logistics and transportation for production. This helps to reduce storage accumulation of large inventories of goods. Fewer inventories mean less waste and improve supplier's profits. Advanced technologies in business communication are the key success of supply chain management practice. Using Information technology wisely, limit suppliers to produce only required amount of stock to meet the demand and provide quality service. Efficient, reliable deliveries keep inventories at cost-effective level. As advanced technologies are becoming widely used; the supply chain evolves into the supply network; Companies are able to apply efficient information management as well as goods and services. (Zuckerman 2002, 3)

Recent developments in technology have brought information to the forefront of resources from which firms can obtain genuine competitive advantage. These technologies provide the means for multiple organizations to coordinate their activities in order to manage a supply chain. As the rate of technological advances increased, the cost associated with this information has decreased. Simultaneously, the speed with which this essential information is developing can be useful and applied in different business situations to increase efficiency in supply chain. (Handfield & Nichols 1999, 14)

Old business practices involved buying enough goods to fill the shelves to ensure running shortages of goods, ingredients or menu items. Today service-driven systems are replacing these old types of systems with the new practice of catering wholesaling and other manufacturing sectors, in order to maintain a competitive edge. Supply chain management is a concept that is used increasingly to replace traditional type management approaches to the buying, storing and moving goods. Supply chain management handle all activities throughout the chain, from their original source to the end user, but is concerned more with ensuring quality, continuity of supply, the control of costs customer services, and the increase of profits. In brief, supply chain management is managing flows across departments, sites and often companies, for which a high degree of management integration is needed. (Eastham et al 2001, 40)

There are four elements that are recognized as key to the successful planning of logistics operations, these are: first, supply chain is seen as a one entity rather than a number of related elements such as procurement, manufacturing, distribution and so forth. Logistic is also viewed in a similar way. The real change is getting outside this isolation of a single organization and integrating in supply chain with other organizations. Second, supply chain is more of a strategic planning process, with special emphasis on strategic decision-making rather than

on the operational systems. Third, supply chain management provides different approach in dealing with inventory. (Rushton et al. 2006, 29-30)

Traditionally, inventory has been seen as a safety of running out of stock to meet the changing customer demand, it lead to large and expensive stocks of products being held. In supply chain management inventory is used to balance the integrated flow of product through chain. Fourth, effective supply chain management is achieved by the use of integrated information systems as part of the whole supply chain rather than an isolated or separate components. The recent advanced information systems technology has enabled organizations to visualize product demand and stock levels throughout the supply chain. (Rushton et al. 2006, 29-30)

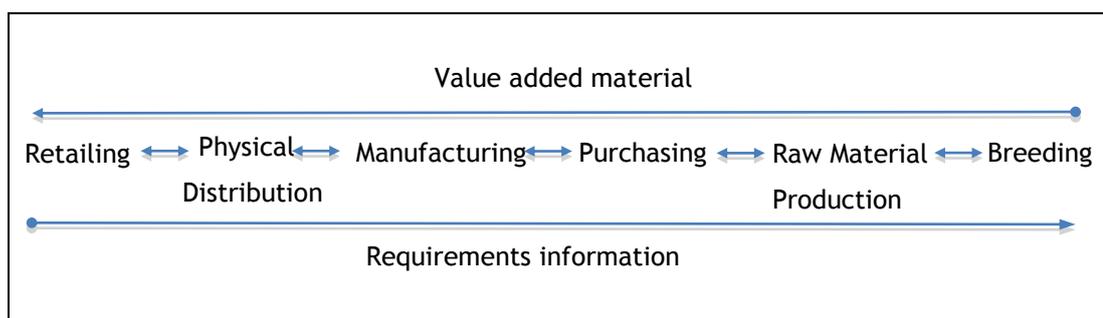


Figure 3: basic structure of the food supply chain (Eastham et al. 2001, 75)

Figure 3 illustrates the basic structure of the food supply chain, which push value added material flow, from the production of stock downstream right through to retail, with the pull of information from the final consumer upstream right through to the production of raw materials. Supply chains consist of activities carried out by people and organizations. (Eastham et al. 2001, 74)

Finding the most effective and efficient way of adding value, with the aim of creating solutions to the major problems related to providing consumer requirements effectively and at lowest price within an organization or between organizations. For example, sales, logistics, and production department within an organization working together to reduce inventory levels. Alternative, third party logistics, production planning sharing ideas to supply raw materials using effective methods, provides short - term storage by use of vehicle. (Eastham et al. 2001, 74)

### 3.2 Logistics costs Identification

Logistics costs are described by using various methods of allocating costs to products. The purpose of these various methods allocations is to gain better understanding about the cost base of logistics operations, and to be able to make better decisions. There are different ways of representing costs; the most commonly used ones are, fixed and variable, direct and indirect. Other methods that are rarely used are engineering and discretionary. Above-mentioned alternative of representing costs are illustrated in the figure 4. When cost is analyzed using different methods, better information is gained enable organization to manage their business. (Harrison& Hoek 2005, 66)

#### 3.2.1 Fixed variable costs

Fixed costs remain constant within a specific period of time despite fluctuations in production. For example; rent or rates, insurances charges, and management salary. Variable cost changes as the volume of activity changes. Variable costs means that total cost raises and falls as the activity rises and falls. However, it must be noticed that variable costs are constant if expressed on a per unit basis. For a cost to be variable, it must be variable with respect to activity base. Most common activity bases are direct labor hours, machine hours, units produced, and units sold. The three different ways of representing costs can be seen as different ways of cutting up the cube (Figure 4) (Harrison & Hoek 2005, 66)

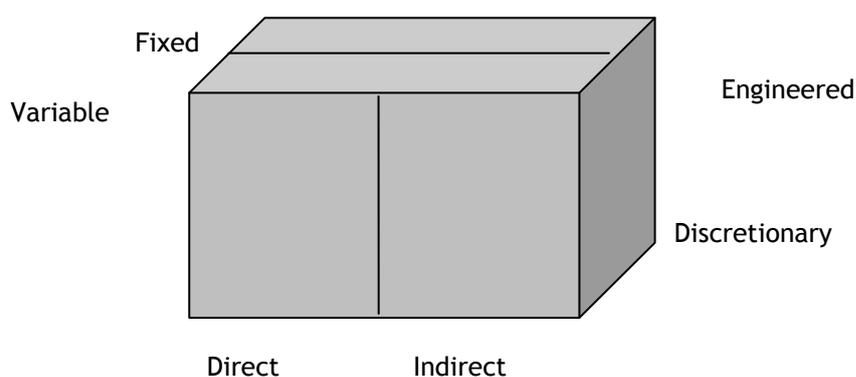


Figure 4: three ways of cutting total cost cube (Harrison & Hoek 2005, 66)

A transportation service incurs several costs, such as labor, fuel, maintenance, administrative, and many others. These costs can be divided into those costs that vary with services or volume (variable costs) and those that do not (fixed costs). Of course, all costs are variable if a long enough period of time and a great enough volume is considered. For purpose of transportation pricing, however it is useful to consider costs that are constant over the normal op-

erating volume of the carrier as fixed. All other costs are treated as variable. (Ballou 1999, 153)

### 3.2.2 Direct and Indirect costs

Direct costs are easy to trace, they are expenses occurred during logistics performance. They include; direct cost of transportation, warehousing, material handling, and order processing. For example, transport costs for an order placed for one truck can be directly attributed to a particular order. (Bowersox & Closs 1996, 646)

Direct or operational cost includes, direct cost of transportation, warehousing, material handling, or even order processing and inventory. For example, transport costs for an individual truckload order can be directly attributed to a specific order. Indirect expenses are usually difficult to isolate. Costs associated with indirect factors are occurred in fixed basis as a result of allocation of resources to logistical operations. For example, the cost of capital invested in real estate, transportation equipment. (Bowersox & Closs 1996, 646)

### 3.2.3 Engineered and discretionary

Engineered costs are those costs that are directly related to usually apply to variable costs. For example, for example if a manufacturer decides to sell an additional 50 chairs, the material and labor cost will increase, if the manufacturers decide not to sell the additional chairs, then the variable costs are not applied. (Harrison & Hoek 2005, 72)

Discretionary costs are usually connected to fixed cost. Discretionary fixed costs are fixed amount for a specific period of time by the management when budgeting. For example, research and development costs, marketing, advertising and sales promotion costs. These cost and can be reduced or completely eliminated from the organization (Harrison & Hoek 2005, 72)

### 3.2.4 Logistics activity-based costing

Activity-based costing seeks to relate all relevant expenses to the value adding activities performed. For example, costs are assigned to a customer or product to specify all relevant activity costs independent of when and where they occurred. The principle concept of activity-based costing is that expenses need to be allocated to the activity that consumes resources rather than to an organizational or budget unit. Logistics activity-based costing must provide managers with an understanding required to determine if a specific customer, order, product, or service is profitable. Effective costing requires identification of the specific expenses to be

included in an analysis framework. Another important aspect is to specify the period of time over which costs are accumulated for measurement. (Bowersox Closs 1996, 645-646)

Activity-based costing recognises that overhead costs do not just happen, but are caused by business activities, such as holding products in store. Activity-based costing therefore seeks to break the business down into major processes such as manufacture, storage and distribution and then break each process into activities. For example, the distribution process would include such activities as picking, loading, transport and delivery. For each of these activities, there must be one cost driver. For example, the cost driver for the storage activity may be the volume of a case, whereas the transport activity may be driven by weight. The cost driver for the transportation activity may be the number of kilometres driven, and the cost per kilometre would be the cost per unit of the cost driver. (Harrison & Hoek 2005, 75)

### 3.3 Measuring Performance

Measuring performance is an essential aspect of every business factor for managers to confirm whether their business is improving. Without measuring performance it is difficult for managers to know which areas need to be improved, whether more funds should be invested, how changes have affected performance in their operations. At the same time, they can compare present and past performance, against the competitors, or versus other departments within the organization. However, measurement is not the real answer, but only tools that are used when making decisions. There are many possible ways to measure logistics performance, but the problem is choosing the right one. Measurements are used because they are easy to find, and they will serve the real purpose intended. For example, a call center applies measurement of answering call costs instead of using measurements for solving customer problems. It is the role of managers to make sure that logistics performance is measured with appropriate available measures. (Water, 2009, 437)

There are various metrics and performance measures used to ensure the efficient running in supply chain. Whether they measure cost, time, quality, flexibility or innovation it is important to differentiate between cost and non-cost measures such as time and quality because if a supply chain relies only on cost measures it can produce a misleading image of supply chain performance. Qualitative measures like that used to measure customer satisfaction, concern the customer's satisfaction, and cannot be used to measure using a single numeric measure. On the other hand, quantitative measures cost, flexibility, and customers' responsiveness can be directly describing numerically. (McKinnon et al. 2010, 111)

### 3.3.1 Financial measurements

Financial measurements are common, because they are easy to find, give wide view, and used to compare result. They also have a disadvantage as they mostly show the past history rather than present performance, and they do not record important aspects of logistics. Accounting conventions describe costs in such a way that directly attributed logistics and range of others that are not, and the cost of logistics depends on the way that overheads and administrative charges are allocated. In principle, we can say that:

Total cost of logistics = Transportation costs+ Warehousing costs + Inventory costs + Information costs + Purchasing costs + other costs

Finding a total cost for logistics is quite difficult more than we can imagine. When managers cannot find exact logistics costs they use estimates measurements. For instant, a standard system or nominal costs that should be incurred if everything is working normally, and if actual costs are higher than this it means there is some problem and there is need for investigation. Most managers, who commonly practice reducing costs, do not necessary look for the lowest cost, but also for a more balance achievement. For instance, building an extra warehouse will increase logistics costs, but also improve other areas of business. (Waters 2009, 437-438)

The fact is that logistics costs do not occur separately, a single change in supply chain affect wide range of functions. Imagine that, a company plans to import materials from a supplier located in far distance because they are offering lower price. If any problem occurs during transportation the logistics department is not in charge of solving the problem, but it is the work of customer service department. So, financial measures give useful information, but should be viewed in relation with more specific measurement for logistics. (Waters 2009, 438)

### 3.3.2 Productivity

Productivity is one of the most commonly used measures of performance. Unfortunately, people often confuse it as the amount of work done by each person. Total productivity is not mostly used because of practical difficulties, managers prefer using partial productivity measurement because they can focus on one input at a time and they are able to compare the current performance with the history of other companies.

Partial productivity = 
$$\frac{\text{total throughput}}{\text{Units of a single resource used}}$$

The most common types of partial productivity relate the throughput to four types of resources. The first one is equipment productivity, for instant, the number of miles driven per truck, and products moved per truck. The second type of partial productivity is labor produc

tivity, such as the number of deliveries per driver, tones delivered per shift, or order delivered per hour worked. The third type of partial productivity is capital productivity, for example, the amount of stock stored per Euros, or the throughput per Euro invested in equipment. The fourth type of partial productivity is energy productivity, it includes, the number of deliveries done per liter of fuel, the amount of stock stored per kilowatt-hour of electricity, or the value added for each euro paid on energy. (Waters 2009, 442)

Productivity is a relationship between output (goods or services) produced and quantities of inputs (resources) utilized by the system to produce that output. If a system has clearly measurable outputs and identifiable, measurable inputs that can be matched to the appropriate outputs. Productivity measurement is quite commonly used, however, it can be difficult to match up for a given period of time, input and out mix or types constantly changes, or data are difficult to obtain or unavailable. There are three essential type of productivity measures; static, dynamic, and surrogate. If all the output and input in a given system are included in the productivity equation, it would be equal to a total factor static productivity ratio. If outputs and inputs in a system compare static productivity ratio from one period to another, the result is a dynamic productivity. Surrogate productivity represents factors that are not usually included in the concept of productivity but are highly correlated to customer satisfaction, profit, effectiveness, efficiency and so forth. (Bowersox & Closs 1996, 673)

### 3.3.3 Benchmarking

Benchmarking is a continuous process of measuring and comparing own business performance against other companies which are performing best, and obtain information that will help organization to identify improvement and implement. Figure 5 in the next page shows six-steps of benchmarking. First, the company should recognizing the need to improve logistics, then defining the suitable measures of performance to be used, then identifying the leading competitors in industry, and examine their logistics performance. Finally, redesign the supply chains and implement their results. As a matter of fact, managers use benchmarking to find ideas for logistics that they can copy or adapt. (Waters 2009, 453) There are four types of benchmarking;

- 1) Internal benchmarking is used to compare similar operations that can be used in an organization.
  - 2) Competitive benchmarking involves analyzing and comparing organization's performances against those of competitors.
  - 3) Functional benchmarking involves analyzing particular function in organizations against other industries
  - 4) Generic benchmarking investigates activities carried out by most of organizations.
- (Quayle & Jones 1999, 65)

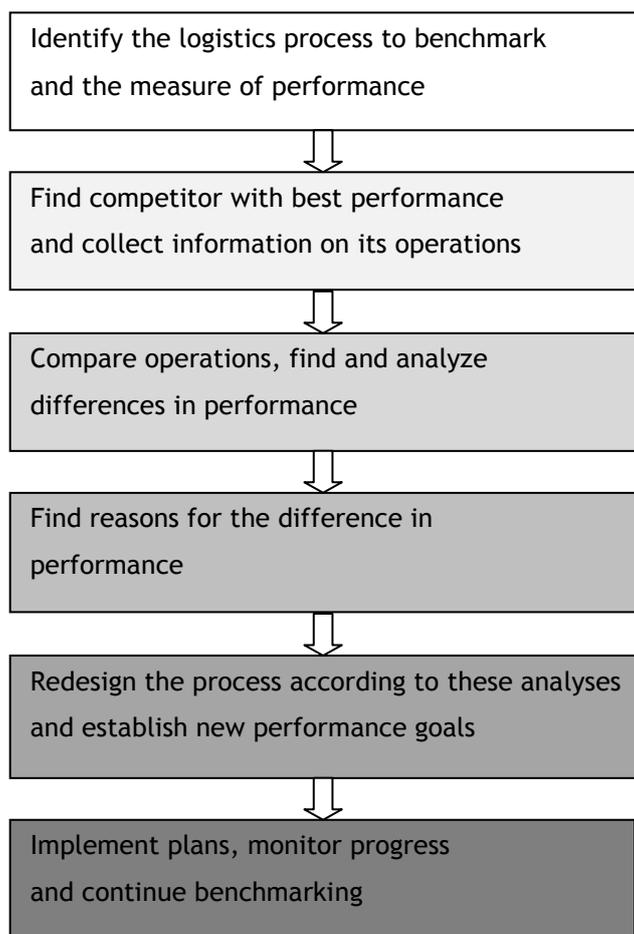


Figure 5: Steps in benchmarking (Water 2009, 454)

Benchmarking is conducted to investigate how other organization's operations are carried out. The information gathered is used to improve own organization's activities. If the competitor's activities and processes are equal or even much better than the measurements acquired during the investigation, it is guarantee that the organization is performing well. Most easy way to perform benchmarking is by using one department in a company and compares its operations with another department. Many people assume obtaining information of a leading company with best performance might be challenging, but it can be easy more than you can imagine. Everyone knows how large companies operate, for instance, Amazon sells books, Walmart supermarket sells food and household equipment, and etc. The fact is competitors continuously use others operators information for benchmarking. Organizations dealing in similar line of business share useful information to benefit and improve their activities. But, sometimes it is difficult to get information from direct competitors but managers can still get information from other industries. Organizations may learn completely different type of operation, for instant, train organization can find improvements from airlines or other organizations that are not operating in the same industry. (Water 2009, 454)

### 3.3.4 Performance monitoring

It is important to identify the role of logistics and distribution within the context of the company's objectives. It is also essential that the control system match and integrated the nature of logistics within the organization. Some of these objectives are: To enable the achievement of present and future business objectives which are directly associated with logistics and distribution objectives, and to facilitate the effective availability of logistics services, hence facilitating checkup to ensure distribution operation is suitable for the general objectives. Another point is to enable the efficient operation of logistics resources, to ensure that the distribution operation is working accordingly. Also to, support the planning and control of an operation and returning the feedback information to the process of planning and management. The last objective is to provide measures that pinpoint on the actual outputs of the business, to implement action if the operations are not performing well or when potential improvement in operation is required. (Rushton et al. 2006, 485)

Sometimes it is difficult for managers to be convinced that their operations really need improvement; they may measure performance and analyze operations but still not realize that there are better methods that can be introduced. Unfortunately, the fact is that they would almost certainly be mistaken. Usually, there are areas that need to be improved, for instant; late deliveries, too expensive products, not well trained employees, wrong service and so on. Managers can easily improve these operations, but usually they seem to be satisfied with their old inefficient methods. There are many reasons why managers decided not to do anything to improve the situation. Perhaps it is because they have tried to improve things in the past but they failed and they are afraid to repeat similar mistakes again. Mostly is because they lack inspiration for new changes, or due to lack of authority to undergo a reform, or they may not have time or see the need for changes, or not know how to improve things, or think it is too expensive and difficult to implement. (Waters 2009, 462)

### 3.4 Cost reduction methods

Cost reduction is a strategy directed toward minimizing the variable costs associated with movement of storage. The best strategy is usually formulated by evaluating alternative actions, such as choosing among different warehouse locations or selecting among alternative modes. Capital strategy is directed toward minimizing the level of investment in logistics system. Maximizing the return on investment is the motivation for this strategy. Delivering products direct to the customers, selecting a just-in-time supply approach and using a third-party providers services are the good example of avoiding costs (Ballou, 1999, 32)

There are several alternatives to achieve cost reductions, the main factor of achieving cost reduction is by identify and eliminate unnecessary costs and apply costs efficiency without interfering with the product or service quality and delivery performance. There are several approaches applied by organization to perform cost reduction. These includes; outsourcing, total requirement contracting, establishing long-term agreements, wide buying agreements, pool cooperative, cooperation with suppliers, and concentration of ownership among others. (Raedels 1995, 112)

### 3.4.1 Outsourcing

One of the strongest and most sustained trends within business over the last years has been the trend towards outsourcing. With increased fervor and conviction, companies have sought to reduce costs by contracting out services and activities traditionally provided in-house. Companies are contracting out because it is cheaper compared to carrying out their own logistics activities. Apart from saving money through great efficiency but also gain effectiveness by focusing more on other organization activities. (Quayle & Jones 1999, 3-4)

There are many factors to consider when deciding when selecting supplier from third-party provider. For example, Costs are reduced because asset ownership is eliminated, as well as capital cost because distribution facilities are not required neither vehicles nor fuels. Another advantage of using third-party is the economical scale benefits, it is expensive to run many small operations compared to one large operation by a third-party, which will replace two or more operations and provide cost savings. (Rushton et al. 2006, 73-74)

Currently, most third party users are not satisfied by the service provided because it does not reach their expectation, costs are higher than their estimates, quality, and ability of the people running the operation are insufficient. To improve this situation, third-party users have developed a more partnership approach relationship to improve services and reducing costs. Major users insist that service providers do not have sufficient approach to manage all contracted operations; they only provide minimum services hence failing to fully enhance operations that they are contracted to. On the other hand, service providers claim that they are rarely given the opportunity to develop new ideas and improvements, because the third-party users are not ready to disclose their full information in supply chain. (Rushton et al. 2006, 79)

Third-party logistics can be defined as firms that provide part or all of its customer's logistics services. Third-party logistics is mostly practiced trend in business organizations in Europe and the United States, All or part of logistics activities are outsourced to enable company to leverage its resources, spread risks and concentrate on the future business growth. In successful TPL operations result in lower logistics costs up to 30 percent, better service, inventory

and transportation costs are also reduced. However, TPL is not suitable for all industries; some prefer operating their own logistics activities rather than outsourcing. Other factors include reduced customer contact, lack of in-house expertise and insecurity of company's confidential information. (Ojala & Jämsä 2006, 10-11)

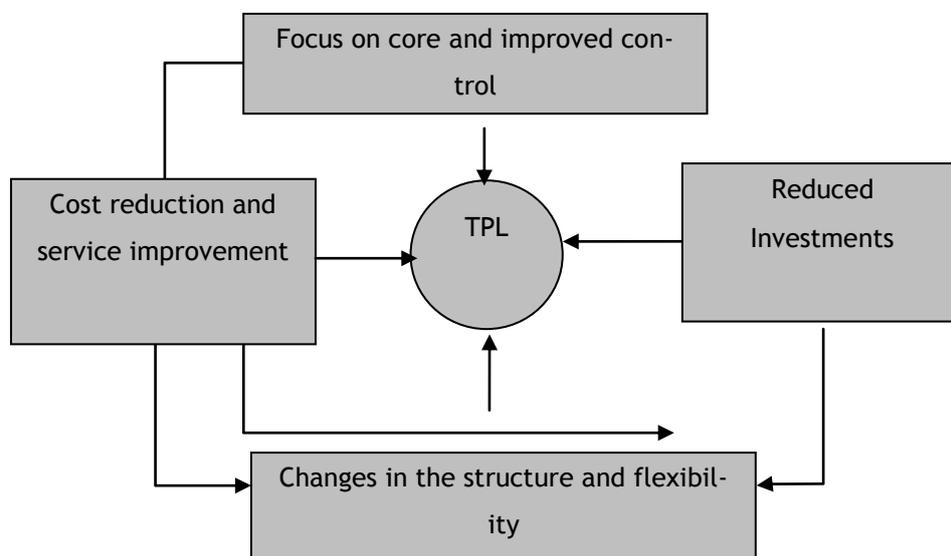


Figure 6: Driving forces behind the use of TPL-services (Ojala & Jämsä 2006, 11)

Another advanced form of third-party logistics is fourth-party logistics which is defined as an integrator that bring together the resources abilities and technology of its own organization and other organizations to create broad scope in supply chain solutions. Forth party logistics provide and performs all or part of the corporate logistics activities on behalf of others (e.g. transportation, warehousing and inventory management. Forth party logistics provider integrates logistics and IT resources, and technology to manipulate the supply chains of their customers. The real physical operations are performed by subcontracted logistics firms or other services providers. (Rushton et al. 2006, 81-83)

In logistic partnership companies concentrate more on how to develop their core business area, long -term contracts, and open communication and information sharing are essential to build and maintain trust among strategic partners. Communication network enable information flow between partners at all levels. Now days, most companies are willing to purchase technology solutions directly from logistics providers thus eliminating the brokers. Although the future of industries is expected to be challenging the new strategic partnership will offer new ways to get over difficulties and achieve development. (Ojala & Jämsä 2006, 77-78)

### 3.4.2 Long-term agreement

Most business organizations nowadays enter into long - term agreement with their suppliers for security reasons. Food safety crises related to long-distance sourcing can affect a large number of people. On the other hand, if we measure our food availability within 100 miles then we may be also at risk of hunger during off seasons like winter, food shortages might affect the health and food security of the local population. Therefore, a well-prepared business establishes long-term agreements with suppliers for security purpose and has an alternative solution in such situation. Without secure long-term contracts it will be so difficult for suppliers to make future plans in time, more secure arrangements allows producers to invest and plan on time towards long-term sustainability. (McKinnon et al. 275, 2010)

Back in the times, most manufacturing companies use to purchase logistics services on short term basis through market transaction, but now days they have entered into long-term contracts with logistics companies because they are satisfied by their performance. In this relationship there is collaboration for longer time, information sharing, and price is often negotiated. This has led many food companies to cooperate and develop a close relationship with few logistics companies. (Eastham et al. 2001, 301)

Wide buying agreement is an agreement done between suppliers and the buying organization, and sub-division which are located in different region. The arrangements are made by either the headquarters or one of the divisions, by making contract with reliable supplier. In centralized buying, the purchasing department decides the type of product or service that is required and performs purchasing on behalf of other divisions (Raedels 1995, 113)

### 3.4.3 Cooperation with suppliers

Originally, organizations have been using large number of suppliers to increase competition, bargaining for good prices, and guarantee for security reasons if a supplier is not reliable. However, increasing cooperation within supply chain especially strategic alliances enable organizations to operate with fewer best suppliers and work continuously with them. Rank Xerox illustrated this effect, when they decreased the number of suppliers from 5000 to 300, and Ford also reduced from 4000 to 350 suppliers. (Water 2009, 52)

Nowadays organizations are carrying out pooled purchasing whereby, goods are purchased for several organizations at ones, and then costs are shared equally. For example, one distribution center buy a truck full of particular product to avoid high transportation costs, then contacts other distribution centers within the same company in different location and seek if they want to participate in sharing the order. Once they come into an agreement the order is

placed and goods are delivered to all distribution centers. This activity is applicable in commercial center, but more applicable in governmental and nonprofit sectors since there is more emotional trust. The disadvantages of pooled purchasing include difficulties of arranging the orders for other organizations, and handling the payment in advance before other partners pay their shares. (Raedels 1995, 113)

Organizations within supply chain are increasingly recognizing that they are sharing a common objective to satisfy their final customers. If any single member of the supply chain fails, then customers are unhappy and are likely to move their business elsewhere, meaning that all other members of the chain suffer. So members should cooperate to make sure that they all work together to satisfy final customers. This is an important point, as it means that competitors are not other organizations within the same supply chain, but are organizations in other supply chain. (Water 2009, 51)

#### 3.4.4 Alliances

It is very common for a firm that has greatly invested in transportation facilities, warehouses, inventories, order-processing systems, logistics technology, and administrative personnel to consider if these investments should be shared with other firms to reduce own costs. Contrarily, being aware of the high costs of logistics, a firm may enter into partnership with another firm that has high potential capability in logistics, strategic facility locations in markets, recommended technology, and magnificent administrative capability that other firms admire to share. A logistics alliance is built on mutual understanding between partners, and sharing of information, technology solutions that contribute to logistics performance, and precise goals to achieve higher performance in logistics operation by maintaining rules while working with other partners, by sharing and contributing to the alliances. (Ballou, 1999, 630)

The most common way to create a company's value is by sharing common processes and services with various business organizations. The value from sharing processes and services is advantageous in many ways. First, they offer benefits of creating centralized resources with availability of specialized knowledge and expertise in how to operate a common process or service. For many years business processes have been the main goal and competitive advantage for large organizations, from the beginning of the modern business era, the size of an organization has created opportunity. Information technology management is another function that creates opportunities and progress of economies. Information technology creates natural opportunities to reduce costs, significant achievement expertise, and improve productivity. Sharing the complex capabilities, and adapting flexible standards of operating principles, and continuous participation in the never-ending progress of technology. (Kaplan & Norton 2006, 77-78)

Co-strategizing sharing of ideas, and participating in the future market development projects, technologies, and competition with different stakeholders helps companies to increase their opportunities in new inventions as several partners share and test their insights regarding concerning the environment of their future targets. Continuous interaction with major stakeholders enables companies to apply the knowledge gained through observing present and future development of other organisations for new business innovations. More involvement in cost approach, the more opportunities for significant development. (Dos & Kosonen 2008, 56-57)

### 3.5 Transportation

The nature of logistics and supply chain is changing due to companies moving toward global operations. Long-distance modes of transport have become important toward the development of achieving efficient global logistics operations. Products and raw materials are moved from long distances due to factories location, global manufacturing point, and location of production facilities. (Rushton et al. 2006, 360)

According to European statistics, road transport trend have been going on for many years, and most likely it will fall down in the near future as the train transport declined for many years. Road transport is usually emphasized for transportation movement within individual countries. On the other hand, train freight still plays a major role in transportation, for example, USA, Switzerland, Hungary, and Austria. All modes of transport are essential for the movement of goods; however, there is consideration to be made when selecting suitable mode of transport. For example; operational factors, transport mode characteristics, cost and services factors. (Rushton et al. 2006, 360)

#### 3.5.1 Transportation costs

Transportation costs can be divided into two categories; the flow costs and transportation resource costs. First, the flow costs are those costs associated to the product flows from production point to consumption point or at the organization's premises, i.e. contract carrier costs. Transportation resource costs are those cost occurred during product flow management. For example, repair parts. Product flow cost depends on the volume and the type of transportation mode chosen. Some products like, frozen foods costs reflect special handling and require special transportation equipment. Companies will have to make business decision of using comprehensive transportation costs by avoiding indirect costs. For example, some companies use third-party to avoid transportation cost such as routing and dispatching. (Shapiro 2001, 240)

### 3.5.2 Physical nature of goods

Transportation is directly related to the physical nature of product, weight or volume of the product, value and weight, length of the journey involved. Some products have special features like fragility; perish ability, time constraints, compatible and less compatible. Heavy product are cheaper to transport by road or rail compared to airfreight which is rather expensive. The value of the product to be transported need to be taken into account, high value product is relatively expensive compared to low valued products. (Rushton et al. 2006, 365)

Temperature control supply chain require food products to be maintained in a temperature controlled environment, food transported over long distance requires special temperature control facilities to keep them fresh, cold, or warm, There are several food temperature levels that are suitable for different type of food products, or instant, frozen, cold chill, medium chill, and exotic chill. Supply chain involves many handling stages that may increase the chances of food spoilage and waste occurring. If a food supply chain is handling a wide variety of products then an optimum temperature setting is used, failure to maintain the right temperature required throughout the food products can be get damaged and it can affect the quality of the product before it reach delivery destination for consumption. (Ferne & Sparks et al. 2009, 266-267)

### 3.5.3 Mode of transportation

Road transport is the most commonly used mode of transport, it involves trucks and Lorries or special designed vehicles to carry delicate goods. Road transport is flexible, it link all channels, offer customer-to-customer service, and can make many short trips. Road transportation can be affected by rising costs of fuel, lack of experienced drivers, regulation of working hours, limits of emissions, traffic etc. In Europe an average distance of a truck journey is about 350km; beyond this it is advisable to use other mode of transport. (Waters 2009, 410)

Railways are usually used for moving large volume of cargos over long distance. Rail terminals are connected to other modes of transport, for instant, customers can transfers goods from train to vehicles and trucks, or from the sea port to the truck waiting for road transportation. One of the main advantages of rail freight systems is that they are relatively cheap mode of transport compared to other types of frights. Rail freight is suitable particularly for bulky goods that require to be moved over long distances and where time and speed is not considered. (Rushton 2006, 369)

Water transport depends on geographical distribution and access to customers and suppliers to the waterways. Even when there is reliable access, water transport requires expensive port

facilities. Within European region there are 42,000 km of canals, rivers and lakes that are used for freight transport. Some countries have more developed river and canal systems that enable movement of water freight. Water transportation requires port facilities to connect them with other model of transport. There are three types of water transport, they includes; inland waterways that consist of rivers and canals, coastal shipping involved with movement of materials from one port to another and ocean transport that connect to other major seas. (Waters 2009, 414)

Intermodal transportation involves movement of goods within the same loading unit or vehicle, which uses successively several modes of transport without handling of the goods themselves during the process of when good are being changed from one mode to another. For instant; using cheap shipping service with flexible road transport. Goods are assembled in pallets for each transfer of loads from warehouse to truck or to any other mode of transport such as trains, ships, or aircraft. Intermodal transportation reduce the number of personnel required between transit and time, however, the transfer between modes requires extra handling, and time. This can cause delays hence increase costs. (Rushton et al. 2006, 381-382)

#### 3.5.4 Ownership of transport

Own logistics transports involve company using its own transportation facilities and do not hire transportation services from other companies. The advantage with own transport is that, there is integration in, communication, customer service, delivery schedule, and so on. Organizations should use in-house transport if only it is efficient and cheaper compared to third-party providers. The advantage of using third-party logistics is that, the organization can concentrate on its core business, while third-party organizations provide them with better services and less expensive. (Waters 2009, 420-423)

Using own logistics transports may cost more than outsourcing logistics services to third-party providers. In short journeys there is increasing price of fuel, tight drivers working schedule, government regulations are increasing transportation costs. For example, in the year 2002 the cost of importing food to UK was smaller compared to the cost of distributing food within the country. This is one good reason why companies use cheap long-distance services to importing food from abroad. (Waters 2009, 420-423)

## 4 Food services

Food services cover a wide range of food services operations. The term comes from the French word restaurant, meaning “restorer of energy.” The term was used in mid-1700s to describe public places that offered soup and bread. Today, any public place that is involved

in preparing and selling for consumption in or away from their facilities can be described as a restaurant. Foodservice is generally used to represent the broader term, which encompasses all sorts of public and private locations that provide food for sale. Food service is a basic part of the North American life style and is also growing in other part of the worlds. American spends 48 percent of their food budget on food away from home in commercial restaurants. Roughly half of American's population eats in a restaurant at least once a month. (Barrows, Powers & Reynolds 2009, 68)

The evolution of public eating-places comes about as a result of people's desire to travel to different places for spiritual and trading purpose. Religious pilgrimages played a major role in establishing the inns of France and England. Merchants travel from one country to another to buy or sell their goods and required a place to eat and rest. Early foodservices were inn, taverns, and hostels that are perhaps our forerunners of present restaurant. Introduction of the European hotels that charged room and board separately, and then, later come a la carte foodservice leading to hotel and inn food services to be self-supporting. The French cook shops were licensed to prepare ragouts, or stews, to be eaten ecriteau, or menus, put on the wall or by the door to attract passerby. In 1849, the cafeteria was a further step in the simplification of restaurant food services. This style of self-service come during the Gold Rush days due to the demand of fast service, it was regarded as an American innovation and its popularity spread across the United States. Today, commercial cafeterias still play an important role in the foodservice industry. (Payne-Palacio & Theis 2009, 15-17)

#### 4.1 The food service industries

Food service industries are continuously growing and undergoing many changes. More women are entering the labor force and the working environment is also getting better. Most organization are responding to customers need and providing them with a variety of choices in the market. Employees are well authorized and the importance of food safety is accepted. Food services operations are usually categorized as either commercial or onsite foodservices. The commercial section includes food services that are selling food to make profit, the onsite sometimes known as noncommercial or institutional provides foodservice activity for the business in which the foodservice is located. Both foodservice section are not completely different from each other, they have few similar features. (Spear & Greigoire 2004, 10)

#### 4.2 Commercial segment

The commercial section includes a wide variety of restaurants from limited service to fine dining, lodging, food and drinks, recreation and sports centers, and suitable stores. Competition is increasing among foodservice operators this is because many different types of food-

service providers are serving similar menu items and providing similar services. Those operations that had developed their menu are now providing variety of food menu items, other food services includes; drive-in, takeaway, delivery mobile service and catering. (Spears & Greigoire 2004, 10)

Food taken away from home may be purchased from various locations. This wide availability depends on the size and intention of the food service industry, this includes working area cafeterias, convenience stores, restaurants, hotel, lodging, casinos, and taverns, and many others. Even supermarkets are realizing the needs of providing foodservices, as well as local supermarkets are now including a dining place in their shops. Most of the foodservice providers in this section are undergoing a continuous growth because of this development progress that has been going on for over four decades. For some years, the high growth in food service is seen in operations such as takeout, drive-through and delivery. Macdonald's report that 75 percent of its sales comes from the drive-through (Barrows, Powers & Reynolds 2009, 68-70)

Another major category of food services is institutional food service, it includes eating places for office workers carried out by foodservices contractors who caterers or operate restaurant business, by serving food in places such as office building, health care facilities, sports centers, and many other. Nowadays most office workers find it convenience and time saving to have restaurant within their working facilities and they no longer need to go far looking for an eating place during their lunch break. (Barrows, Powers & Reynolds 2009, 68)

Increasing competition among food services operations has affected sales in commercial, non-commercial and institutional market. If there a small number of employees are working in offices and factories it means that there will be less customers eating at the employee cafeterias, mobile food carts, and vending machines. Also, nearby commercial restaurants are being affected. Employees feeding is undergoing great changes because of the rising cost of labor and the decrease in corporate subsidies. Managers are realizing that these operations must be self-supporting. (Spears & Greigoire 2004, 22)

Most airports operate differently depending on the needs and requirements, some own restaurant or operate under major franchising operators. Operating airports restaurant is a unique challenge that requires a long-term commitment that most of us cannot be able to deliver. Restaurants in airport depend on the airlines to attract customers to their premises; most airports require foodservice providers 24hours. Usually, passengers have about half an hour minutes to order meals and eat before travelling. This fast service requires efficient employees who are able to serve quickly, and well trained kitchen staff who can prepare food fast. Restaurant operators also need to know flight schedules and departure times. (Spears & Greigoire 2004, 13)

Taking a boat cruise is considered as one of the best vacations anyone can experience. All kinds of people go for boat, old, young, couple, single, families and friends, the fact is that the food offered in the cruise is excellent, usually; the food cost is included in the price of the cruise. (Spears & Greigore 2003, 13) major foodservice industry referred as “food on the move” operated by airlines, rail, ferry and boat cruises. Both trains and railroad are facing logistics problems of planning and organizing the food that will be served to the customers onboard during the journey. Consumer’s food preferences are important aspect of food serving on trains and planes. (Payne-Palacio & Theis 2009, 41-42)

#### 4.3 On-site segment

The on-site food service segment includes hospitals, schools, college, and universities, day-care, elderly care, military barracks, and correctional facilities. These food services operations provide meals primarily for those who are directly involved in the facility such as patients, students, prisoners, and employees. Some visitors to these facilities also may be served. (Spears & Gregoire 2004, 16)

One of fastest growing section of America’s population in the future will be people over age 65. Most of the people in this age are not very healthy and have little income, however, many live at their own home and receive retirement incomes but some get social security benefits. The rapid growth of this group is one reason why there is increasing need to provide services for the elderly population. Most companies are providing senior living accommodation to elderly people. This provides them with independent apartment with long-term health care and professional services, food services, as well as household assistance and other daily activities support. (Barrows, Powers & Reynolds 2009, 221-223)

The increase demand in nursing home care has been a problem for many years due to several factors, among them is the population growth, an increasing number of elderly persons in the population, urban living in small houses with less space, increased income, and greater availability of health care insurance benefits. Food plays a major part in the lives of most nursing home patients. For most of them food may be one thing they look forward for each day. The quality and amount of food served as well as the care and supervision applied in foodservice are important to any nursing home’s success and effectiveness. (Payne-Palacio & Theis 2009, 38)

Home assistants are used to support elderly people’s living at home on their own to prepare large portion of meal that can be consumed for several days. Home services are available for those elderly people who do not manage to live on their own at home and need extra support. Usually municipalities provide and make arrangements for food services and delivery of meals

in the service homes. Besides municipalities, elderly people also receive support from other organizations and private entrepreneurs, in the service home groups and in the individual sheltered homes. There were about 63 600 customers who received home service and service home support in 2007 in Finland. It has been estimated that about 26 000 elderly people receive meal at home and about 10 000 get their food made by assistants at home (Alden-Nieminen 1999)

One example of off-premise delivery is delivering service to home of elderly and long time sick individuals not requiring hospitalization. This method meets the need for nutritious meals for those persons who are temporarily disabled, or for the elderly who live on their own and are unable to cook for themselves. In communities where such methods are used, meals are contracted and paid for by the individual in need of these services or by the community agency or volunteer organizations. The meal is loaded in insulated carrier while in transit to maintain required temperatures until delivered to the home. (Payne-Palacio & Theis 316-317)

Hospital food services operations provide food for both all kind of patients and their family and friends in hospital facilities. Employees meal service and retail sales are becoming increasingly important. Most of hospital management care has put pressure on hospital to control costs, this means that arrangements are made in advance in healthcare sector because care is provided under a fixed budget and costs are controlled and managed. well managed care enable the healthcare to develop, and food services managers to improve the menus, employees working in one or two shifts, and relying on more suitable foods. Hospitals food services directors are being expected to increase income. As a result, food kiosks, bakeries, cafeterias are becoming more popular places in hospitals. The new concern in hospitals is that food services is an income producer rather than a cost center and advantageous to employee. (Spears & Gregoire 2004, 16)

The type of organization and management found in school food services are different depending on the size and location of schools involved. In most school a cook or a manager supervises food preparation and serving services, and there are few kitchen staffs assisting. In Finland the municipalities are responsible in providing and delivering food to schools and day cares centers children of working parents. Large city school systems often use a centralized production kitchen and deliver meals for service to individual schools in the system. (Interview with the Development Manager in municipality of Espoo 2011)

Most University and Colleges have contract with independent operating restaurants to set up and operate food services, but some run their own restaurant. Student restaurants and staff restaurants are most common now days used to provide lunch meals, In Finland most school

are running their own food restaurants that provide food for students and member of employees working in these institutes. (Interview with the Chef from University unit 2011)

#### 4.4 Types of food service systems

Due to increasing of both labor costs and a shortage of well-trained employees, food services managers have been receptive to using new forms of food with built-in convenience or labor-saving features. New food products, available in various forms and stages of preparation, have appeared on the market in increasing numbers each year. Many require specialized equipment for final production, delivery, and service. (Spears & Gregoire 2004, 84)

Food services systems differ in where the food is being prepared in relation to where it is served, and the time duration between preparation and service, as well as the amount and kind of labor and equipment needed. The most commonly used types used are; conventional, ready-prepared (cook/chill/or cook/freeze), commissary (central production kitchen) and assembly/serve. (Payne-Palacio & Theis 2009, 63)

##### Conventional food services

This method have been used traditionally for many years, the food is prepared and served in the same location where the kitchen is located. Back in the history, food preparation and cooking took place in the same place, whereby; the kitchen had its own butcher, bakery and vegetable preparation desk. Today, conventional system have evolved and modified because of labor shortages, high labor costs, and availability of supplementary food. To reduce time and labor costs, food services manager started to purchase food products directly from suppliers or producers. Most user of this type of system is independent restaurants, schools, colleges, hospital and health care facilities, and nursing homes. Advantage in this system is that, less space for storing frozen food is required compared to other systems, and the distribution costs are less, this save energy as well. The disadvantage with conventional systems is that, it is difficult for workers to achieve high production because the menu and the workload changes every day. (Payne-Palacio & Theis 2009, 64)

##### Ready prepared food services

Ready prepared food services were developed to overcome the increased labor costs and a critical shortage of skilled food productions personnel. In ready prepared food services, menu items are produced and held chilled or frozen until heated for service later. A significant difference between ready prepared and conventional foodservice is that menu items are not produced to be consumed immediately but to be stored and can be used later when needed.

When the food items are received, they are recorded and stored in storage and almost in daily bases certain amount that is required is removed from the storage. After production, menu items are stored in refrigerators or freezers and entered in the distribution inventory. (Spears & Gregoire 2004, 88)

Advantage of ready-prepared system over the commissary system is that food are prepared and stored on the same premises, menu meals are ready on time because there are no waiting delays. Disadvantage in this type of system is that, there is need of large cold storage and freezers. Which require more space and increase expenses to purchasing and operate freezing machines although ready-prepared systems have been used by large institutes like health care, and employees feeding facilities smaller applicants such as schools, supermarkets, fast-food companies, and restaurants have also started using the technology of ready-prepared foodservice system (Payne-Palacio & Theis 2009, 66)

#### Commissary food services

Commissary system sometimes (central production kitchen) are large in size with centralized food purchasing and delivery of prepared foods to be serve in different locations and regions to be finally prepared and served. This system consists of large kitchen equipment used to prepare and cook large amount of food. Commissary system is mostly used by food service organization with many scattered units to deliver the food, for instant large schools kitchens in the city area. The food items in the menu is distributed in different forms, hot, cold, or frozen for reheating before serving. This type of kitchen functions act as a meals preparation kitchen, delivered to the serving kitchen, and distribution kitchens or to the actual place where the customers are located. (Payne-Palacio & Theis 2009, 68)

Commissary food services management has been adopted in operations where service centers are located in remote areas but yet accessible to the production unit. Reducing the duplication of production, labor, and equipment that occurs if production is carried out at each service center has been the objective. Space requirements at the service centers also can be reduced because only few number of production equipment are required. The high costs of constructing commissaries food services and purchasing of transportation equipment and operating costs in producing and transporting food are at present biggest concerns in evaluating the cost effectiveness of these food services. Commissary food services has been used in schools, despite that most towns prefers combining them with conventional foodservice. Recently, centralized production facilities are currently been built in capital regions where there many schools are located. (Spears & Gregoire 2004, 95-96)

### Assembly serving food services

Assembly/serve food services have developed because of the market availability of foods that are ready to be served or require less cooking. Other challenging factor that keeps occurring is the shortage of skilled personnel in food production area and the increasing cost of labor. Food products that are delivered into the operation are fully prepared in advance and only require storage, assembly, heating, and service functions are commonly performed in these food services, therefore reducing labor and equipment costs. There is less cooking work required in on site production. (Spears & Gregoire 2004, 96-97)

Assembly system saves labor because few people are required, and high skill labor is not necessary required. Other advantages are, less waste; require less purchasing time, and less pilferage. Few equipment and space are required as well as operation, electricity and water costs. This type of kitchen is most common in daycares and schools. (Payne-Palacio & Theis 2009, 69)

#### 4.5 Factors affecting choice of distribution systems

Organizations have different requirements for delivering foodservice depending on the type of food service systems, the kind of foodservices, the size and physical structure of the facility, style of service used, personnel skill level, economic factors related to labor and the costs of equipment, food safety measures, timing of meal service, space requirements and availability. Most factors that affect distribution system are related and have influence on each other. (Payne-Palacio & Theis 2009, 302)

#### Type of food service systems

The type of food service systems used determines if there is need for delivery services. Section 4.4 describe four types of food services systems, The assembly system is most commonly used in schools and daycares; full-prepared food is purchased, warmed and served or stored. In the commissary (central production kitchen) food is either put in bulk or portioned, and then stored in temperature control, food is hold frozen, chilled, and hot, each method requires different equipment. Bulk food may be kept in pans and then stored in freezer storage and can later be warmed and served from the same pan, or transferred in containers that are tightly closed to avoid leakage during transportation to the serving area. (Payne-palacio & Theis 2009, 299)

Due to the increased number and range of temperature-controlled products have increased, the issue of food safety have become common. When the food is held in the insulated carriers in the production kitchen and then loaded into the trucks for transfer to the distribution

location on fixed schedule, on arrival to customers remises the food is stored in freezers and only certain amount that is need is removed to be cooked and served. Mostly, the drivers are responsible for unloading the truck and transferring the food carriers to the storage or service area. Empty carriers from the previous trip are collected and returned to the commissary on the delivery truck. (Interview with the Logistic planning manager from the Wholesale Company, September 2011)

The fleet of trucks required by commissary depends on the geographical distances between the commissary and the serving area, and number of deliveries to be made by each truck driver. Just-in-time delivery is important especially when hot food is to be delivered. Theoretically, hot food should be transported in short distances, and frozen food for long distances, however, they require insulated carriers to maintain food temperature during transportation time. If the service facility has adequate space for holding frozen food, meals can be sent a day or two earlier. If there is no enough storage space, delivery timing should correspond with meal periods whereby the frozen food is melted waiting to be cooked and served. (Payne-Palacio 2009, 301)

#### Kind of food service organization

The type of organization determines what kind of delivery or service system is required. In those places where there is large number of people, serving should be carried out quickly, like in schools, colleges, daycares, elderly homes, industries, and most cafeterias and restaurants which provide meal services. Fast food restaurants also serve foods quickly to, but with over-the-counter or drive in service. (Payne-Palacio 2009, 302)

Hospitals and nursing homes provide food services to their patient and their families, visitors, and member of employees working in hospital also receives similar food services. Kiosks and cafeterias are becoming common nowadays in hospitals and provide services for staff, employees, and visitors. Tray services are offered to ward patients' sick in bed, in most hospitals there are dining room services where food is being served, vending machines are plenty in most hospitals to supplement in-between meals hours. (Barrows, Powers & Reynolds 2009, 16)

#### Size and physical layout of facility

The size of the building and the order of arrangement of the facility should be considered when selecting a delivery system. For example, some restaurants may be situated in expensive areas in town, generally, in order to make use of the space available, arrangement can be done in such a way that the bakery may be in one floor, cooking and preparation in another floor, then dinning and dish cleaning in another floor. It is important to connect and involves different units with elevators to enable delivery of food quickly to the service area.

(Payne-Palacio & Theis 2009, 303)

One of the strategies for cost reduction includes consolidation of food production facilities. One large unit takes the responsibilities of production for several other facilities. This centralized location may then employ a cook-chill food production. Most hospitals that operate their own food services also purchase, including food services products, through cooperation purchasing organizations. Pool purchasing of large volume of foods, has achieved significant cost savings. Hospital food service, like all other food service organizations, has carefully examined its employee scheduling practices and product use to ensure maximum efficiency. (Barrows, Powers & Reynolds 2009, 215)

Timing required for meal service

Another factor that influences the choice of delivery-services systems is the timing requirement for meal services. For instant, if a large number of people are to be served at an exact time in ceremonial occasion, food must be ready and served to all guests to meet the requirements. Sufficient workers are required for serving to avoid time delays, hot wheel electrical cart can be used to hold and deliver food in the dining room so that it can be served directly to the guests. Another method of serving which is not very applicable is putting plates on tray and then carrying them to the dining room. This method is time consuming because several trips are made from the serving area to the dining room compared to using carts for serving. In case where few people are to be served at the same time, like in restaurant customers make orders and the food is cooked according to the orders within short period of time. In schools, pupils are ready for lunch at the same time, to avoid long queue in cafeteria meal period can be scheduled in such a way that different groups goes for lunch at interval of 10-15 minutes. Another suitable alternative is having multiple serving rows if there is enough space. (Payne-Palacio 2009, 304)

## 5 The theoretical framework of the thesis

The theoretical background of this study consists of four sections; the first section presents the choice of the study and its implementation, followed by an introduction to ageing and related services in Finland. The next section includes a brief review of relevant literature in logistics and distribution, food supply chain management, logistics costs identification, performance measurements, transportation, and cost reduction methods. The fourth section presents the food services followed by food industries, food services systems, and then factors affecting choice of distribution systems. The theoretical framework is illustrated in figure 7 in the following page.

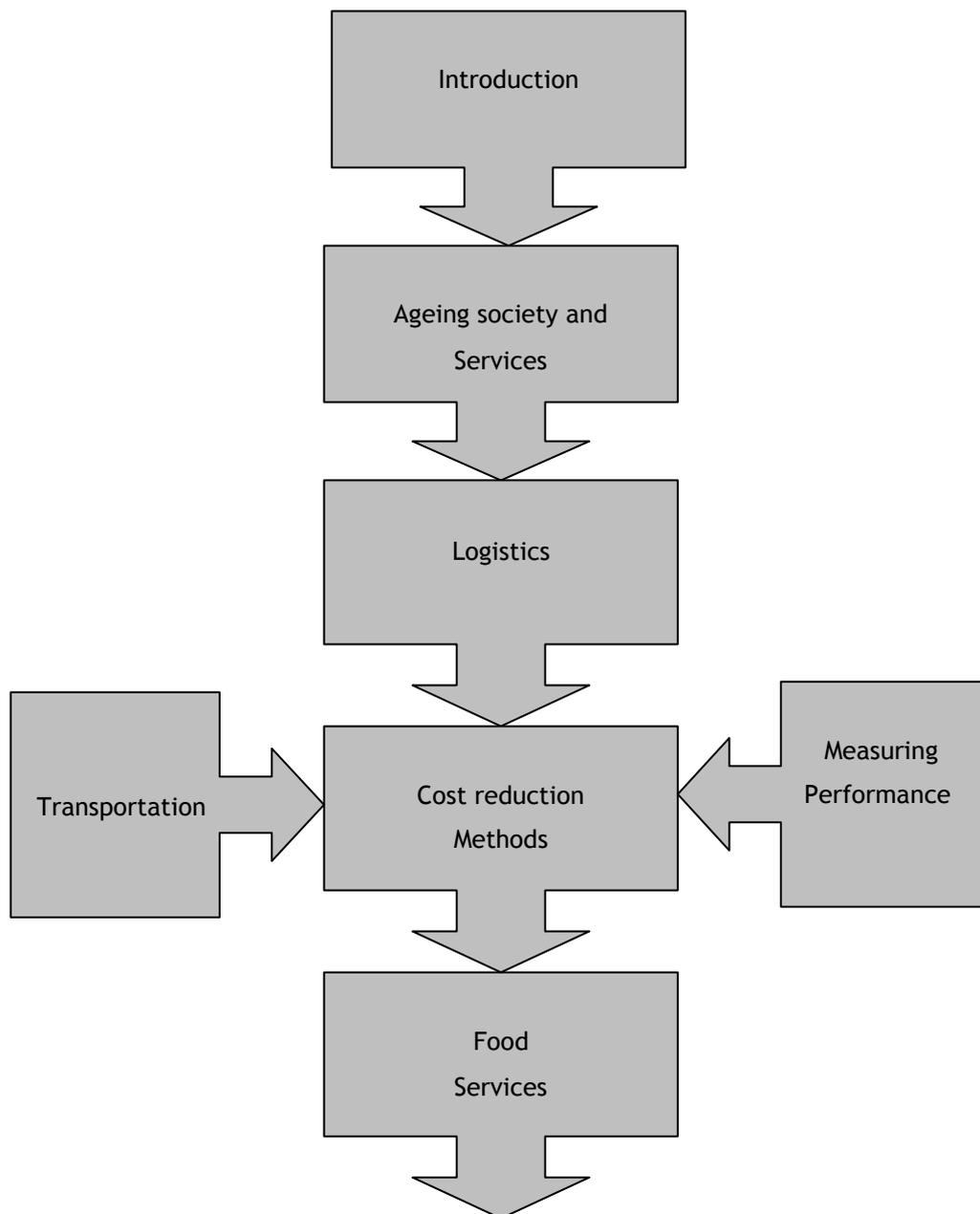


Figure 7: The theoretical framework of the study

## 6 Research approach and methodology

Research is a process of gathering, exploring and interpreting information to find answer to a question. (Kumar 2005, 7) the author describes research as a process that involves defining, designing, doing and performing investigation to solve a research problem. (Maylor & Blackmon 2005, 5)

## 6.1 Methodological approach: Qualitative

The research method used in this study was qualitative research. This type of method was chosen because the researcher wanted to gain a deeper understanding of the research area that little was known. Data were collected through questionnaires and unstructured interviews to provide a range of views about the studying area of the research. Questionnaires were sent to all respondent through e-mails and then later face-to-face and telephone interviews were conducted.

Qualitative research intend to be more explorative and unstructured, and emphasis understanding. To obtain these understanding the researcher has to consider who will be involved in this study, and who possess the required information, this requires selecting the most relevant respondents. In qualitative research, data are collection according to the order of occurrences in an interactive way by writing down notes or recording the conversation that is later transcribed and summarized to obtain the key points information. (Ghuri & Gronhaug 2010, 148-196)

In this study the author concentrates on exploratory research, (Kumar 2005, 10) this type of research is used to investigate into a problem or situation which provides insights to the research. The research objective is to provide details where little is known or to investigate the possibilities of undertaking a particular research. Exploratory research may use a variety of methods such as interviews, discussion, experiments, or other procedures for the purpose of gaining information.

The research was more likely to include qualitative research interview design because exploratory elements were included in the study. Unstructured interview and questionnaire method were used to collect the data. The investigator estimated that if interviews were conducted from different business sectors rich information will be obtained. In this case, the interviewee who participated in this study was from, Public organization, wholesale trade, large kitchen from the University unit, and Private Service home.

## 6.2 Data collection

The theoretical background information of the research was obtained from books, earlier studies, articles, reports, journals, and other publications. Secondary data are usually primary data collected by some else apart from the investigator. Researchers reuses the information as secondary data because it is easier to collect and less expensive. Primary data were collected through unstructured questionnaires sent to all respondents through e-mails, also telephone interviews, and face-to-face interviews were performed. The researcher got help

in construct the questionnaire from thesis supervisor who was also the contact person for Active project.

There are two main approaches of gathering information about a situation, a person or phenomenon. Usually, information required for the research is available and the researchers only need to extract the required information for the purpose of their studies. However, it must be noticed that, besides secondary data, primary data must be collected. (Kumar 2005, 118)

Primary data is the data that have not been previously used or published. There are different methods of collected primary data in quantitative research, directly from the sources by means of interviewing, observation and using questionnaires. Interviewing is the most common method used to collect information from people. Interviews are classified according to the degree of flexibility. Data collected through unstructured interviews are very useful in situation where in-depth information is required or little is known about the area. The flexibility nature of unstructured interview allows the researcher to obtain important information from the respondents. (Kumar 2005, 123-125)

The author and the thesis supervisor discussed and outlined the right companies to be interviewed within Helsinki, Espoo, and Vantaa, then proceeded investigating the background information and business operation area of these companies. In June 2011, six companies were approached through telephone calls, to persuade them to participate in the research. Whereby, several e-mails were exchange, and four companies were willing to participate in the research. The next step was to send copies of cover letters attached with the questionnaire to all respondents by e-mails; later individual interviews were arranged separately with all interviewees.

Secondary data such as organization's information materials may also be summarized, e.g. using minutes of meetings, internal reports, briefings, schedules etc. the researcher may use such material to support the research along with other data that he/she have collected If a researcher considers using these kinds of materials the summary presented should provide the key points, describes the purpose of the document, how it relates to the research work, and why it is significant. (Saunders, Lewis & Thornhill 2010, 492)

### 6.3 Interviews

Interview is the most common method used to collect information through different forms of interaction with people. Interview is defined as a purposeful discussion between two or more individuals. The use of interview helps the researcher to gather valid and reliable data that are relevant to the research questions and research strategy that have been adopted.

We can differentiate different types of interview according to nature of interactions between the researcher and those who participate in the process. Interviews may be performed on an individual basis, between the researcher and the single participant mostly by arranging a face - to - face meeting with the participants. Sometimes interviews may be conducted by telephone, electronically, through Skype or e-mails, or intranet within an organization's. (Saunders, Lewis, & Thornhill 2009, 321)

#### 6.4 Unstructured interviews

Unstructured interview are informal and used to explore in depth general area that interest the researcher. The interviewee is given an opportunity to talk freely about the research subject; sometimes this type of interaction is referred as non-directive. The interviewer is the one who directs the interview and the interviewee's responds to the questions of the research. (Saunders, Lewis & Thornhill 2009, 321)

Most people and business researchers perform surveys and interviews to collect data for the research; the most important point to consider is how structured or standardized the questions should appear. In unstructured questionnaires or interviews, the questions should be prepared in advance. However, the answers are not expected to be ready before the interview, instead the respondents are freely allowed to reply on their own words. A questionnaire where the questions are predetermined, but the respondents can use their own words and ways to answer this is semi-structured questionnaire that can be used in a survey or in interviews. (Ghauri & Gronhaug 2005, 123)

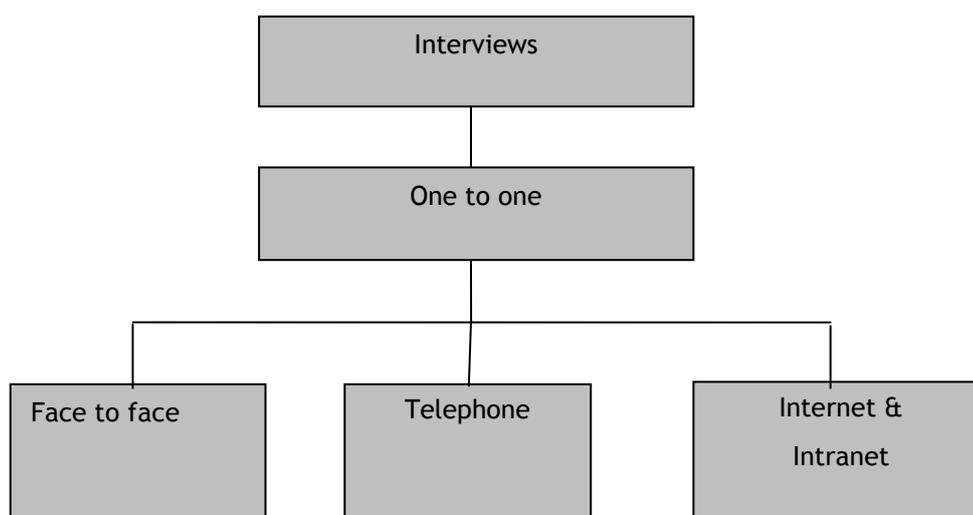


Figure 8: A typology of primary data (Maylor & Blackmon 2005, 350)

Interviews can be categorized according to nature of interactions between the researcher and those who participate in the process. Figure 8 in the previous page shows different methods of communication used in interviews. In this particular study qualitative interviews were performed. The structure and the content of the questionnaire were unstructured, with open-ended questions. The questions were formulated with flexibility, to enable the interviewees understand the questionnaire. Interviews were performed on an individual basis, between the researcher and every single participant. In the beginning interviews dates were organized through telephone, then electronically through internet, and later face-to-face interview were conducted.

In situation whereby investigators are planning to use exploratory research questions, unstructured approach will be the most probably method to use. In an unstructured interview, the questions do not necessary need to be entirely structured or unstructured. In an unstructured interview, the researchers focus directly on the general area she/he intends to discuss, and then allow other factors to emerge as the conversation progress. (Maylor & Blackmon 2005, 230)

The Author point out that although unstructured approach is excellent for maximizing the creativity you can bring interpreting your data and have chance to develop some new and unique insights from your evidence. However, it can create challenges to student researchers. Un structured approach have got no particular time when it should be finished, which means that it is open-ended, and it may take weeks or months to summarize the data collected, analyze, and to interpretation. (Maylor & Blackmon 2005, 350)

#### 6.5 Advantages and disadvantages of interviews

In situation where in-depth information is required interview is the most suitable method of collecting data. Accurate information is gain and a clear picture of a respondent's position or behavior. Open-ended questions allow the respondents to freely answer the questionnaire according to their own opinion, excluding multiple choices alternatives. Interview is the most appropriate way of obtaining information concerning sensitive subject, because the interviewer gives the interviewee article chance to get ready before starting to ask questions. (Kumar 2005, 131)

In case of misunderstanding, complication or sensitive subjects, interviewer can explain, repeat, or put the question in simple form for the respondent to understand. On the other hand, the interview can ask for further elaboration of answers. This method of data collection is suitable for exploratory type of study because it fits the purpose very well. (Ghuri & Gronhaug 2005, 133)

Some of research participants who receive questionnaire through internet, intranet, or postal mail are more reluctant to participate in an interview for many reasons, they may feel inappropriate to provide sensitive and confidential information to someone they don't know. The use of personal interview may be applied to achieve better quality of response rather than the use of questionnaires. (Saunders, Lewis & Thornhill 2009, 324)

Interviews are time consuming and sometimes could be expensive especially if respondents are located in a wide geographical area. It could be less expensive if potential respondents are situated within one area. The quality of the data depends on the kind of the interaction the interviewer had with the interviewee, because it can affect the quality of the interview. Because the conversation is different from every interview, it is more likely to obtain different quality of responses. In an interview situation the quality of the responses can also be affected by the commitment of the interviewer during the interview conversation, The person who conduct the interview can also affect the interview responses, if the interview is conducted by someone else apart from the researcher, it is possible they may not interpret the responses correctly or choose wrong words to summarizes the interviewee opinion. (Kumar 2005, 131-132)

Conducting qualitative interview by telephone may reduce reliability, the participants may be not willing to get involved into an exploratory conversation, or they may refuse to participate in the interviews. It is difficult to perform an interview on telephone and at the same time take notes. Also in situation whereby e-mail are used to send questionnaires the interviewer will not be able to witness the behavior of the participants and it may affect the interpretation of the notes taken (Saunders, Lewis & Thornhill 2009, 349)

#### Open-ended and close-ended question

The form of questions and wording are very important in a research instrument as they have an effect on the quality and type of information gathered. The question must be presented in appropriate way to allow the respondents understand the questions. Both open-ended and closed-ended questions are commonly used in the social sciences research. (Kumar 2005, 133)

In open-ended question multiple choices alternatives are not given. The respondents write down the answers in the questionnaire, while in an interview schedule the investigator records the conversations with a recording machine or write down summary note. In closed-ended question multiple choices are offered in the questionnaire or in interview schedule whereby the respondent or the investigator ticks the option that the respondent's choose. (Kumar 2005, 132)

Open ended questions allow participants to define and describe a situation or event, an open ended question is designed to encourage the interviewee to provide an extensive and development answer and may be used to communicate expressive of an action or obtain facts. It encourages the interviewee to reply as they wish. An open question is likely to start with, or includes, 'what', how or why. For example: 'How has corporate strategy changed over the past five years?' (Saunders, Lewis & Thornhill 2005, 262)

## 6.6 Reliability and validity

If a research tool is constantly agreeing, declare in advance and accurate it can be called reliable. The greater the consistency and stability of an instrument is the greater the reliability. Validity refers to the extent the researchers are measuring what they intending to measure or how accurate the research results are. It simply means, does the research instrument allow the researcher to reach the research target. (Kumar 2005, 153)

To apply the concept of reliability and validity in research, we should use measurement tools that are both reliable and valid. When a researcher collects the same similar information more than once, using the same instrument and obtains similar results under the similar conditions, this is reliability. On the other hand, if the researcher obtains information that give accurate responses from respondents this is validity. (Kumar 2005, 154-156)

Qualitative data are easy to analyze if they are put in an order of approach while collecting, handling and storing them. Qualitative data should be well managed so that they can be easily traced. The researcher must be able to tell where every data was collected, and from who the information was collect? The second point is, reliability, the information transcribed or recorded must be immediately recorded during the actual interview conversation. The third point is maintaining all interview written notes, recorded information, and transcription to prove where data were collected and what methods of data collection were applied. (Maylor & Blackmon 2005, 344)

Sample size in qualitative studies are not based on mathematical or systematic consideration, but rather involves making decisions not only about how many individuals to include in a study and how to select these individuals, but also about the conditions and standard that will be used in selecting these individuals. (Gauri & Gronhaug 2005, 154-155)

The research approach adapted in this study is qualitative; data collection methods used was through questionnaires and unstructured interviews. This study is declared valid and reliable because the researcher selected best market leading organizations and companies to participate in this study in order to obtain information from the persons with the most

experience in logistics foodservice.

The respondents who were interviewed were; a development manager, a logistic planning manager, restaurant manager, chef, and a restaurant supervisor. After the interviews were performed the information collected was immediately transcribe into short summary notes in order to maintain the reliability of the research findings. Since the study was based on sampling of the data collected from the four organizations, the results cannot be generalized to represent the entire foodservice logistics.

(Kumar 2005, 165) the writer explains that, sampling has little significance as the main aim of qualitative inquiries either to explore or describe the situation, or phenomenon. Qualitative research does not make an attempt to either quantify or determine the extent of this situation. Even one individual as a sample can be used to describe whatever the researcher is aiming to investigate. A study based on the information obtained from one individual or undertaken to describe a situation is considered valid.

The concept of sampling in qualitative research is rarely to arrive at statistically valid conclusion, but rather to understand, explore, gain observation, or obtain, and create explanations. However, in qualitative research sampling factors are also important, the researcher has to consider how many data should be collected, who is involved and possesses the required information and is he/she willing to share it. (Ghuri & Gronhaug 2005, 155)

## 6.7 Analysis of the results

The intention of analysis is to recognize and obtain understanding of the data gathered during the research. Data analysis is a process of showing order, structure and meaning of large number of data collected. In qualitative studies the research is often over powered by the large number of data. During the analysis process the researcher reduces, and sorts out and re arranges the data. Usually, researchers examine the data to acquire understanding or to identify problems and evaluate hypotheses. There is no agreed or existing approach of qualitative data; however components like data reduction, data display, and conclusion drawing are used in qualitative data analysis. (Ghuri & Gronhaug 2005, 206)

In this study the data analysis was performed by first selecting and transcribing the data that were recorded in audio recorder into written notes, the researcher then focused and abstracted only the important information from the notes. The key words were then organized and categorized according to order they appeared, and then classified in different topics according to the meaning they presented in this study. At this stage the researcher was ready to use the topics to discuss the research results according to the given topics to build theory.

## 7 Empirical study

### 7.1 Research materials

The four organizations that participated in this study were; the Municipality of Espoo catering unit, Wholesale Trade Company, University Catering unit, and a Private Service home. Due to confidential issues the names of these organizations and individuals are not mentioned in this study. Instead, they are presented in letters E, K, L, V, or according to the interviewees working positions. In this case, the Development Manager, Logistics Planning Manager, Restaurant Manager, Chef, and a Catering Supervisor, and Restaurant Supervisor.

#### 7.1.1 Espoo Catering unit

In Finland, the public sector plays a central role in organizing elderly care services due to the high share of public financing. Municipalities have various roles in elderly care services; they produce the elderly care services, and purchase similar services from private sectors. Beside public care service, there are private elderly care service providers which provide operate like typical businesses, the services provided by these private producers are very expensive and mostly target wealthy customers. If an elderly person is not satisfied with services provided, the only alternatives are to be without the services or to buy the service from the private if he/she is wealthy enough. (Pirnes 2006, 5)

Espoo Catering unit produces and arranges the food services needed within Espoo town, and is responsible for the food services of the children, young people, elderly persons, patients and member of staff. Espoo catering also offers expert services that are related to the catering services operation. In addition, the firm achieves additional sales from schools branches, coffee, buffet, and order delivery at homes. Espoo Catering participates in the elderly people food delivery and nutrition rehabilitation. At present, Espoo catering is operating on development to meet the strategy of the town and the needs of different customer groups. The employees offer supporting service toward healthy food choices by helping customers choosing food products, as well as introducing organic and, fair trades food products. (Espoo Vuoden talousarvio sekä taloussuunnitelma 2011)

The food menu is developed to perform improvement in customers' services delivery. The kitchen staffs are well aware of different customer's group food quality and taste to increase customer satisfaction, There is continuous centralization of food production units, where by, small production kitchens are modified and changed into the service kitchens to reduce logistics costs. (Espoo Vuoden talousarvio sekä taloussuunnitelma 2011)

The use of special software, known as, aroma system was extended according to the plan made in 2010. The electric ordering through the aroma was extended to connect all food service system. The system was first piloted and tested before it was applied to order meals and food ingredients materials within the food service operation of Espoo catering. This system will be utilized in the follow-up and tracking down of orders along the process. (Espoo Vuoden talousarvio sekä taloussuunnitelma 2011)

In 2011, the number of employees was estimated to be 515, the staff know-how in process, computer knowledge, customer service skills and management know-how to developed catering services. The new planning of central kitchen begun in 2010 to improve productivity, the kitchen network structure of the central kitchen was changed by eliminating smaller production kitchens and encouraging outsourcing both food nutrition and logistics service. (Espoo Vuoden talousarvio sekä taloussuunnitelma 2011)

#### 7.1.2 Wholesaler

Company K is a sister company to a major company that serves as a wholesale and partner with other companies in Finland. Company K is a Finnish leading company in hotel, restaurant and catering-services wholesale, which work in partnership with other business organizations and with municipalities in Finland and provides logistics and distribution services to its customers and retailers. Company K is one of the biggest wholesale in the country operating in hotels, restaurants and catering. The turnover was about 2, 5 billion Euros (from their own estimate) in 2010 in Finland. (Company K website, retrieved September 2011)

High customer satisfaction requires continuous operation developing; Company K offers its customers with the best acquisition solutions in wholesale trade and supplying services. The company's objective is to be the best in its own field, and the most desired partner, by maintain cooperation with other partners and be a good employer to its employees. The wide customer's food products range consist of; food products, alcohols, kitchen equipment and utensils. Their menu offers a wide variety of products, high quality and sells at an affordable price to customers. (Company K website, retrieved September 2011)

Company K operates in all regions of Finland; it has six business areas, six delivery sales units, sixteen wholesales. The company offer logistics services in six regions within the country, six delivery sales units, 14 wholesales, and about 25 000 customers. Currently, the total number of employees is about 550. Long time cooperation with the reliable local partners and international suppliers Company K offers the best selections and high-quality products at the most competitively prices. (Company K website, retrieved September 2011)

The Menu products series offered to their customers have wide variety of good quality products at an advantageous price. There are 500 various menu products of which 300 are fresh food products. Customer service is the most important focus of their operation, and there is continue customer services development to delivery satisfaction to their customers. (Company K website, retrieved September 2011)

### 7.1.3 University catering unit

The University catering unit restaurant is a research-based innovation environment and a services learning environment, which was established in 2002. The University unit is a teaching restaurant that offers nutrition services located inside University facility in the ground floor. The restaurant offers buffet lunch for student and member of staffs in the University, The University unit restaurant also operates a cafeteria in the first floor, and also organize events services within the University, meetings services and lobby services. (University catering unit website, retrieved October 2011)

The University catering unit emphasis on learning activity, service activity, and research development activities. It provides students with a different skills and opportunity to learn by both participating and by developing service processes, most of these business services are carried out by restaurant management students. (University catering unit website, retrieved October 2011)

The University catering unit has unique ways of operating; the students' working there shares duties equally, by fully participating in the developing of the operation processes. In practice this means that the services are produced by student labor power using learning by developing model of the University catering unit. Students are given opportunities to develop their area of specialization in learning environments by applying theoretical knowledge into practice continuously. (University catering unit website, retrieved October 2011)

The member of employees in the University catering unit consist of, the Restaurant manager, the Chef, three superior trainees, studying semester senior teachers and permanently working staffs, as well students who are studying nutrition service. The University catering unit work in cooperation with member of staff who are working within studying environment of the University, the teachers and other member of staff, the student administration office as well as students. The University catering unit role is to enable the member of staff to work in partnership in the and at the same time to provide better customer services. (Interview with the Chef October 2011)

The University catering unit customers consist of the student within the University facility,

and member of employees. This is due to the fact that the University catering unit is situated in same building with the University teaching area. The University catering unit also provides meals for the neighboring students and member of employees from the watch making school and another University located across the street. (Interview with the Chef October 2011)

#### 7.1.4 Elderly home

Private Service home W is center specialized in the elderly persons' housing services, rehabilitation services and care services, and it is located in Helsinki and provides activities and possibilities to promote mental and physical wellness of elderly people. Their objective is to support elderly people's ability to function with their daily activities. In service home W there are nurses, occupational therapists and physiotherapists, specialists and psychologist and social worker. (Private Service home website, retrieved October 2011)

The Foundation has a restaurant that provides meals for elderly people living within the building. There are 7 people working in the kitchen, in total there are 30 people working in in this service home. Other facilities available include, swimming pool, gymnastic, and rental homes, all residents share a common living room next to the restaurant dining room. (Private Service home website, retrieved October 2011)

Private elderly home W provides rental homes, group apartments that suit customer who need 24-hours care service, special support is offered by professional skilled staff. Inhabitants also have right to choose the doctor from the house and professionals (physiotherapist, occupational therapist, foot therapist) provide the inhabitant's individual care and rehabilitation. (Private Service home website, retrieved October 2011)

Apart from group apartments, there are also rental flats for those individuals who want to live independently and can participate in the leisure time program of service home w and use the restaurant services. Other form of accommodation provided is rental services for those individuals who come for physical exercise and wellness for short period of time. The rehabilitation staff and nurses offer special services to meet the need of different persons, service home W have long experience with veterans and disables rehabilitation and postnatal care treatment. (Private Service home website retrieved, October 2011)

The third type of home unit is offered to elderly people who have lost their memories. (Not dementia) they are offers special care in a respectful way of allowing them to familiarize with the new surroundings, and also provide them with short-term treatment. The objective is the improvement their quality of life, by maintaining their ability to function and partici-

pate in everyday activities in the service home. (Private Service home website, retrieved October 2011)

## 7.2 Methods

The research problem of this study is in a qualitative mode of inquiry, it was more likely for the interviewer to use unstructured interviews to collect the empirical data through interviews and questionnaires in order to obtain in-depth information. The questionnaires were first send to interviewees through e-mail before arranging individual interviews with each interviewee at different times. (Kumar 2005,16) mention that, while analyzing data in qualitative research the researcher should go through a process of identifying themes and describing what was found out during the interviews rather than subjecting the data to statistical procedures.

The questionnaire layout was designed in such a way that it looks simple and appealing to encourage responses. The author had a clear idea on what the questionnaire was to achieve and the research goals were outlined on how each question was to be analyzed later to obtain the result needed. The questionnaire was presented to the thesis supervisors before it was applied, whereby it was reviewed and few changes were made.

During the interview the researcher used a tape recorder to record the interview conversation. After coming back from the interviews all conversations were immediately transcribed into written narrative notes according to the order of the questionnaire. The notes were then summarized into brief shorter statements, which were then categorized in different topics according to the order of the interview and the meaning they provided. A letter of thank was send to all interviewees who participated in this study.

## 7.3 Results

What was learned from this study? The research question whether is possible to influence logistics costs in food delivery services for elderly people in public service homes by examining and utilizing the existing logistical systems and operators. To find an answer to this question the research investigates the existing logistics performance such as those of wholesaler logistics service providers, a University catering unit, a private elderly home, and Espoo catering unit.

This section present the research results in form of topics that was categorized according to the meaning of the information transcribed from the interviews. These topics are, logistic customer service, performance measuring, logistic process and supply management, logistics

cost, outsourcing logistics services, mode of transport used, outsourcing logistics services and type of foodservice systems used.

According to the writer, arranging and presenting the findings of our study can be difficult sometimes. Basically, there are no rules how it should be done, but we should refer to the purpose of the study and report when it comes to what we want to communicate and to whom. The researcher should be systematic on how they present their results. For example, by the order of occurrence, criteria or topics, order of location or by order of importance. (Ghuri & Gronhaug 2010, 238)

### 7.3.1 Logistics delivery services

The result findings concerning logistics delivery service suggest that not all interviewees were satisfied with the logistics customer services provided by their suppliers. Considering the size of distribution channel of the companies responding to this research, it is to be supposed that logistic service need to be improved. The developing manager from the public organization hoped that the suppliers improve their logistics services in the future, while the logistic planning manager from company K explained that delivery service is the key factor in their business. Their drivers are well trained and have good standard of moral to by providing delivery satisfaction, and listening to their customers complains.

Company K has customer feedback system in their website whereby customers can give their opinion and suggestion about those areas in delivery services that require to be improved. Meanwhile, the According to the Chef, the University catering unit is satisfied with the delivery services offered by their suppliers because the drivers are friendly and very punctual with their work. The result shows that the University catering unit receives the best delivery services compared to others.

The result information obtained from the private service home shows that, they are completely unsatisfied with the delivery services provided by their supplier's, not all trucks drivers are polite, it is difficult to have a healthy conversation with them because it may lead to an argument. In some situation products are lost, or wrong order is received. It is not easy to settle dispute and make new arrangements to correct error that have occurred. (Payne-Palacio & Theis 2009, 614) point out that, losses may easily occur at the point of receiving goods if management is negligent about checking in orders as they are received. This task may be carried out by an assistant, but perhaps someone from the managerial authority should give instruction or advice how activity should be carried out.

According to (Journal of business logistics 2011) Delivery personnel in physical distribution

consist of company-employed truck drivers, they are responsible in handling the goods after delivery, in most industries delivery process consists of arriving on time at customer's firm, and assisting in unloading the goods. Drivers are able to create personal contact quality during service encounter with customers and they can affect customers purchasing behavior. The interactions that take place during service delivery such as courtesy (politeness, consideration, friendliness) credibility (honesty, ability to inspire trust, and confidence), or understanding the customer's specific requirements. Friendliness and attentiveness of employees have been reported to enhance customers' perceptions of service quality.

### 7.3.2 Logistics process and supply chain management

The question regarding how order fulfillment is carried out, the results obtained differed depending on the nature of interviewee's business operation. In the case of organization E customers' orders are classified in different groups. They include, hospitals orders received electronically, day cares weekly orders, and schools orders placed electronically by use of Aroma software used to make internal order within their system. The number of the students and the length of the studying semester determine the nature of order.

According to the second interviewee from company K logistic process is achieved through effective use of special software in ordering, invoicing and coordinating with partners, it allows them to make logistics planning in advance; customers are also able to place orders using these programs. Information is exchanged through Internet, intranet, and telephone communication. Usually the products are delivered to their customer's premises one day earlier to avoid delays. Sometimes, emergency orders are placed through telephone calls whereby arrangement and schedule are discussed between company K and their customers. Customers are able to make orders through Parents Company, and then the order is re-directed to company K through telephone communication. According to (Waters, 2009, 136) if information passes from one system to another there is more chance of an error occurring, uncertainty, delays and inefficiency. This may increase the chances of late deliveries occurring, emergency orders, dispatch and shortages.

The interviewees from the University catering unit explained that they are involved with multiple suppliers, who supply them with various food ingredients. Most of these suppliers wholesalers are centralized in one location. Order processing is done electronically through supplier's website; telephone communication is rarely used because information exchange usually takes place through e-mails. The food products usually arrive during early hours in the morning at the University premises 24hr in advance, the driver usually unpacks the truck and transfer the food in the kitchen storage.

The restaurant supervisor from the private service home explained that orders are processed through Internet from different suppliers, in rarely cases orders are processed manually through telephone, emergency deliveries are usually very effective because goods are received very fast within few hours. It is always necessary to avoid good arriving to earlier than estimated time because there is not enough storage space to accommodate surplus goods. Their kitchen provides about five hundred portions of meals per day because it includes many courses. Usually, they have to be sufficient food supply in storage throughout 24 hours.

### 7.3.3 Logistics costs

Two questions were considered in this section, the question regarding how costs are allocated, and the question of methods used to reduce logistics costs. The logistics manager from company E stated that logistic costs are allocated with Qlick View computer follow-up system. Methods used to reduce logistics costs includes, using centralized menu to all schools and day cares, recipes and acquisition, electric food ordering system, regular control and follow-up of resources

According to the respond issued by the interviewee from company K, fuel costs seem to be the highest costs experienced, and vehicles driver's salary, vehicle repairs and spare costs. Extra costs are occurred due to carelessness action of drivers forget to deliver food in some distribution point which will then require an extra trip back to collect the food holding equipment. Unfortunately the price of fuel have increased due to the rising price of gasoline, but this make them even to conserve more and reduce the number of trip made by long distance trucks, and balancing the weight of the good on transit by not under loading or over loading the trucks to maintain time schedules.

The activity of the vehicle is the amount that is used, which is the same as the distance travelled. Thus, we can see that the running cost is directly related to, and can be measured by, the distance covered by the vehicle. Vehicle running costs are the costs that are occurred as a result of the vehicle being used. The cost of fuel are usually the largest of all variable costs, the main reason why fuel cost is significant is because of the high fuel consumption and due to the constant rise in energy cost due to periodic shortages and heavy taxation. According to (Rushton et al. 2006, 426)

Both interviewees from the University catering Unit had similar opinion regarding costs allocation. Their strategy is to pack their delivery trucks full to minimize the number of trips they make while reducing fuel consumption. The Chef explained that costs are also occurred if damages and losses occur, extra costs are avoided by measuring the food required and observation the flows of customers.

The catering supervisor from private service home explained that they choose to use fixed cost method where by the cost of transport is charged depending on the number of trips made by each truck, in this way they are able to purchase large bulk of food and fully load the truck. The other method used by suppliers to estimates transportation costs is by charging according to the weight of the food products delivered, they prefer not to use it because it is quite expensive; however it's not possible to purchase large stock of food because it requires large storage space.

#### 7.3.4 Performance monitoring

There was no similarity in the result finding concerning performance monitoring, all interviewees explained completely different methods that are used to monitor the performances. The development manager from the public sector explained that the amount of meals served by each employee is used as an effectiveness indicator to measure performance. Company K measures their performances through customer satisfaction, time efficiency, and truck capacity per trips, the interviewee expressed that performance measurement is done through benchmarking by comparing their performance with their sister companies, or with completely different companies.

From the University catering unit both interviewees the restaurant manager and the chef agreed that, logistic measurements are performed through controlling the amount of food products purchased not to exceed the capacity of storage space and by avoiding order to arrive too early than required, at least not more than two days earlier, in this way they are able to avoid stock accumulation and food damages occurring. The restaurant supervisor from the private service expressed that by keeping customers records they are able to estimate the number of customers and the number of meal portions to be served. However sometimes it's difficult to estimate, and there is possibility of either cooking less or excess food.

#### 7.3.5 Mode of transport used

The questions categorized in this topic were the questions regarding the type of vehicle used to deliver food products to interviewee's facilities units, and what kind of equipment are used in handling food deliveries. The researcher found out that there was similarity in the answer issued by all interviewees. In all cases road transportation with optimized schedule are used, refrigerated transport services trucks (controlled-temperature transportation) are the most preferable for transporting deep frozen food products to customers premises. The logistic planning manager from company K expressed that special programmed thermostat trucks with temperature settings are used to reduce energy consumption during transportation.

Besides controlled-temperature transportation, the public organization E uses hot delivery system cook & serve method to provide home delivery food services to elderly people homes. According to the interviewee response, company K trucks requirements depends on the size, geographical distances between wholesale location and the customer location, and the number of distribution location each truck have to deliver the food products. For example large trucks are used to deliver food products from the airport, and harbor to the wholesaler warehouses for storage and preservation, while small trucks distribute food to various distribution locations within the country, i.e. day cares, schools, hotels and restaurants.

The public service home restaurant supervisor commented that packaging material wastes is reduced by use of suitable sizes that fit the products, bio waste is also controlled by cooperation with the customer, and all kitchens waste material are sorted out and recycled. In general, all interviewees' companies perform reverse logistics, the drivers are responsible for transferring food carriers to customer's storage and collecting back packaging trash, and empty carriers left from previous trip.

The logistic planning manager from company K mentioned that they use computer-based approach for routing and schedules vehicles which provide them with the ability to investigate different possibilities compared to manual method which is carried out by using computer software package. According to their scheduling each truck supply about 21 numbers of customers per trip, if this number is exceeded delays may happen. Usually customers are informed if delays are expected. In this case we can agree that the private service home receive optimized delivery services because company K is their supplier.

#### 7.3.6 Outsourcing Logistics services

Third party logistics is nowadays accepted business practice and is becoming common in Europe and the United States. Companies are outsourcing several logistics activities or even the entire logistics process. Outsourcing enables companies to focus on their core business, leverage resources, spreading risks and concentrate on future growth of their businesses. Reducing logistics costs and improved service are among the benefits received from third party providers (Ojala & Jämsä 2006, 10)

The question regarding how outsourcing is carried out was addressed to all respondents. Generally, all interviewees mentioned that, they outsource most of their logistics services to third party providers, however, the method used slightly differed from each other. For instant, public organization E use multiple third party logistic providers to deliver food services. One of their supplier provide cook & serve method logistics services, whereby the food is cooked and packed hot in the production kitchen and then delivered to service kitchens or to

others distribution locations. Cook & Serve method is also used to deliver food to individual customers at home.

The wholesaler company interviewee described their cold temperature trucks are used to deliver food to other business organizations, municipalities in Finland, retailers, and small business entrepreneurs. As a matter of fact, company K is a third party logistics provider for organization E and private service home W, company K does not invest in vehicles vessels, instead it contract out from smaller logistics firms.

The interviewee from the University catering unit explained that, arrangements are made with their wholesale suppliers to collect purchased raw food in one central location, and then a single supplier deliver goods to the University catering Unit. This type of system is advantageous because only one logistic service providers is involved and less time and energy is used because all goods are delivered by one truck. The results were different in the private service home because multiple suppliers are involved. In this case we can agree that the University unit use single outsourcing while private service home use multiple outsourcing

#### 7.3.7 Type of foodservice systems used

Based on the data obtained, the result shows that the interviewee's facilities layouts are completely different from each other. As indicated from the theoretical section 4.1 there are various types of foodservice system depending on where the food is being prepared and where it is will be served, and time duration between preparation and serving the food, the amount and kind of labor and equipment required. In the questionnaire the respondents were asked to describe the type of foodservice system used and equipment required.

According to research findings, different types of kitchens were used in those organizations and companies that participated in this study. Company K is more involved with ready-prepared system because it supplies most of their customer with prepared frozen food. The public organization E use central production kitchens, food is prepared and then delivered to several distribution locations, and assembly kitchens used in schools and daycares, and also conventional kitchens where the food is prepared and then served within the same facility.

The University catering unit and the private elderly home used conventional kitchen even though some of the food products purchased are ready-prepared from their wholesale suppliers. Company K provide logistics services by delivering food to their customers from the warehouses to the several distribution places including, service homes, schools, day cares, and restaurants. In the service kitchen the food is reheated or cooked and then served to customers. Besides delivery services, company K also provides wholesale services by providing

and supplying its customers with varieties of food products, i.e. frozen food, dry cereals, meat and fish, fresh vegetables and salads.

It has been said that one should buy only the amount that can be used at once or stored adequate amount that is needed. The fact is, one should store only what is essential for limited period of time because unnecessary large inventories tend to increase the possibility of loss through spoilage, waste, or theft. (Payne-palacio & Theis 2009, 615) the layout of the university restaurant Unit food service area is designed to hold a capacity of 400 customers, but usually the limits are exceeded to about 1000 customer in total. Storage space is limited for both frozen and dry food, they plan to extend the kitchen layout in the future, and their strategy is to maintain minimum stock not to exceed the storage capacity. The private service home has enough space to hold extra food that can be used in case there are delays in orders.

The results showed that, two companies used different types of kitchen while the other two used similar type of kitchen, but in general they all used similar equipment's in foodservice, which include; freezers, refrigerators, electrical cookers, oven for reheating, temperature-holding cabinets, water steamers, trays holding racks, dish washing facilities.

## 8 Conclusions

The purpose of this study is to examine logistics operation systems and performance of the existing logistical systems and operators, like those of large scale kitchens operators with an objective of finding better methods that can be demonstrated to influence foodservice logistics costs. Logistics costs can be reduced by eliminating unnecessary activities that increase costs, through cost reduction methods such as; outsourcing, entering into long-term relationships with suppliers, cooperating with suppliers, and by establishing alliances, as well as measuring performance. The conclusion of the study is based on topics discussed in the result findings, as well as suggestion, opinion, and ideas obtained during this study.

### 8.1 Service Quality

Quality is defined as a total composite product and service characteristics of marketing, engineering, manufacturing, and maintenance through which the product and service in use will meet customer's expectation. (Quayle & Jones 1999, 71) below, quality is explained by the illustration, considering a truck delivery services provided by third party providers, first, there have to be plans on the route to be used, secondly, the timing requirement usually there have to be exact time when the food products have to be delivered to customer's destination. Another aspect to consider is cost. Therefore, the basic requirements of this example would be the route, the time, and the cost, and depending on the choice made on what will be prioritized first.

Truck delivery could meet all these requirements by delivering the right thing at the right place, at the right time and at the right cost, but still not be able to provide a quality service. If the service is not reliable, sometimes delays occur, or products arrive too early, or the route used was not efficient, it will still be considered unreliable service. But supposed the truck met all the basic requirements, supplied the product on time, and the delivery cost were not so high but the driver was unfriendly and lack moral, and the products were damaged or lost. Although it met the basic requirements there is no way it would be described as a quality service.

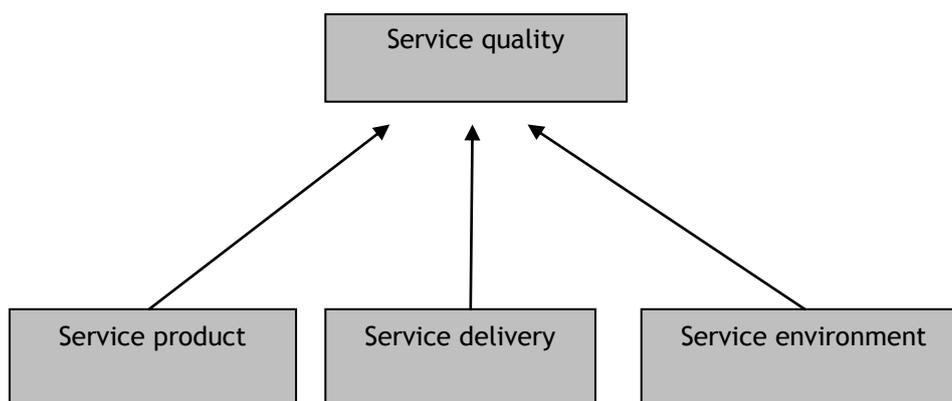


Figure: 9 the three component model of service quality (Kandampully 2007, 90)

In other words to meet the perception of quality there are certain basic requirements that have to be achieved, and there are certain higher order requirements that have to be met. In this case we would expect better service, products that are not damaged, all products delivered without being lost on during delivery process. High quality will mean the products are well packed, and well described or labeled the content inside as well as other minor but important details. But no matter how cheap the transportation costs are, unless it is efficient there is no point of considering such services. To have services being described as quality the customer will expect higher-level benefits. These benefits are what give an organization a competitive advantage, and usually less cost are required to achieve it.

## 8.2 Supply chain solution

It is easy to understand the buyer inspiration; they need to develop a constant approach to supplier performances, they should receive improved performance from supplier, organizations can learn more about their own performance through relationships with their suppliers and customers. Mostly, organizations learn better from each other. (Quayle & Jones 1999, 8)

### 8.2.1 Integrated system

Nowadays companies are recognizing that increasing improvements in value require breaking up their operations boundaries and participating in the supply chain instead of being isolated since it may affect their performance. Those firms that collaborate to share plans and information usually improve in supply chain performance and obtain benefits. Most suppliers are developing their services, even though it appears that less effort have been put in reducing costs by outsourcing services. This is clearly seen in the public organization E, whereby outsourcing has been continuously practiced but logistic costs are still high. Selecting appropriate suppliers requires also the organization to integrate not only internally but as well as externally in the supply chain. It is important to respect suppliers and learn from them by working in partnership with them. Controlling services through agreements is nowadays replaced by joint agreements by exchange and sharing information and knowledge freely; success depends on a relationship that is based on trust between suppliers and their customers.

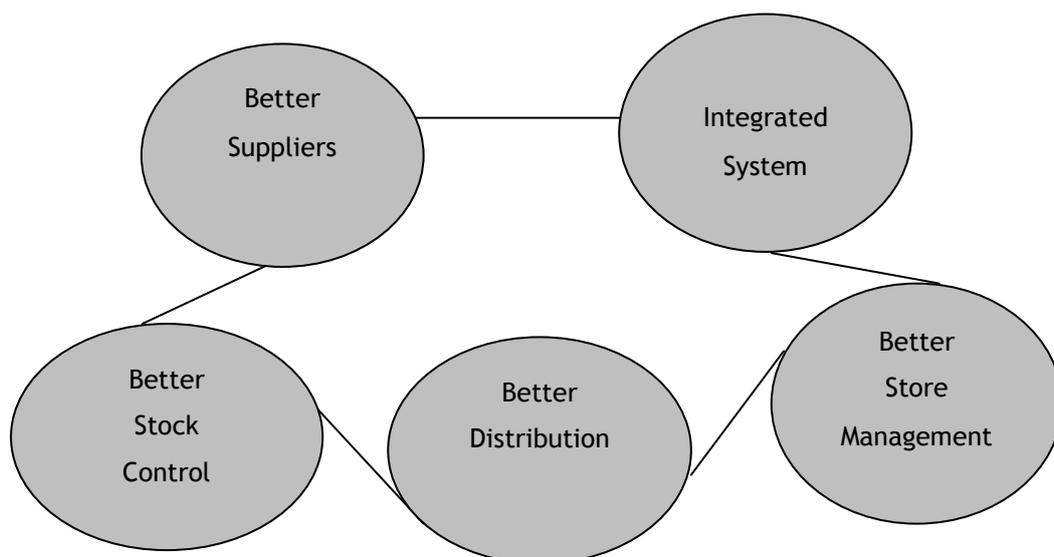


Figure: 10 supply chain solution (Quayle & Jones 1999, 9)

### 8.2.2 Better suppliers

The Internet has provided new challenges and possible solutions in computer networks, open systems in Internet has enable suppliers and their customers and other people working in different areas of the supply chain to integrate and maintain regularly communication through internet. Since this information is cheaper to purchase, there is less restriction compared to traditional organizational system whereby communication cost were far much higher. Referring back to the result findings, the University catering unit communicates with their suppliers mostly through Internet service, very rarely telephone is used, unless in making of emer-

agency orders. The new internet system provide the possibility for supply chain partners to share information, this enable firms who are partnering to maintain lower inventories and acquire lower prices and better value, or even make profits.

### 8.2.3 Distributers

Many organizations outsource distribution activities to third party providers and do not employ people to manage distribution; this directly affects the customer service. For example, if there is a problem with the order fulfillment it is the organization that suffers but not the distributor. Internet has enable transactions to happen, information exchange; however, distribution requires providing physical efficiency and delivery of goods and services in supply chain from suppliers point to customer destination.

Apart from transportation costs, distribution costs include warehousing costs and special requirements such as refrigeration, insurance, and stock damage. The more stock held the greater the cost of storage and the greater the chance of losses occurring. Another factor to be considered in distribution is reverse logistics, the research results shows that all organization that participated in this research practiced reverse logistics. The logistic planning manager explained that reverse logistic safes time and costs because the handling equipment and packaging waste from customers destination are collected on the return trip to the warehouses.

### 8.2.4 Stock control

The storage system is divided into two important functions: inventory holding and material handling. These functions are seen by tracing product flow through a typical food distribution warehouse. (Ballou 1999, 248) The purpose of inventories or stocks is to protect against the changes in demand and supply. According to the research result, inventories held were of different nature, the raw food ingredients, prepared frozen food, and dry food. Perishable food products should be consumed within a short period of time to avoid accumulation, exceeding the space capacity, difficulties in handle, and the risk of damage or deterioration.

Lack of inventory increase product being lost or misplacing, holding inventory is seen as an insurance against running out of the material or to save costs if there were sales offers. It's easy to serve large number of customer if there is accumulation of excess stocks, on the other hand it is costly and risk in terms of cash flow. Stocks are held depending on the costs associated with ordering, transportation, large bulk transit discount, and transit time from suppliers to customer. Another factor why organizations hold stocks is for safety reason to have sufficient supplies to meet customers demand if suppliers are not efficient.

### 8.2.5 Better stores management

The function of store is to provide services quicker with economical possibilities. Usually, the most important consideration is to keep stock level lowest to minimize capital, and cost of storage. Organization holds stock for either efficient or effective services need or for economic needs. However, the more stock held the easier and available it is to meet customers demand, on the other side, the larger the stock held the higher the cost. Making order very frequently to avoid holding costs and accumulation can lead to high cost.

It is advisable to maintain minimum stock holding to meet the demand and not over stocking to avoid holding costs. According to the research result, the University catering unit have less space to hold the capacity of their stocks, to overcome this problem, they avoid to large stock being held, by ensuring that the products are not delivered to early before they are required. Their desire is to extend the storage facilities so that they can manage to hold stocks to meet the changing customer demand within the University facility.

Performance should not suffer from shortages of material at the same time working capital should not be held in stocks, especially product that are not selling. The stores should be economically operated to achieve saving in material and other costs if possible, transportation costs should be lowered perhaps by selecting effective right mode of transportation to deliver food. It is important that proper methods of storage and preservation are used to avoid food ingredients deteriorating; store reduces material handling cost, and maintaining safety within the working area.

### 8.3 Single sourcing or multiple sourcing suppliers

Outsourcing is becoming a new trend for most of the organization; it is the role of manager to make decisions how many suppliers organization should be involved with, and if one supplier will be able to provide all the resources required or many suppliers are required to provide services and goods at the same time. If this is the case then there will be many suppliers to manage. When organization decides to do outsourcing, it is typically seeking to increase cost savings, looking for money value, better services, and access to best practices and to increase innovation. In single outsourcing the organization chooses single supplier to provide them with all services required, and rely on the supplier to provide this service within the period of their agreement. In many cases single supplier usually uses a range of subcontractors to assist them to deliver the services to their customers. A good example is seen in this study where by company K subcontract all its delivery services to other small firms within the country.

The reason why usually single suppliers use subcontractors is due to the reason that the supplier is not well equipped to provide the range of services required, and must then use third parties to deliver parts of these services to their customers. However, organization pays a certain amount of price for having all of the services to be organized by the supplier. Considering that the supplier is the middleman between the organization and the subcontracted firms, organization will be charged some fees as well as a percentage will be added to the amount the subcontractor is charging the supplier to provide a profit. However, it is difficult to determine whether this percentage will be similar amount charged if the supplier would have performed the services instead of using a subcontractor.

One common problem with single sourcing is that organization get stuck with one supplier, the supplier controls their subcontractors, and is will concentrate more on protecting their own interest. In case of single supplier the organization have to enter into long term contract, most supplier are looking for long term contracts because it give them more leverage to deliver cost savings and value for money over long time their customers. However, long-term contract can be disadvantageous to organization in case the supplier's performances are not good, or the relationship between them is not working, or cost savings and money value are not achieved.

In multiple sourcing, organization deal with different suppliers who provide parts of services that have been outsourced. A good example in this study is the private service home W, they have multiple suppliers who provide delivery services separately, and their suppliers include meat producer, green vegetable producers, frozen food ingredient wholesale traders and so many others. When an organization involves itself with multiple suppliers, there is flexibility of making choices, but also competition could arise among the suppliers.

The advantage is that the organization does not get stuck with one supplier instead there is a range of services from different suppliers all the time. Organization have the best opportunity to obtain best service quality from different supplier, by offering them a proposal whereby a bid to see who will offer the best proposal. The disadvantage with multiple suppliers is that the organization will be carrying large responsibility of working with several suppliers. Interaction could be hard and sometimes it could be difficult to make the right deal and making sure that contract agreements are properly applied. The organization is also responsible to continue searching for different suppliers and establish interaction with them if there is intention of making contract.

#### 8.4 Distribution location decision

The public organization E has 70 production kitchens and 130 service kitchens; their wholesale suppliers deliver food products to their premises. During the interview with the production manager she expressed the organization is facing major problem because the logistics costs are very high, and they intend to save costs by cutting down the number of production kitchens and services kitchen in the near future.

Location decisions are important because they affect an organization's performance for long period of time. According to research result, Public organization E has invested on many location and it is not easy to simply close down and move somewhere else. Most of their distribution locations are scattered over big geographical area, this means high transportation costs are incurred, moving to new location won't be much easier, and actually it may turn out to be even more expensive. It is not easy to choose a new location, it may be difficult, sometimes organizations try to avoid this issue by staying in the same place, however, this does not guarantee that there will be achievement obtained in new location, but the fact is that, staying in poor location will increase delays from suppliers and high transportation costs.

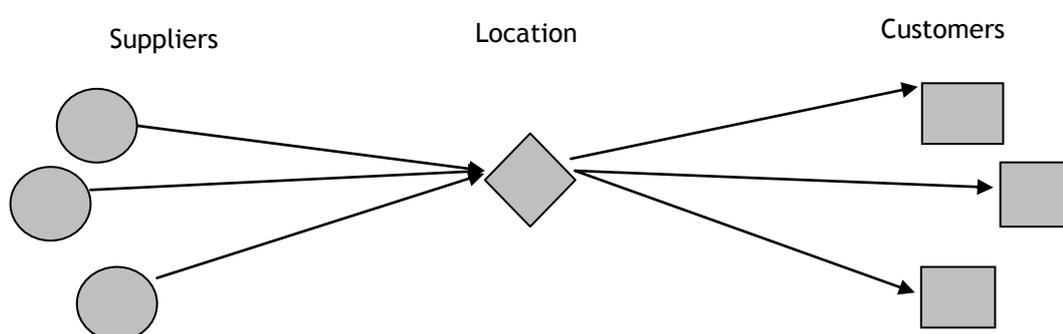


Figure: 11 compromise position (Waters 2009, 206)

If an organization wants to change its facilities, it may do so by expanding the existing facility, open new facilities at new site while maintain their operation at existing site, or close down existing operation and move all their operation to new site. Factors of location decision can be measured by, operation cost, employee's wages, distance from customers and suppliers, reliability of suppliers, manager need to make the right decisions about the geographical location of customer's distribution sites. Unfortunately is almost impossible to find a site that near to customer and supplier. Operations costs can be reduced if operations are centralized, however, organization have to be careful that lower operation costs are not replaced with higher logistics costs. For example, an organization may be having lower operation costs but moving goods to customers may be so expensive because delivery and transportation costs are

high. Location near customers enable organization to deliver fast services to customers with low transportation costs, but there will be long distance to be covered from suppliers. Contrary, a location near by the suppliers make products to be moved quickly with low transportation costs, but then, the distance is long to customer's location. If both transport costs are added together total costs will be obtained. Figure 11 suggest that a compromise location somewhere between customers and suppliers balances the costs and gives the lowest total. (Waters, 2009, 206)

## 8.7 Assessment of the research

The research topic of this study is sensitive and the researcher faced difficulties to collect data because some of the respondents were reluctant in participating in this study; in answering the questionnaires and making interview arrangements. Despite of all these challenges, the researcher was able to collect the require data for this study. (Kumar 2005, 213) express that, research is conducted to improve conditions. Any information provided, no matter how small, it is important and most likely it will help society directly or indirectly, it is acceptable to ask questions, if you cannot justify the relevance of the research you are conducting, you are wasting the respondent's time.

The concept of logistic is very wide and complex. Not all aspects of logistics could be included in this study. During the research process new topic kept on arising, for example, efficient and effective logistic food services for elderly public homes. Perhaps in the future other researchers will be able to develop new idea and continue this study to provide solutions for other municipalities that are facing similar challenges in this particular area, or in related area in care services for elderly people.

This research intention is to discover cost effective logistics methods or solution that can be adopted to influence foodservice logistics costs for the municipality of Espoo. This is done by investigating the logistics operation and performance of existing logistical systems and operators. Therefore, the researcher selected five reliable respondents from catering service, wholesale supplying trade, University catering unit, and private service home.

The researcher may have interviewed public service homes, pharmaceutical industries, and chemical shipping companies that are using cold temperature control facilities to carry out storage and transportation activities in supplying medicine and vaccines to hospitals, pharmacies and other health centers. The author of this study had also intention to perform some interview from organizations located from other city within the country or abroad, for instance neighboring countries. Unfortunately this was not possible because it would have required financial funds cover travelling and communication expenses.

## 8.8 Summary of the research

The population in Finland is rapidly ageing the number of children and people of working age decreases. There were 255,912 at the age of 80 and over at the end of 2010 and it is estimated that by 2030 the population will rise still further. Municipalities are responsible for producing and organizing food services required within their regions.

The purpose of this study is to analyze the performance of existing logistical systems and operators, such as those of large kitchen operators, in order to find better methods that can be demonstrated to influence foodservice logistics costs. The results of this study will contribute to the Active innovation net program in order to develop better and more cost effective food delivery services for public homes for the elderly in the municipality of Espoo.

The study consists of eight sections. The first section presents the choice of the study and its implementation, followed by an introduction to ageing and related services in Finland. The next section includes a brief review of relevant literature in logistics and distribution, food supply chain management, logistics costs identification, performance measurements, transportation, and cost reduction methods. The fourth section presents the food services followed by food industries, food service systems, and then factors affecting choice of distribution systems. The fifth section describes the theoretical framework of the thesis. The sixth section of this study presents the research approach and methodology chosen. The research problem in this study is in a qualitative mode of inquiry, data were collected through questionnaires and unstructured interviews. The seventh section of this study describes the organizations and individuals who participated in this study including, the development manager of Espoo catering, the logistic planning manager from a Wholesale trading company named K, the restaurant manager, and the chef from a University catering unit named L, and the restaurant supervisor from the Private Service home L. The result of this study is reliable because data were collected from selected reliable sources, and methods used was by recording interview information in an audio recorder which was transcribed immediately, and then summarizing into brief short statements. The researcher abstracted important information from the summary and categorized them into a systematic way in order of occurrence and topics. These topics include; logistics delivery services, logistics process and supply chain management, logistics costs, performance monitoring, mode of transport, outsourcing logistics services, and type of food service systems. The final section of this study presents the conclusions, and suggestion gathered during this study. This includes; the service quality, supply chain solutions, single and multiple suppliers in outsourcing, and distribution location decision. Finally, various suggestions for future researchers are discussed in the assessment part of this study

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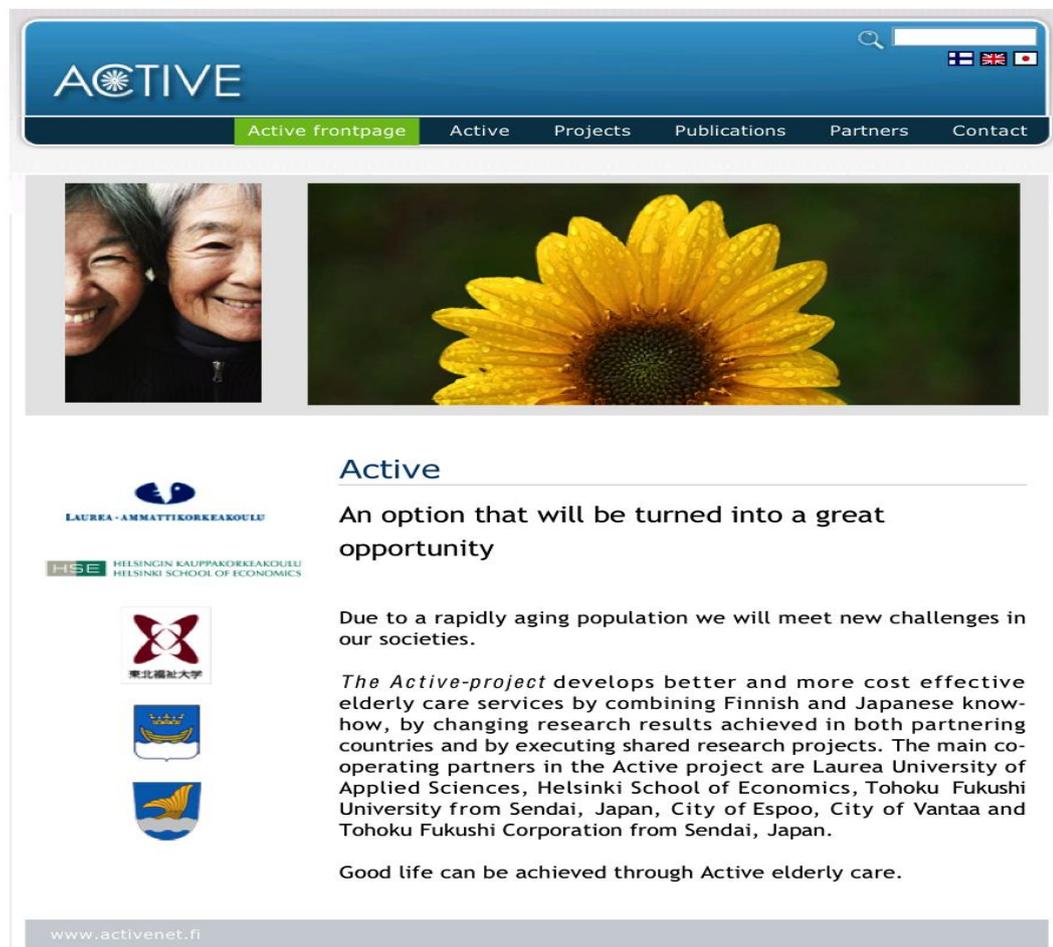
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Appendices

Appendix 1: Active net website profile



(Active net website retrieved, September 2011)

Appendix 2: The map of Espoo



(Espoo city retrieved, September 2011)

Appendix 3: Foodservice at service homes and home service



Figure A: Service home (Private Service home 2011)



Figure B: Home service (YLE Uutiset 2009)

Appendix 4: Food carrier and food transportation truck



Figure A: Food carrier (Raskaskalusto 2011)



Figure B: Transportation truck (Raskaskalusto 2011)