Stakeholders	Building Owner	Developer/ Builder	Inha
New service •Chapter 2: Home services •Chapter 3: Stakeholders	△ ◆	△ ◆	△ ◆
Time saving •Chapter 3: Stakeholders •Chapter 5: Business Logic			△
Cost savings •Chapter 3: Stakeholders •Chapter 4: Technology and logistics •Chapter 5: Business Logic			△
Affect on building image •Chapter 4: Technology and logistics •Chapter 5: Business Logic	△ ◆	△ ◆ ◆	△ ◆

△ = Findings in literature   ◆ = References to interwiews   ⬭ = Focus points

Mia Andelin

Home Service Concept

Technology, Logistics and Business Models

Home Service Concept – Technology, Logistics and Business Models

Mia Andelin

VTT Building and Transport

Abstract

The real estate and building cluster is partly evolving into a service business where physical facilities are considered as part of a service system. Applications of new technologies have mainly been directed to new buildings but new technologies for service provision should also be applied in old housing stock since new construction production is decreasing in Western Europe. New services to residential buildings are sought after, as the population is ageing.

This thesis introduces different home services provided to multi-storey residential buildings, stakeholders of services and their relationships and the technology and logistics of the service. The aim of this thesis is to examine business models of home services. The main objective is to find the business logic behind the home service. Research is limited to multi-storey residential buildings and a special emphasis is given to existing building stock and different reception systems.

This thesis is based on literature study and interviews. The literature study was carried out to illustrate some existing home services, logistic solutions and funding. Interviews among different stakeholders were carried out to determine the different viewpoints of different stakeholders. The patterns in the interviews and the literature findings overlapped partly.

Apparently, home services are needed in future. Potential customer segments are families, wealthy adults seeking high quality services, elderly and disabled people. But to create efficiency and turnover, services need a large customer density, which means that services should not be created for special groups but for everybody. The funding of services can be public, private or there can be a public-private partnership.

According to this thesis there are three main interests to invest in home services and delivery: (1) services for inhabitants, (2) cost savings for haulier/ logistician and service provider, and (3) new services affecting on building image for builder / developer. Finally, the future service concepts and business actions will show how the listed opportunities, strengths, threats and weaknesses of home services come true.

Preface

This thesis, MSc (Eng), is part of the ongoing HOMEDOOR project (G1RD-CT-2001-00493) (e-Commerce Logistics for Homes, 2001–2004), funded by the European Commission and project partners from four European countries (Finland, Germany, France and Spain). The HOMEDOOR project is carried out at European level and this study, although conducted in Finland, addresses main issues identified in the four countries. Major socio-economic motives for the project are to improve quality of living, enable and facilitate home services for the ageing population and revitalise urban residential structures.

This thesis was supervised by Kari I. Leväinen, professor of Real Estate and Facilities Management at Helsinki University of Technology. Leena Sarvaranta and Esa Nykänen acted as my instructors in VTT. I wish to thank them all for their guidance during the writing process.

And finally I'd like to thank my dear darling Jussi for everything. "It isn't much good having anything exciting if you can't share it with somebody. It's so much more friendly with two." –A. A. Milne

Introductory remarks

Project objective

The key of HOMEDOOR Project is in integrating existing and new buildings to the global e-commerce network by providing the logistics solution for multi-storey and other buildings. It is expected to give growth impulses to traditional building business sectors in building rehabilitation and modernisation as well as new service sectors.

Cross-industrial dimension

HOMEDOOR Project is a cross-industrial project, addressing the developmental issues and contributions to many significant areas of residential buildings, such as:

- Urban architecture, accessibility of buildings and construction technology
- Service and delivery logistics
- Building modernisation
- E-commerce logistics, customer data security
- User needs and user perception.

Open concept for joint creation of value

HOMEDOOR Concept is an open concept focussing on design and construction of an enabling system, and therefore, results of the Project find applications in:

- Facilities design and architecture
- Structural engineering
- Elevator installations and maintenance
- Information flow management, machine-to-machine solutions
- Real estate services
- Home services (public/private sector)
- User-centred approach.

In HOMEDOOR Project we have left out the traditional approach for industrial value/supply chains. With incremental technology-push development, user needs would remain secondary. Instead, we have adopted an approach whereby we observe and take into consideration the user needs throughout the development process. HOMEDOOR is a user-centred concept, open to several business and service applications in future, depending on ideas and networks of individual Partners.

Challenge

The main challenge from business point of view is that HOMEDOOR Concept, as it is now, is 5–10 years ahead of mainstream thinking. This is also an opportunity!

Contents

Definitions

Attended reception: Attended reception is a home delivery model where customers wait at home to receive the delivery. The delivery is done in a specific time window.

Business Model: Business model links activities, actors and resources together, within and between stakeholders in buyer-seller relationships (Leminen 2001).

Delivery Time Window: Delivery time window is a certain period when the service provider or haulier/logistician delivers ordered items.

Design for All: Design for all are the interventions on environments, products and services with the aim that everybody, included the future generations, independently of the age, sex, capacities or cultural baggage can enjoy participating in the building of our society. The main idea is to make products and services usable for everybody. (Homedoor 2 2002, p. 36.)

Electronic business: Electronic business (e-Business) can be defined as all the different sectors of business that are using information technology and it's devices such as the Internet. E-business consists of e-commerce, communication, etc.

Electronic Commerce: Electronic commerce (e-Commerce) can defined as the purchase and sale of information, products and services using anyone of the thousands of computer networks that make up the Internet. Typical e-Commerce activities include for example online banking, purchase of goods and purchase of services. (Tatnall & Lepa 2003.)

Electronic grocery shopping: Electronic grocery shopping (EGS) means selling groceries mainly by data networks. In electronic grocery shopping the order is made elsewhere than in the physical-shopping place (e.g. in the Internet). The order is passed on to the shopkeeper in electronic form. EGS usually includes a home delivery.

Home services: Home services can be defined as intangible assets covering certain real estate related requirements. These services can be for example cleaning, maintenance and home shopping.

Unattended reception: Using facilities enabling unattended reception, the customer is relieved of the need to receive deliveries in person. Unattended reception may be based on reception boxes, delivery boxes, shared reception boxes or collection and delivery points. (Punakivi 2003, p. 7.)

Abbreviations

B2B	Business to Business
B2C	Business to Customer
CPU	Central Processing Unit
EGS	Electronic Grocery Shopping
HTTP	Hyper Text Transport Protocol
ICT	Information and Communication Technologies
iTV	Interactive Television
LDC	Local Distribution Centre
LPS	Logistics Service Provider
PIN	Personal Identification Number
POD	Proof of Delivery
PPP	Public-private partnership
SSL	Security Socket Layer
TSL	Transport Layer Security
UI	User Interface
WWW	World Wide Web

1. Introduction

1.1 Background

The population structure in Europe is changing. Society is changing both in its structure and its needs. Citizens want an adaptable dwelling to make life easier, depending on their needs, throughout life. It will become important to find a convertible and versatile dwelling for all the life. Convertible means that the dwelling can become accessible with some little interventions, and versatile means that spatial transformation is possible according to the users' needs. (Homedoor 1, p. 7.)

Living as such sets certain requirements. New services based on new technologies are offering possibilities for ageing people to live independently at home longer than before. It would, for example, be beneficial to combine an elevator and an automatic groceries storage and transportation system into one integrated system (Homedoor 1, p. 14). Thanks to technological development, it is expected that services are easier to achieve and more varied. Also, the status of various consumer groups becomes interesting from the marketing point of view.

1.2 Research methods

This study is mainly based on a literature study. Further prioritisation has been done on findings and conclusions of an on-going European project, supported by interviews of 3 stakeholders. Partly, the process can be characterised as "snow-balling". The themes and insights that emerged during the interviews were compared with the themes in the literature.

1.3 Definition of research

The aim of this thesis is to consider what kind of home services can be provided to multi-storey buildings. This thesis also discusses new technical solutions for home delivery and different stakeholders of services. The main objective is to extract what are the business models in home services. Research is limited to multi-storey buildings and a special emphasis is given to the existing building stock.

1.4 Structure of research

This thesis will introduce and discuss different future home services, service parties, technologies, and business logic in home services (Figure 1.).
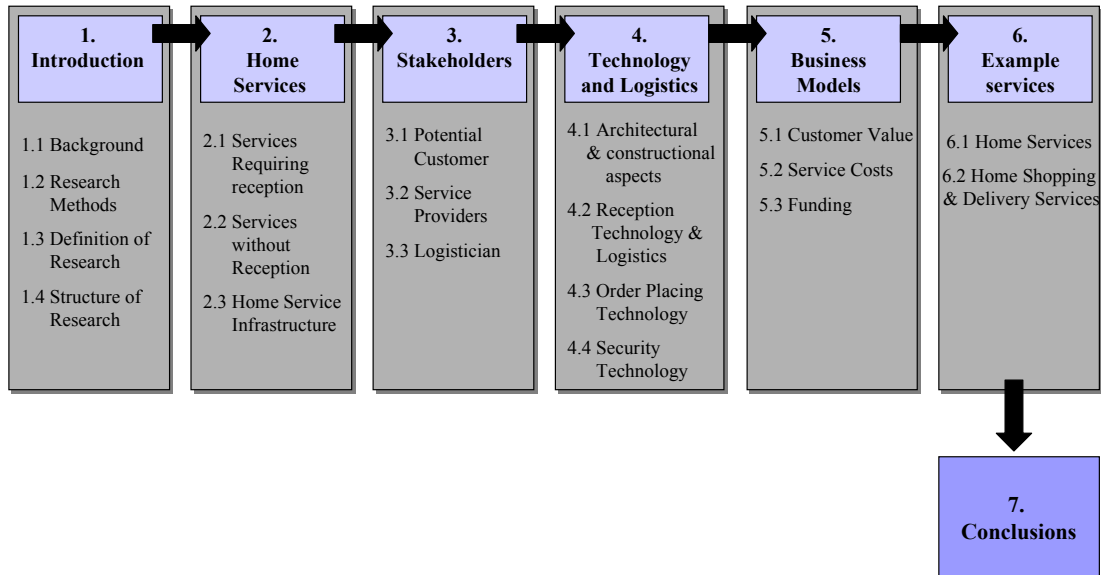
Figure 1. Structure of research.

In the Introduction chapter, background and research methods are introduced, scope is defined and the structure of thesis is illustrated.

Chapter 2, Home services, introduces different kinds of home services and different parties linked to services. There are various services related to living that people need or want to buy. The most general services are implemented and discussed.

Different stakeholders of service and their tasks are discussed in chapter 3. This chapter introduces three special groups that might especially need the services and therefore they could be the most potential customers. This chapter presents possible service providers and logisticians as well.

The technologies and logistics related to home services are introduced in chapter 4, Technology and logistics. Order making, home delivery and security alternatives are presented. Technology has a central role in new home services in view of the fact that new technological solutions are needed and implemented in dwellings to improve living. Technology is also needed for using these new services and securing home deliveries. Another issue addressed in this chapter is what kind of requirements logistics sets from an architectural point of view.

In Chapter 5, Business models of services are explored. Business logic is a key issue in creating new services. The aim of this chapter is to recognise different interests that stakeholders have for service and their willingness to invest.

Existing home services are discussed in chapter 6. The chapter is divided into two subtitles: Home services; and Home shopping and home delivery. Five different services and their operations are introduced.

Chapter 7 brings all the previous chapters together and concludes this thesis. This chapter presents the summary and the conclusions.

2. Home services

The purpose of this chapter is to introduce and define different home service types. The real estate and building cluster is partly evolving into a service business where physical facilities are considered as part of a service system. Information and communication technologies (ICT) have made developing new products and real estate service concepts possible. Unfortunately, applications of new technologies have mainly been directed to new buildings while most of the citizens live in dwellings where the basic structures and solutions have been made decades ago. New technologies can solve many problems in old stock too, but new kinds of services and service concepts are needed. (Nummelin 2003, p. 9.)

Home services can be defined as intangible assets covering certain real estate related requirements. The word "service" is widely used to denote a sector that "does things for you". Service is frequently described as intangible and the output is viewed as an activity rather than a tangible object. (Johns 1999.) The service network related to housing is wide. These real estate services can be for example cleaning, maintenance and home shopping. The development of the information society is triggering changes in services. In future, functional services are going to have an increasingly important role in affluent society because with help of these services consumers will be able to improve the fluency of their every day activities (Tuorila 2001). The service need of users is the key factor in service markets and new services for inhabitants should be built from the customer's point of view.

2.1 Services requiring reception

Often, services are requiring some sort of reception. Depending on service type, the reception can be either attended or unattended. For example, home care services have to be received in person but for home shopping items, reception systems can be used.

2.1.1 Social services

Independent living and everyday tasks at home are getting harder as dwellers age. Family, friends and relatives can assist with tasks, but in some cases this help is inadequate or it is not available. Also, the demand for social services is going to increase as the post-war generation gets older. In view of the fact that there is not an adequate amount of institutional care available for the elderly, there should be some other way to offer social services to them. One opportunity is to offer services to their homes. If these services are brought to homes, it depends on the service type whether

the reception of service has to be received in person or the service can be delivered unattended.

The hardships of independent living can be reduced in many ways. Examples of such services could be: meal service, transportation, convoying, security, clothing and household management services. Transportation service is important for people having limited mobility and for those who are not able to use the public transportation system. Household management service is provided when people need help in their daily activities because of a sickness or limited mobility. Household management service workers are working closely with home care and in some cases household management and home care are combined. (Nissinen & Santasalo 2002, pp. 12–13.) It is possible to obtain services from non-profit organisations, governmental actors or by purchasing them from different service providers. Usually municipalities provide social services, but there are also private service providers in this area. In the future this public-private partnership is expected to increase. (Siekkinen 2002, p. 14.)

Elderly people services are being developed all the time and the borders between different service models are disappearing. From the societal point of view it is worthwhile to support independent living as long as it is possible, as the costs of independent living are much lower than costs of living in institution. As an example of growing attention to this issue is the fact that it has been estimated that it is gainful to markedly subsidise elevator installations in existing apartment buildings with no elevator if this makes it possible for few aged inhabitants to live there a little longer. (Siekkinen 2002, p. 16.)

2.1.2 Home shopping and home delivery

Home shopping can be defined as shopping done at home. Usually it also includes home delivery. From the customer's point of view this fact means that the supermarket is distributed to the households (Yrjölä 2003, p. 112). The traditional way of home shopping is mail order shopping. Catalogue and TV shopping are fairly established and common forms of non-store shopping, but other forms, such as electronic shopping (e-shopping) and Electronic Grocery Shopping (EGS), are new and emergent. Nowadays the most common products purchased by home shopping are clothes, music, furniture, groceries and books. The most popular ways today to place an order are to use either the Internet or the phone.

From the consumer's point of view, home shopping is an attractive service model since it is providing timesaving for the consumer. The consumer is able to order groceries and other products at home, and have them delivered to the door. This appeals particularly

to people with little time or desire to shop and those unable to leave the home. As a result of increase of the number of double income and single-person households over the past 30 years most apartments are likely to be unoccupied during the working hours at daytime (McKinnon & Tallam 2003). People are also spending their leisure time outside home, which is increasing the probability of nobody being at home outside working hours. These reasons are supporting the use of unattended home delivery service models (e.g. delivery boxes or lockers for home delivery). The customer's main motivations for using home shopping services are convenience, time saving and avoiding the work involved in picking and home delivery. Additionally, a significant proportion of customers (15%) cited physical or constraint issues as their primary reason for home shopping. (Punakivi 2003, p. 41.) For example, in Finland Ruokavarasto is providing home shopping and delivery services.

2.1.3 Laundry

A laundry service is one of the possible services provided as home services. This service can be similar to a hotel' laundry service. Laundry services could work by using laundry boxes or bags (Americleaners 2003). The customer puts dirty clothes into the bag or box and fills a form, which records the types of clothes or household linen being sent to the laundry. The filled form is put into the laundry box or bag as well. If a reception locker system is used, the laundry box or bag is taken to a locker from where the laundry service provider or logistician picks it up. Afterwards, the clean laundry is returned to the reception locker. This how, for example, Americleaners works.

2.2 Home services without reception

Other services are home services or real estate services that are not using the reception box or locker system. One thing they have in common with services with reception is that the services in some way utilise new technologies and ICT. The aim of this utilisation is to provide services more efficiently and in real time.

2.2.1 Housing management

Housing management can be defined as real estate management that aims to be responsible for managing all operations and services related to a residential community (e.g. condominiums), (Rakli 2003). According to the law, the housing manager is the executive director of condominium. The housing manager is responsible for taking care of a condominium's administrative and routine businesses. Utilising ICT in house

management services can be one way to improve the service level. For instance, Internet or e-mail can be one way to send notifications to the house manager or to inhabitants.

2.2.2 Maintenance

Maintenance can be specified as all the regular operations that are aiming to keep the real estate in a certain condition (Rakli 2003). For example, maintenance includes maintaining technical systems, cleaning, maintenance of outdoor areas, repairs and replacements. New technologies can create a service network where inhabitants and maintenance service providers can act in real time. For example, an inhabitant can call a repairman via an ICT system when needed and the system will inform the repairman of the new customer. In interviews it was discussed that the maintenance company could offer extended services, like small renovations, through new ICT systems (Kautto 2003).

2.3 Home service infrastructure

Home service infrastructure consists of administration and maintenance. Administration has critical role in a home service and reception system since it is responsible for administrating the ICT related to the system. The administration works in a service centre as a help desk to the whole system. Administration is the main operator of the reception system – acting as a middleman between customers and service providers. Therefore administration is also the potential owner of the reception system. Maintenance is responsible for the physical box (for example, maintenance takes care of malfunctioning boxes). The same actor can be responsible for both administration and maintenance tasks. Maintenance and administration are responsible for taking care of alarms from the lockers, lockers' settings and monitoring lockers.

The service centre with a help desk is needed to take care of failures of services. Different ways to contact the service centre should be offered, for instance, e-mail, fax, toll-free numbers, postal address, call back button and bulletin board. The service centre is also offering a channel for complaints. Service centres can also take care of informing customers about, for example, new services and special offers.

2.3.1 Real estate corporation

Real estate corporations are companies practising real estate business. Real estate corporations are typically owners of rental buildings but they may also have

construction management operations. The housing stock of these corporations is usually wide-ranging. For example in Finland one of the biggest real estate corporations is Sato which owns around 24 000 rental apartments. Real estate corporations are one of the potential administrators and maintainers of home service systems as these corporations usually have their own maintenance and house managing units to take care of these tasks.

2.3.2 Maintenance company

Yet another possible maintainer and/or administrator is a maintenance company. Maintenance companies take physically care of the building. Maintenance companies are offering janitorial services, cleaning, plumbing and electrical works. A maintenance company can be a potential administrator and maintainer of reception systems because maintenance companies have access to buildings and they also have technical know-how.

2.4 Concluding remarks

The real estate and building cluster is partly evolving into a service business where physical facilities are considered as part of a service system. Although most of the new technologies have mainly been directed to new construction, citizens however, live in dwellings where the basic structures and solutions have been made tens of years ago. To achieve higher customer density and more efficient business, it would be beneficial to provide new technologies also to old building stock.

As inhabitants and buildings age, one way to improve the quality of living and services is to create new services. Examples of such services could be; meal service, transportation, security, clothing, home shopping, home delivery and household management services. From the consumer's point of view home shopping with unattended delivery is an attractive service model since most apartments are unoccupied during the working hours at daytime.

The home service system contains large information flows. Therefore there has to be some to control the system and information linked to it. There has to be also some actor, maintenance, taking care of the physical features (e.g. lockers) of service. Real estate corporations are potential administrators and maintainers of home service and reception systems. Maintenance company can be a potential administrator and maintainer of reception systems because maintenance companies have access to buildings and they also have technical know-how.

3. Stakeholders

The main purpose of this chapter is to introduce and define stakeholders of services. Stakeholders of the service chain can be divided into five different groups; customers, retailers / service providers, logisticians/ hauliers, administration and maintenance (Figure 2.). Administration and maintenance was already introduced in chapter 2.3.

Customer	Retailer / service provider	Logistician / Haulier	Administration & Maintenance	Customer
Ordering	Grocery shopping for customer	Order delivery and deposition to Shop2box reception locker	Informing customer about delivery	Picking up delivery
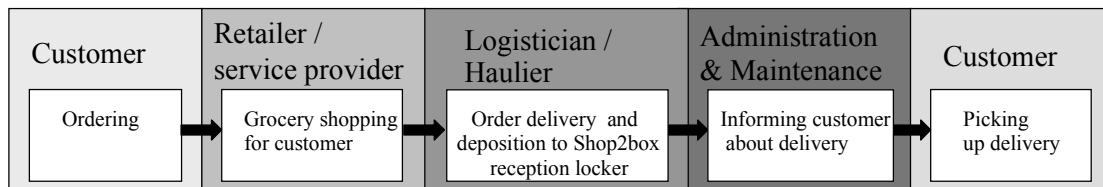
Figure 2. Stakeholder relationships.

3.1 Potential customer

Home is the place where people fulfil their every day needs (e.g. eating, sleeping), and it is also a place where people enjoy being. In this context a home service customer can be defined as a private person who places an order from home to a service provider. The customer has a crucial role in a home service system; without customers the business idea is not sustainable.

Ideas of potential customer types for services vary quite a lot. Studies on potential e-shopper have indicated that the presence of children is an important variable as well as working women. This can also be applied to home shopping as they have similar features. The age groups most likely to shop online from home include single males less than 40 years old and households where the female head is 40 to 49 years. Presence or absence of children as well as the age of the youngest child has a significant influence on households' needs, resources and expenditures. Housewives and part-time female workers with pre-school children are potential in-home shoppers. (Dholakia & Uusitalo 2002.) Customer's main motivations for using home services are convenience, timesaving and avoiding the work involved in shopping and home delivery.

3.1.1 Family with two kids – both parents working

A common idea of a potential customer is a family with two kids and both parents working. Also in interviews it was mentioned that the potential beneficiaries of new services, especially in food delivery, are families (Elo 2003). For working women, shopping along with other household tasks has become a particular challenge and can be

associated with negative feelings. Busy women are more likely to accept new retailing formats, such as online home shopping, if it is seen as time saving and convenient. Families possess a potential, ability and interest for learning something new and have a high regard for free time (Homedoor market study 2002, p. 22, Kautto 2003). They are interested in reducing the time and effort spent on shopping for groceries as well. They also value the reduced time needed for home shopping and the opportunity to arrange delivery; this group is also typically willing to pay a premium for an enhanced service. (Palmer et al. 2000, p. 14.) But home shopping can also be seen as less fun and recreational than traditional shopping, and for these reasons women may be less likely to accept a new retailing format. (Dholakia & Uusitalo 2002.)

3.1.2 Elderly and disabled people

Yet another important customer group is elderly and disabled people in need of services and help with every day life. The ageing population is a major concern in Western Europe, Japan and the US (Nummelin 2003, p. 11). For example, it is estimated that in 2020 about 20 percent of the European population will be aged over 65 (Siekkinen 2002, p. 3). Elderly people prefer to live in their own home and neighbourhood as long as possible. By virtue of this, European countries have no choice but to improve the prospects for old people to stay in their own homes and to implement different integrated residential solutions for the third and fourth age population.

The growing population of elderly people will increase the demand on support for living. Inadequate satisfaction of these needs is going to put great constraints on society, both socially and economically. (Homedoor 1. 2002, pp. 7–8.) As people grow older they can become physically less mobile and could benefit if they were able to conduct more of their daily affairs, such as banking and grocery shopping, from home. The main assistance forms for elderly are shopping, real estate management, cleaning, changing clothes, shopping, making food, helping with outdoor activities, personal hygiene, taking care of day-to-day business, medication and socialising (Nissinen & Santasalo 2002, p. 34).

It may not be easy to challenge the shopping habits of the elderly since older consumers are usually satisfied with traditional shopping methods. Retirees, who do not suffer from a scarcity of time and frequently enjoy activity and ambience of in-store shopping are not going to accept in-home shopping as readily as the young (Dholakia & Uusitalo 2002). Online home service are not alone solution for this customer group since the people in this group are not likely to spend large amounts of money on anything, neither they are computer literate nor innovative consumers. Elderly may not be interested in learning new technology such as using computer as well. However, today's active working-age people are gradually becoming older – this kind of technology illiteracy

might not be such a problem in future. The modest commercial potential of these customers is compensated for by the potential benefits in terms of the cost and quality of social care (Heikkilä et al. 1999). In interviews it was mentioned that local grocery shop could also be a social contact to customer when offering home delivery as extended service (Elo 2003). According to interview it is important to give service alternatives to customers. For example, home care persons do shopping either by going to the shop or through the Internet with the customer. However, the importance of social contact in these situations should not be underestimated. (Kiviniitty 2003.)

3.1.3 Wealthy adults seeking high quality services

This category includes the so-called "money rich, time poor" people with above average incomes but little spare time. For these people, time is the ultimate commodity and they are willing to pay handsomely for services that preserve it. They also possess assets for buying different kind of services and are interested in buying services. They demand superior service and top-quality products for the money they pay. These people are often interested in special (luxury) products. (Palmer et al. 2000, p. 15.)

There is evidence suggesting that the higher the consumers' socio-economic status, (measured by education, income and occupational status), the more positive the consumers' perceptions will be of home shopping relative to in-store shopping. There is an indication that Internet-using households are likely to have higher than average income. (Dholakia & Uusitalo 2002.) According to Yrjölä (2003) younger people, who are busy and computer literate, can be considered to be attracted to home shopping, especially to e-shopping. With a growing number of dual households (two working members) and a resulting emphasis on expediency, home service with home delivery seems to have the potential to help households utilise their scarce time resources better (Yrjölä 2003, p. 58).

3.2 Service providers

A service provider receives the order a customer makes and then provides the ordered service to the customer. Service providers can be, for example, retailers or cleaners. A municipality can be considered to be a service provider since it is providing services to inhabitants of the municipality. The service provider works in co-operation with a logistician who delivers the order to the customer. Usually, service providers are working as middlemen between customers and logisticians. They are providing logistician's services among their own services.

3.2.1 Municipality

Finland is divided into 446 municipalities forming the local government. According to the law, these municipalities have certain functions. One of these functions, in Finland and other Nordic countries, is that municipalities are responsible for arranging social and welfare services. Social and welfare services can be provided by the municipality itself or with the co-operation of other municipalities. Another option is to buy services from private service providers, third sectors or from other municipalities. (Nissinen & Santasalo 2002, p. 10.)

According to Nissinen & Santasalo (2002), the public sector nowadays provides 90 percent of elderly peoples' services in Finland. The main supplier of social and health services needs some other methodologies of procuring services to a population that is ageing quickly. In the future municipalities should guide and develop the available public services. On of the developments is that municipalities are expected to start partnerships with different service providers. Municipalities should also guide customers to use the services that are provided by communities and foundations. (Sonkin et al. 1999, p. 181.) In interview there was an idea that there should be a regional service framework supporting business logic for tailored services (Kautto 2003).

3.2.2 Retailers

The retailer can be a local merchandiser or company. Retailers are operating in traditional stores and/or they can provide services via the Internet. Home shopping with delivery can be an extra service to their customers. In interviews it was stated that new services (e.g. home delivery) could be extended services for a local grocery (Elo 2003, Kautto 2003). E-business is offering the retail company opportunities not just to let the customer choose the way of interaction or transaction, but also the level of activity of participating in the value creation process or the value chain. For example, customers may shop traditionally by picking the goods from the store shelves and delivering them to their homes or they can shop groceries through Internet and have them delivered to home. (Windischhofer 2003, p. 36.)

3.2.3 Private service providers

A private service provider is a person, who is using possessed inputs to practice economical operations on the person's own account and at the person's own risk. An entrepreneur can be a freelancer, self-employed or the entrepreneur may have hired labour. (Tilastokeskus 2003.) A private service entrepreneur may be, for example,

a cleaner, house manager or health visitor. Private service entrepreneurs are providing, for example, laundry services, maintenance and cleaning services. The ageing population and privatisation of social services may also provide new, Internet based, business opportunities for these service providers (Heikkilä et al. 1999).

3.2.4 Third party

A third party is a private service provider. The third party can be defined as a company performing service activities on behalf of others. The third party can be, for example, some sort of service middleman. One option is that third party operates as a service centre where the customer needs meets service providers' offerings. The third party can also be an independent partner providing a certain service. The third party can be a social service provider, maintenance company, logistician or haulier. The third party could own the reception system and also provide it's own services. This way, the reception system ownership can just be extra business for the third party.

3.2.5 Third sector

Third sector includes different types of communities, associations, organisations and foundations. The third sector has an important role in taking care of old people in Finland. The third sector is complementing services provided by municipalities and it is channelling civic activity in elderly favour. The third sector is providing a significant part of elderly people services in Finland. It is difficult to replace these services with other services and other service providers. In particular, small third sector organisations can have an important role to play, since service markets are unattractive for big service providers and if the elderly people living in the district have low purchasing power.

The third sector in Finland is greatly depending on RAY's (Finland's Slot Money Association) support and municipalities outsourcing services. (Sonkin et al. 1999, p. 144.) The strength of the associations is that they are having support from the local people, they have reputation as non-commercial service provider and the prices of the services are low since different kinds of financial support.

3.3 Logistician

Logistics Service Providers (LPS) have grown in importance since more and more companies outsource their logistics functions. Generally speaking, logistics service providers are companies, which perform logistics on behalf of others. Home shopping,

especially E-commerce, and home delivery business models promote the importance of logistics and, in many cases, create different logistical tasks. (Delfmann et al. 2002.)

According to Delfmann et al. (2002) logistical core processes are; transportation, shipping and warehousing. Associated "added value" activities to logistical core processes are quality control, merchandising, returning goods and tracking & tracing. Logistician has an important role in a Homedoor-type reception system as deliverer (Chapter 4.), which is responsible for delivering ordered services or goods in time to right place.

3.3.1 Post

The postal service can be considered a potential logistician in this service concept since they have the best experience of logistics having been working in this business sector for hundreds of years. Postal service organisations are usually the national front-runners in the logistics sector. For example, the Finnish Post has three core business sectors; communication exchange, electronic communication exchange and logistics. The communication exchange sector is providing letter and magazine delivery services, electronic communication exchange sector is offering services related to electronic document management and electronic data transfer between companies in Finland and Baltic Sea region. The logistics sector is providing solutions to companies' and communities' materials management, warehouse and terminal operations, and logistics management in Finland and its vicinity. The logistics sector is also producing domestic and international parcel services for firms, communities and consumers. (Finnish Post 2003.)

3.3.2 Logistic companies

Private logistic companies such as DHL and UPS are specialised in providing logistical services. Their core business is to deliver parcels, letters and other items. These kinds of international logistic companies take advantage of global delivery and logistic centre networks. Companies are offering personal consultation services to create custom made solutions to customers needs. For example DHL is offering consulting in logistic solutions, warehouse and project management, IT solutions, and tax, customs, legal and regulatory expertise (DHL). Logistic companies have practical and well-designed delivery networks to ensure delivery of parcel in tight delivery times.

3.4 Concluding remarks

Stakeholders of the service chain can be divided in five groups; customers, traders or service providers, hauliers/logisticians, administration and maintenance. The customer has a central role in a home service system since there is no business without a customer. Three special groups mentioned to be the most potential customers of service in this chapter are families with kids, wealthy adults, and the elderly and disabled. Studies have indicated that the presence of children is an important factor affecting shopping habits, as well as working women. Wealthy adults seeking high quality services possess assets for buying services to get more leisure time. Elderly and disabled people are another important customer category since they need assistance in living. Providing service to their homes is an important issue since the number of people in need of support is going to increase in the post-war generation age and there is insufficient institutional care available.

Service provision can be both private and public. Benefits of public private partnerships in service provision should also be exploited. Municipalities usually provide social services, but there can also be private or third sector actors in this sector. Private service providers usually provide commercial services (e.g. EGS, housing services). Logistician is responsible for delivering ordered services or goods in time to right place. Logistician can be private service providers or state-owned business.

4. Technology and logistics

This chapter introduces various technologies attached to home services. Different kinds of technologies are needed in dwellings, for instance, in home delivery and in securing orders and deliveries. The lifecycle of a building is long and so the renewal of the whole building stock is slow. So far, technological innovations in home services have mostly been introduced in new buildings, although applications for existing buildings would have a much wider market. In the future, basic technology in buildings will be supplemented with new service concepts in which usability will have a decisive importance (Visio 2010, 2003). Home services include both information and material processes. These processes are interacting with the customer at the ordering point and the delivery point. This chapter introduces technologies and logistics linked to these processes. In chapter 4.1 architectural and constructional aspects are discussed. It is important to utilise already existing constructional solution in creating new services and reception systems to old buildings. Home delivery technology and logistics are considered in chapter 4.2.

4.1 Architectural and constructional aspects

With regard to architectural design requirements to logistics, constructional requirements in relation to barrier free and aesthetic design should be analysed. Technical requirements regarding a barrier free access to buildings and apartments are completed by the design components. Concerning the reception system structural requirements have to be introduced to the architectural guidelines for the integration of a logistic system. (Homedoor 1 2002, p. 15.) Normally, there is only small amount of space around buildings, particularly in city centres; therefore it is beneficial to utilise already existing construction solutions. In interviews there was an idea of renovating public rooms (e.g. hobby rooms etc.) on ground floors into collection point rooms. This would be beneficial since it is believed that mail delivery will also go in the direction of collection points instead of "to door delivery" in the future (Kautto 2003).

First it is important to examine, what kind of construction requirements must be fulfilled concerning the barrier free design of residential buildings. Moreover, architectural requirements to the barrier free design should be the basis for any planning of residential buildings. In that way it could be possible to counteract a social isolation of an ageing society. Integration instead of isolation is the essential objective of the architectural requirements concerning the inhabitants as well as the reception system. Structural and aesthetic integration of the reception system is the second central topic. One option could be to develop an additive module, which seems to offer widest possibilities of application. A special challenge is to detail the aesthetic and functional

claim of such an additive system to existing residential buildings. (Homedoor 1 2002, pp. 14–15.)

4.2 Reception technology and logistics

There are different ways to receive purchased items. Possible scenarios for delivery concepts are picking up by customer from a collection point, private reception locker, attended reception or integrated system. Receiving services do not necessarily require a reception technology since services cannot always be delivered to a reception system. In some cases it is necessary to have the customer present (e.g. home care services) and in some cases it is not so important that the customer is in attendance (e.g. maintenance services). But there is nothing new in attended reception since it is already in use, so it is discussed here very briefly. Due to this, in this thesis, emphasis is given to unattended reception system since it is offering new service solutions and business opportunities. There are many interesting aspects in unattended reception solutions. For instance, it would be advantageous to have a user friendly, secure and competent logistic system to assist the reception, even if there is nobody home.

4.2.1 Locker technology

Locker technology is one of the biggest issues in the reception system. Basically, the reception system is serving two purposes: delivering the products by the logistician /haulier and picking up the products by the customer. The locker can be both private or in shared use. In both cases the delivery and collection process has to be authenticated and authorised some way. This technology is discussed later in chapter 4.4.2 Reception locker technology. The locker system itself can be placed either inside or outside of a building or it can be a stand alone collection point allocated in a convenient place for customers.

There are several requirements set for the locker. For instance daily grocery products are more demanding than other physical products like books and clothing, because groceries need to be preserved in certain temperatures. Therefore the lockers have to operate over many temperature ranges and keep the groceries fresh as long as any normal refrigerator. (Kämäräinen et al. 2003, p. 1.) Proper preservation of the goods requires at least three different temperatures in the locker: ambient, chilled and frozen. Other opportunity, if delivery boxes are used instead of lockers, is that the boxes are insulated. Insulation should ensure that frozen/chilled food remains frozen/chilled for 12 hours. There are also non-food items, such as detergents, that may not be placed to same compartment with food. These detergents need own compartment in the box or locker.

The reception locker should also be able to send alarms to administrator and maintainer. For example, if boxes have different compartments for certain temperatures, the locker alarms if temperatures in these compartments arise above or decreases below a set limit. Alarm is also sent if a power failure occurs. Locker system should also be backed up with a battery for power failure situations. An alarm should be also sent if a door of the locker is left open.

The administrator should also be able to edit the settings of the locker, control locker temperatures and open lockers remotely. Remote control is an important feature, for example, if customers have difficulties opening the locker. For instance in the case that the code given to customer does not open the box, the customer calls to service centre where from administrator can open the locker remotely. Administrator and maintenance should be able to monitor the boxes. For operative purposes of the box, it is needed that there is some profile, status and administrative information (such as if the box is full or empty, is it cooled or not, what are the dimensions inside the box, who is authorised to open the box etc.) available. This information will be saved into a database located at the service centre. Data networks (e.g. Internet or other networks) are used for controlling and monitoring lockers remotely.

4.2.2 Attended reception

The starting point of home delivery service models was attended reception in a certain time window (Yrjölä 2003, p. 111). Private home delivery is traditional and the most common operating model in home delivery. It can be used for receiving both items and services and its popularity is based on the fact that no reception technology is used since the customer is receiving delivery in person. This is also a down side of this model, from the logistician point of view, since to be efficient it needs a high customer density.

4.2.3 Private reception locker

The private reception locker is an unattended home delivery service model. The customer-specific locker can be part of a bigger locker system that can be installed, for example, to the basement of the building. In any case installing private reception lockers requires structural modification of the property. One solution to this is to integrate private reception lockers to the wall next to external door – like a private mailbox. Another possibility is that the reception technology is built into the kitchen wall so that there are doors both to the kitchen and to the hallway. The door is opened and closed by means of keypad with constantly changing pin codes. According McKinnon & Tallam (2003) the main concern in this solution is security since the external doors can be one

way into a home for burglars. The external doors can be alarmed but the inside doors are a problem. For health and safety reasons, builders are not allowed to install locks to inside doors as a child might become trapped.

However the issue of finding the space required for customer specific reception lockers in, for example, apartment buildings can be avoided using the shared delivery locker concept as in collection points (Punakivi 2003, p. 82).

4.2.4 Collection points

Another unattended service model is to deliver orders to public or private collection points located nearby the customer, from where the customer fetches the order in person. (Jaakkola & Kämäräinen 2000, p. 39.) The groceries are delivered to a locked reception locker that is allocated to a specific customer with every delivery, which makes it possible for many customers to use the same reception box. The shared reception locker concept also allows interested customers to easily experiment the service, and makes it easier for customers to adopt home shopping generally (Punakivi 2003, p. 95). The separate lockers have electronic locks with a changing opening code to make possible shared usage of the lockers. This feature is discussed later on in chapter 4.4.2.

Collection points using shared reception locker units may be placed, for example, in apartment house basements, lobbies, bus or under ground stations, office car parks or where ever it is considered to be convenient for customers (Punakivi 2003, pp. 8–11) (Figure 3).
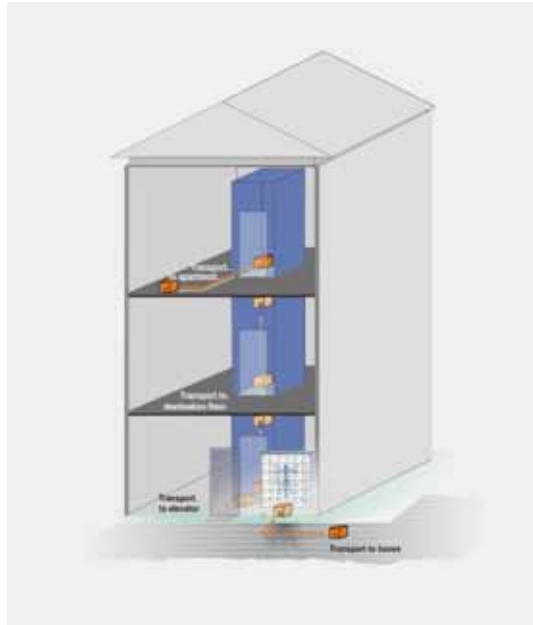
Figure 3. Collection point at the lobby (Homedoor 1 2002).

If the collection point system is installed to the basement of residential building, it should be a private system that is available only for the residents of the building. Some employers in Finland have also indicated an interest in creating an unattended reception facility to their employees at the office. At the collection points the ordered goods can be stored until the customer is able to collect the delivery. (Punakivi 2003, p. 8.)

A collection point has a special feature since it can be used both as initial and as secondary delivery point. As initial delivery point the goods are delivered there directly without attempting to drop off goods to customer's home. Alternatively, collection point can be used to supplement a system of attended delivery. When the customer is not at home the delivery is diverted to a pre-arranged collection point of the vicinity. This is beneficial to carrier as it removes the need to return the order to the depot and organise a redelivery an on the other hand it also offers the customer the benefit of not having to wait for a second delivery. (McKinnon & Tallam 2003.)

On the credit side in this reception model, is that customers are independent of the delivery timetable, i.e. they do not have to be at home for receiving the goods. On the other hand collection points makes shopping slightly easier but they do not remove the need for going to the collection point to pick-up the order. The level of service is lower in this alternative than in the other delivery possibilities, but in some cases it maybe adequate. (Jaakkola & Kämäräinen 2000, p. 40.)

There are several companies developing these reception solutions, such as Hollming in Finland and the large international appliance manufacturer Whirlpool (Yrjölä 2003, p.

125). Hollming has developed a new reception locker system, which is called Shop2Box. In Finland it is taken to use by Ruokavarasto. (Shop2Box 2003) Tower24 has also unattended reception collection point system in use in Dortmund in Germany (Tower24 2003).

4.2.5 Integrated technology

Yet another possibility for receiving orders is to use integrated technology where an elevator and reception lockers are integrated to one system. Nearly 50 % of the existing residential building stock is multi-storey buildings (Homedoor 2 2002, p. 93). In existing buildings equipped with elevators, the situation is such that there is a wide range of different-aged elevator equipment and therefore it is impossible to create a system where the same space could be modified in order to accommodate both people and goods transportation. This is due to the fact that components needed to modify for example the control system of such elevators are no longer available. Therefore it must be assumed that in existing buildings equipped with elevators, the only way to add an automatically operating storage and transportation system in the space for the elevator would be by replacing the old elevator completely. (Homedoor 2 2002, p. 96.)

It would be beneficial to combine an elevator and automatic goods storage and transportation system into one integrated system, a reception system, since it is a new way to provide services to multi-storey buildings (Figure 4.). An existing elevator could be replaced with an integrated system or a new integrated system could be added to building that previously lacked an elevator. Nowadays in many countries, a building with more than four floors (basement including) has to be equipped with elevators (Homedoor 2 2002, p. 23.)
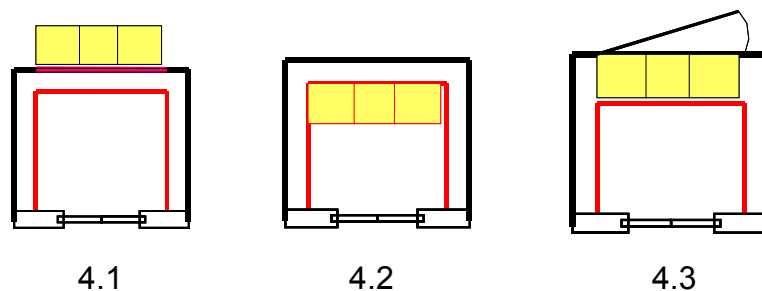

Figure 4. Possibilities to place boxes into the elevator; 4.1 Storage connected to elevator shaft, 4.2 Lockers in elevator, lockers are loaded from inside, 4.3 Lockers in elevator, Lockers are loaded from outside the elevator. (Homedoor 1 200.)

Current elevators do not have the capacity or the necessary control systems needed to handle and deliver products automatically. European and national regulations and directives also have a significant impact on the design of new integrated systems. For instance EU elevator regulations are very strict concerning the openings to the elevator shaft. For this reason loading items directly from the outside (Figure 4.3) to the cabin would be problematic since according to these regulations the shaft is only allowed to contain elevator components (Homedoor 1 2002, pp. 14–15). This is because the elevator shaft is an effective route for fire to spread. Thus storage of goods inside this space, increasing the fire load, is dangerous and requires proper insulation. Storage immediately connected to the shaft is feasible as long as the goods are fire insulated from the shaft space. Also, the elevator cabin as a possible place is not convenient also due to other two reasons; the space is very limited, and the goods are transported up and down the shaft more than once thus consuming unnecessary energy (Homedoor 1 2002, pp. 15–16). The conclusion is that the elevator shaft or cabin is not a good place for stocking items. As well, it is important to examine what kind of constructional requirements must be fulfilled concerning the barrier free design of residential buildings (Homedoor 1 2002, p. 14.) In existing buildings with an elevator and in existing buildings without an elevator, where the elevator is to be placed inside the building, there is not enough space available for placing the reception storage boxes immediately next to the elevator shaft. Thus the reception system must be a stand- alone solution in these situations. (Homedoor 1 2002, p. 16.)

An interesting opportunity would be to integrate a reception system into the building while the building is being fundamentally improved. In existing buildings without an elevator, where the elevator can be placed outside the building connected to the facade (normally in suburbs and in the garden of houses in city centres), the reception system benefits from being integrated with the elevator (Figure 5.). In these situations space can be arranged for both storage and an elevator cabin fulfilling handicapped regulations.
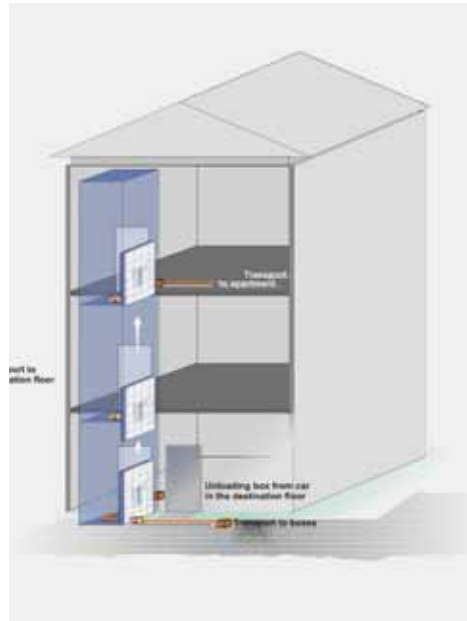
Figure 5. Integrated elevator and reception system (Homedoor 1 2002).

An integrated system outside the building should be considered as an alternative while considering installing an elevator into a building. No extra space is needed in the lobby, since this option requires free space ether in front of the building or behind the building (Figure 6.). There are practically no limitations on the available storage space and both fire protection and protection against unauthorised access is relatively easy and inexpensive. (Homedoor 1 2002, p. 16.) From the logistical point of view, having the shaft outside the building the distance from the distribution vehicle to storage is minimised. From the security point of view, the storage space can have an opening to the outside of the building and one to the inside. Thus the distributor does not need access to the building itself. Only the tenants would have access to the building and they could collect the delivered goods from the storage inside the building at their own floor level. (Homedoor 2 2002, p. 98.) Costs would be significant drawback in this alternative because costs become high due the amount of construction works needed. (Homedoor 1 2002, p. 14.)
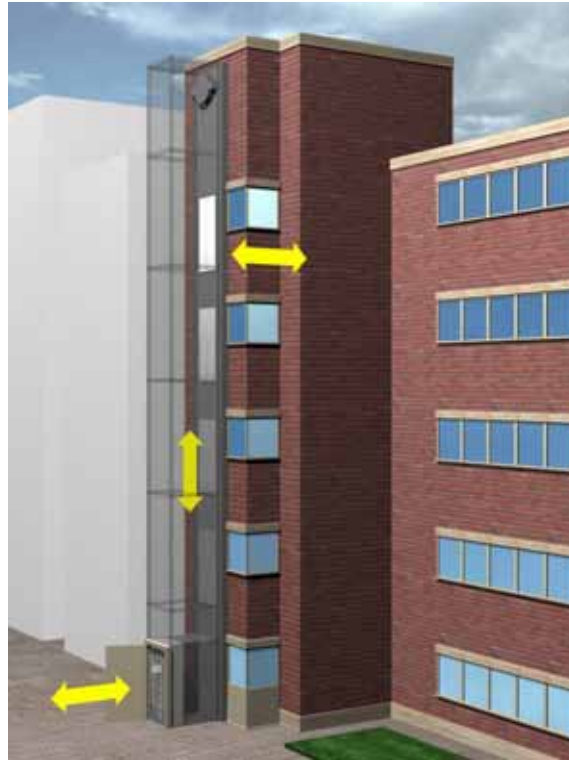
Figure 6. integrated system installation outside the building (Homedoor 1 2002).

New construction residential buildings are much easier to implement than existing buildings. It is possible to set up guidelines and directives how to ensure the accessibility in the building and what kind of space should be reserved for vertical transportation systems. Though, the societal impact is very low since the construction of new residential multi-storey buildings is decreasing dramatically in Western Europe. (Homedoor 2 2002, p. 93.)

4.3 Order placing technology

The first-phase "dot com" companies offered the possibility of ordering over the Internet, thinking it created added value for the consumer. Some of the companies invested in creating a website that really offered some added value in comparison to catalogue sales by showing the products in 3D or other features not possible in print media. Unfortunately, the technology as a whole did not work properly. (Yrjölä 2003, p. 174.)

There are two main possibilities to place an order: phone or Internet. Phone is the most common one since people are accustomed to use phone for communication. Internet is every day tool for many people, therefore it can be considered to be used for ordering items and services. Another, but rather old fashioned, way to make an order is to use fax for this purpose. There might also be some kind of new ordering system, but basically the

system is still based on computer. Usability issues are seen as a potential barrier with interface, information structures and navigation being important contributors. For those people with visual and motor disabilities, the absence of user interfaces and services that allow for these disabilities is a very significant barrier. (Tatnall & Lepa 2003.)

4.3.1 Phone

The order can be made by phone. This is a rather simple way to make the order as most people have a phone, mobile phones are becoming more common and people are familiar with it. The phone is easy to use for anyone and it is used already for mail ordering. To make it easy for users, the numbers of different services can be saved to the phone's memory and then the user does not have to remember the actual phone numbers as the service numbers are in speed dial.

The disadvantage of phone is that customer has to have some kind of catalogue where to order from. The catalogue and the order-making device, in this case phone, are separate. But on the other hand people are used to looking at catalogues since mail ordering. Another disadvantage from the service provider's point of view is that if order is made by phone, it is taking to much time to handle it.

4.3.2 Fax

Fax is one way to make an order. The customers fills a form and faxes it to service provider. Using fax is quite old-fashioned and many people or companies do not always have faxes. These are main reasons why fax is not the most useful device for order making.

4.3.3 Internet portals

The Internet will soon cover more than 50 percent of the households of the western world and mobile connections are starting to increase rapidly (Yrjölä 2003, p. 16). One of the usual ways to make an order in home services is to make it via an Internet Portal. An Internet portal can be defined as a web site containing all essential information, news and links as well as e-business possibilities and virtual meeting places serving specific target groups. One of the advantages of shopping online is the volume of information available in the Internet to the customer. Portals may also offer different kinds of information services, such as help line, discussion forums and information about products and order making.

There are several technological requirements claimed for Web portals. Accessibility is one of the most crucial features of the portals. Portals should be accessible 24-hours a day since if a portal is too slow to download or unavailable for significant amount of time, customers will probably not attempt to use that portal again but click to a competitor. Another important feature is credibility. Credibility in Web site design usually refers to such factors as security, privacy, company details and quality certifications. (Cox & Dale 2001.) The user interface (UI) should be simple and easy to make people use it. The quality of UI can be defined as customer perception of degree to convenience and user friendliness in using a Web site system. Since UI of an online store influences the experience of consumers interacting with a retailer's product and service offering, a well-designed UI system may reduce consumers' cost of searching and the time required for information processing. That is, it will minimise the effort needed to perform choice and purchasing tasks. Online shopping is thought to be pleasurable and satisfying to consumers when the retailer sites are fast, uncluttered and easy-to-navigate. (Park & Kim 2003.)

Customer should be able to customise the web site. Usually using a web site requires a password and with this password the customer can be identified. When properly customisable on the first visit, on a next entry the customer can choose to see only her own preferences (Feinberg et al. 2002). For example the server should remember past orders and offer items based to these earlier orders. One important customisation feature is that the customer should be able to choose the language used. At least for elderly it is important to be able to use native language. In one innovation there is a palm computer with Internet connection that can be mounted to the kitchen wall. Customers are able to write items needed to the virtual shopping list. The service provider can then take the orders right from customers shopping lists.

4.3.4 Bar code reader

One easy way to make a shopping list is to use a bar code reader. Every time when some items run out, the customer can scan the bar codes of the items with the bar code reader, which automatically makes a shopping list from scanned items. The scanned shopping list is sent on a certain day to a service provider to process it. Bar code readers cannot operate alone but require a computer. Because of this, a bar code reader can be considered as a computer accessory. The bar code reader and the computer have to be located in the kitchen or near the kitchen. The only benefit that the customer gets from using a bar code reader is a list of scanned items. All other items that the customer wants to order still have to be found from the net portal of the service provider. Yet another down side is that bar code reader cannot be used without a computer.

4.3.5 Interactive television

Interactive Television (iTV) is expected to reach a significant household penetration of roughly 50 percent within coming years. The question is whether this turns home shopping and TV shopping into a hybrid form of computer online shopping. Basically, iTV is a TV with Internet connection. iTV is used like a computer.

For example, through iTV, the customer can be in real-time connection with a doctor in a healthcare centre. In this situation, a web camera can used for sending a picture of the customer and of the doctor.

4.3.6 Specific ordering device

Specific ordering device could be installed to the kitchen and it could be based on using the Internet. For example, Electrolux introduced an intelligent living-concept in September 2000. It is based on a Central Processing Unit (CPU), called Screenfridge that controls all intelligent features (refrigerator, dishwasher, etc.) in the house. The Screenfridge also helps the household with dinner ideas based on the contents of the refrigerator, stores shopping-lists and a family calendar. Additionally, it has a small video camera to record messages, and via broadband communication on the Internet, a web-based telephone, television and radio (Electrolux 2003) Since the CPU is connected to the Internet all the time, there can be a straight connection to the service provider.

4.4 Security technology

Surveys indicate that both consumer and commercial users are in doubt concerning the security of the basic systems. For example, one survey found that more than two-thirds of Americans are concerned about the threat of hackers and cyber criminals. (McCrohan 2003.) Security is an important issue since it is one of the most crucial features in e-Business and in home delivery business. For instance, first there should be a secure connection to e-Store, after that if the payment is done in e-Bank there should be also a secured connection to bank (Elo 2003). After ordering and paying, there is home delivery, which should also be protected from criminals. So there are many operations that should be secured. In next chapters the Internet portal and reception locker security are discussed.

4.4.1 Internet portal security

Consumers are concerned about disclosing their private and financial information in Internet portals. Computer networks are typically shared resources and sometimes data transmitted is considered to be confidential, thus it should be somehow protected so the other users are not able to read it (Ahola 2003, p. 14). According to Park & Kim (2003) security perception is one of the key affecting factors in consumer's online shopping commitment. While most online shopping portals provide personal information privacy protection policy and guarantee for transaction security, they do not offer detailed information on how transaction and personal data are secured. (Park & Kim 2003.) Adequate security is paramount since unauthorised access can expose the most intimate details of person's life (McCrohan 2003).

One way to make secure Internet connections is to use Secure Socket Layer (SSL) or Transport Layer Security (TLS). SSL and its successor TLS are the most commonly used encryption systems bundled with most Web browsers. They provide privacy, integrity and authentication in Web transactions. SSL is implemented on the top of the transport layer and was developed to support encryption and authentication in both directions on a Hyper Text Transport Protocol (HTTP, which is used in Web browsers and servers to transfer text and graphic files). TLS provides privacy and integrity between two communicating applications. (Ahola 2003, p. 14.) However, there are streams of technological innovations to improve these key performance attributes for the disruptive technology. For example, streams of incremental technologies in certificate signature technologies will eventually replace the current SSL technology to improve online transaction security. (Lee 2001.)

Another way to make a secure connection is to use a Virtual Private network (VPN). The idea of VPN is to create a private network via tunnelling and/or encryption over public data network. VPN is a solution implemented with software, hardware or a combination of those, enabling a secure establishment of a connection over open (insecure) networks, such as the Internet (Finnish Communications Regulatory Authority 2003). VPN provides an active form of security by encrypting or encapsulating data for transmission through an unsecured network. (Ahola 2003, p. 15.) Data transferred through VPN can be encrypted, thus prohibiting the data to be revealed to third parties. In addition to encryption, VPN solutions also enable strong authentication of communicating parties. In practice, VPN connection is established by tunnelling the unprotected communication inside a secure (encrypted) protocol. Commonly used VPN protocols are, for example, IPSec (Internet Protocol Security), L2TP (Layer 2 Tunnelling Protocol) and PPTP (Point to Point Tunnelling Protocol) (Finnish Communications Regulatory Authority 2003).

4.4.2 Reception locker security

As the volume of home delivery rises, the proportion of unattended deliveries is also likely to increase. Traditionally, home delivery has been done by dropping orders to doorsteps or to the neighbour. Nowadays, new secured reception systems are being developed. For example, a special security console can be added to the locker. The console is in direct connection to the administrator's control centre.

User authentication deals with identity verification of users accessing computing resources. Once the user is authenticated, proper access privileges can be granted to the user. The type of authentication used will depend on degree of security required. (Hazari 2002.) While security may not be a major consideration for the home distribution of bulky, lower-value products like groceries, it is a serious concern for companies supplying more expensive, and more portable, non-food items to the home (McKinnon & Tallam 2003).

One way to assure security is to use a proof of delivery (POD). POD is typically a telephone-linked electronic keypad controlling the opening and shutting of the delivery system door. The keypad is constantly changing pin numbers. The keypad communicates with a central server allowing the administrator to alter the pin codes after each delivery. When the deliverer closes the locker door, the keypad device issues another code number, which can be used to confirm that the delivery has been made. At the same time a confirmation message of delivery is sent to the customer's mobile phone or e-mail address. (McKinnon & Tallam 2003.) In case of commercial collection points the staff or computer can check the customer's identification and collect a signature on a supplementary POD. This personal intervention ensures that the products are physically transferred and creates a "paper trail" of PODs that can subsequently be audited.

Another way to identify a customer is using a PIN-code. The separate lockers have electronic locks with a changing opening code to enable shared usage of the lockers using mobile phone (Punakivi 2003, p. 8). One time PIN-code is generated separately for every transaction at locker site. The customer could receive the number of the locker and the code needed to unlock the locker, for example to his mobile phone by text message. Opening the locker requires a keypad, where the PIN is entered. Keypad is located to the locker or near lockers. The control centre issues pin codes to delivery drivers and customers to control the delivery and collection of orders. (McKinnon & Tallam 2003.) Another way for opening locker is to use mobile phone for opening. Customer may have either a PIN-code that she sends to certain number or she may have a phone number were she calls to open the locker.

4.5 Concluding remarks

With regard to architectural design requirements to logistics, constructional requirements in relation to barrier free and aesthetic design should be analysed. The best way to apply new services to buildings is to utilise already existing constructional solutions since there is not space available around and in the buildings. Therefore it would be beneficial to combine an elevator and automatic goods storage and transportation system into one integrated system. Existing elevator could be replaced with a reception system since current elevators do not have the capacity or the necessary control systems needed to handle and deliver products automatically or a new reception system could be added to building that previously lacked an elevator.

The problem in integrated systems is that European and national regulation and directives will have a significant impact on the system design since according to these regulations the shaft is only allowed to contain elevator components. The elevator cabin as a possible reception point is not convenient also because the space is very limited, and the goods are transported up and down the shaft more than once, thus consuming unnecessary energy. The cabin is not good place for stocking items when considering fire safety. Storage immediately connected to the shaft is feasible as long as the goods are fire insulated from the shaft space. The conclusion is that the elevator shaft or cabin is not a good place for stocking items. Therefore basements and attics should be considered as possible places for reception system. Other possibilities for reception are either private reception or picking up item from store, but these do not require any new technology (Table 1).

Table 1. Reception model differences.

Reception model / action	Private home delivery	Picking up	Collection point	Private reception locker or box
Home delivery time window	Fixed delivery hours	Operating hours of the shop	Any time	Any time
Time used per customer	Long	Semi-long	Short	Short
Personal service	Yes	Yes	No	No
Final delivery point	Customer	Shop	Collection point	Reception locker or box
Customer's dependence	Has to be home	Has to go to shop for picking up delivery	Has to go to collection point to pick up delivery	Independent
Investments in technology	No investments needed	No investments needed	Investment needed	Investments needed

Since a diverse mixture of people is going to use the service and reception systems, all UIs should be clear and simple to use. Order can be placed by using phone, fax, Internet, bar code reader, iTV or by specific ordering device. The key factors for choosing ordering method are the user interface and the security. Surveys indicate that both consumer and commercial users are in doubt concerning the security of the basic systems. Security perception is one of the affecting key factors in consumer's online shopping commitment. Security also has an important role in home delivery; as the volume of home delivery rises the proportion of unattended deliveries is also likely to increase. Locker technology is one of the biggest issues in the reception system, but nowadays, new secured reception systems are being developed.

5. Business models

The product and service markets directed at work environments and homes, still largely remain unrealised potential. There is still enormous potential for creating new services and products for customers in these markets. Attempts to expand the market commercially have primarily failed because of problems in the earning logic, rather than, for example, technological challenges. The problem is still that markets have not been able to make the added value of the products or services tangible for customers so that willingness to pay could be created. (Vision 2010, p. 21) The aim of this chapter is to discuss the business logic of home services. Business models link activities, actors and resources together within and between stakeholders in buyer-seller relationships (Leminen 2001). A business generates profit if the value gained is greater than the costs involved in the creations of services (Carú & Cugini 1999). The main objective is to find the potential investors and the business idea. Another objective is to consider the benefits of the services for different stakeholders. The next subchapters will address ways of measuring customer value and service costs. Viable business models will be discussed and different interest groups to fund service will be considered.

5.1 Customer value

Customer value is a customer's perceived preference for and evaluation of those product or service attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations (De Chernatony et al. 2000). One rather simple way to define customer value is to use a transaction cost oriented model. In this model, customer value is the result of benefits customer gets minus costs of purchase.

The consumer is likely to accept the higher price than just the total cost of product or service because he/she perceives transaction costs in monetary forms (the price of the item purchased) and non-monetary forms (time, effort, psychological costs) (Table 1.). Therefore, the consumer perceives as value, not just the price, which is higher in the department store than for example in hypermarket and discount outlet, but also receives value from service, time saving or from psychological benefits such as image or a more pleasant shopping experience. (Windischhofer 2003, p. 30.) Table 2 also shows that the customer's value perception is based on the remaining benefits after the cost of purchase has been subtracted. The benefits for the customer can be for example image of the product, additional product features, ease of accessibility or good service. The cost of purchase for the customer includes for example product preparation, transportation and time used for these tasks. Customer value is created when the customer perceives buying this certain product or service gives a net value after the cost

of purchase from the benefits. (Windischhofer 2003, p. 30.) Costs have nothing to do with value, which is established by the market and by the degree of customer acceptance. The customer is not interested a priori in the cost of the product she purchases, but it's value and price. (Carú & Cugini 1999.)

Table 2. Customer's value perception (Windischhofer 2003, p. 30).

Customer Value = Benefit – Cost of Purchase
Benefits = Attributer desirable to the customer (In customer's eyes)
Cost of Purchase = Total cost of Product or Service to customer
Customer Value = Customer beliefs buying/using the product or service gives a net value (the perceived value is in savings of non-monetary costs such as time and effort)

5.2 Service costs

In the following, grocery business supply chains are discussed in view of recent studies related to online shopping. A statement has been made that delivering groceries directly to people's homes would be cheaper than keeping them on supermarket shelves for do-it-yourself picking and home delivery. New logistic structures in home delivery are offering enhancements and new business opportunities for service providers and logisticians.

For traditional shopping, consumers try to minimise the costs in product/service procurement; transportation to stores, traffic, parking, time and energy spent in a store. The minimum expenditure of resources in traditional shopping can be achieved from one-stop shopping, cross shopping and multi-purpose shopping (i.e. visiting different types of services and stores such as department stores, grocery stores, the bank, and the post office). Resources for home shopping include the set-up costs of getting connected to Web or making a phone call, shipping, and the time and effort needed to locate a specific item either from catalogue or from the Internet. Home shopping has been viewed as economising on resources, because there are no store hours, customer transportation costs, no waiting lines and no pushy salespeople. (Kim 2002.) The cost of home services can be referred to the cost of online grocery business. The costs are mostly comprised of ware housing, picking, delivering, inventory costs and head office costs (Table 3.).

Table 3. Costs of online grocery business with home delivery.

Action
- Picking the order in a warehouse or in a store - Delivering the order to the customer's home (truck & driver) - Systems cost for building and maintaining a web site - Warehousing (building & workers) - Inventory holding costs (web sites & local media) - Head office costs (buyers, management, finance)

5.2.1 Fixed costs

Fixed costs consist of building leases, fixtures and fittings, warehousing, wages and salaries, advertising, etc. Fixed costs remain fairly constant as the sales volume either increases or declines. These costs continue being present, as additional orders are placed and the fixed costs do not come down as number of customers goes up. For instance, wage costs and delivery costs normally rise after time. If these operating costs per customer are high, they leave very little flexibility for errors in business strategy. Therefore management of the fixed costs has become critical factor for success (Lee 2001).

High customer turnover and small average-order size are two of the main factors affecting the profitability of service. E-commerce and virtual value chain have redefined the concepts of economies of scale, which allow small companies to achieve low unit costs for products and services in markets dominated by big companies. Also in e-Commerce, online superstores have the ability to spread fixed costs over a larger customer base and offer a wide selection of goods to frequent visitors. (Lee 2001.)

5.2.2 Variable costs

Internet retailers and service providers have some substantial problems to be solved to reach the break-even operating level compared to traditional "bricks and mortar" retailing and service provision. One of the biggest problems in home shopping and home delivery is the great variable cost. These costs can be even seven times greater compared to traditional retailing according to Ring & Tiggert (2001).

The supply chain from the supplier to household has developed over the years. For example, in the traditional grocery supply chain, goods are delivered to the store and customers perform the picking and final delivery to the home. In online shopping the point of sale has changed from a shop to an Internet portal. The change in the point of

sale and home delivery of the products have only added costs, without any real savings in the whole supply chain. (Yrjölä 2003, p. 6.) Variable costs consist mainly of picking and delivering the order. The emphasis in developing cost efficiency is on increasing picking speed and, in this way, reducing the labour costs of picking. Better picking speed can be achieved by paying attention to where the picking is carried out as well as to the level of automation. (Yrjölä 2003, p. 95.)

The challenge of these operations is solved by three alternative strategies: either by using the current store infrastructure, new dedicated distribution centres or a hybrid model. In the intermediary model (Figure 7.) picking operations are based on the existing store infrastructure and the required investment is significantly smaller compared to using distribution centres (Punakivi 2003, p. 10).
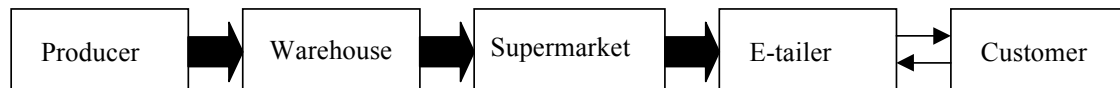
| Producer | → | Warehouse | → | Supermarket | → | E-tailer | ← | Customer |

Figure 7. The e-tailer as an intermediary in the supply chain (Yrjölä 2003, p. 61).

The intermediary model does not change the logistics of the retailing business it is based on. It is the first and still the most common e-grocery business model in existence today (Yrjölä 2003, p. 60). In addition, the customers doing their shopping in the store are slowing down the picking work. Compared to channel model, the intermediary concept has three main strengths. First of all, the risk of over investment is small. Secondly, customer acquisition is easier because of the fact that traditional retailers usually have a well-known brand on the market. And, thirdly, traditional retailers already have a well-established relationship with their suppliers. (Punakivi 2003, p. 10.) According to Yrjölä's (2003) analysis, store-based order picking is less expensive than using a specialised distribution centre when turnover is less than one million euros per year. A turnover of more than 3 million euros means that a dedicated distribution centre appears to be more efficient than store-based picking.

The second strategy, the channel model, is based on Local Distribution Centres (LDC). In this strategy the LDC replaces the supermarket in the supply chain (Figure 8.).

| Producer | → | LDC | → | E-tailer | ← | Customer |

Figure 8. Channel model (Yrjölä 2003, p. 61).

In this model, the service provider purchases items straight from producers or importers to a LDC. LDC can be seen as an assembly plant for shopping baskets, which consist of

grocery items ordered by customers. The main goal in LDC design is to create an efficient flow of products through the centre. (Yrjölä 2003, pp. 94–96.) LDC is typically designed to achieve efficient picking operations whereas traditional stores are normally designed to display products to consumers (Punakivi 2003, p. 10). In distribution centres the picking can be automated, but this requires high investment and, for it to viable, high capacity utilisation and stable demand are also needed.

Yrjölä (2003) is also representing a hybrid model combining distribution centre and store-based picking. This gives an opportunity to create gradual low-risk growth in e-grocery business. In the hybrid model, dividing the floor space into LDC and supermarket areas redesigns supermarkets. This way, order picking and home deliveries can be carried out more effectively than in a conventional supermarket (Punakivi 2003, p. 19).

5.2.3 Transaction costs

Transaction costs are the "costs of running the economic system" and can be regarded as the equivalent to friction in physical systems (Windischhofer 2003, p. 61). Transaction costs can be also defined as the costs of arranging contracts and agreements, trades in general, among interested parties (Heyne et al. 2003, p. 27).

Company's offerings consist of a product, a service and the transactions (Figure 9.). Transactions costs are the searching, negotiating, monitoring and enforcement costs that have to be borne to allow a market exchange between two parties to take place (Lee 2001). According to Lee (2001) these costs depend on four factors: the amount of uncertainty, how opportunistic the trading parties are, the specificity of any assets used in the activity and the frequency of the transactions. About half of the transaction costs are from total costs that are including customer's transaction costs (e.g. sourcing, ordering, delivery etc.) Quarter of transaction cost consists of product costs and another quarter is service costs.
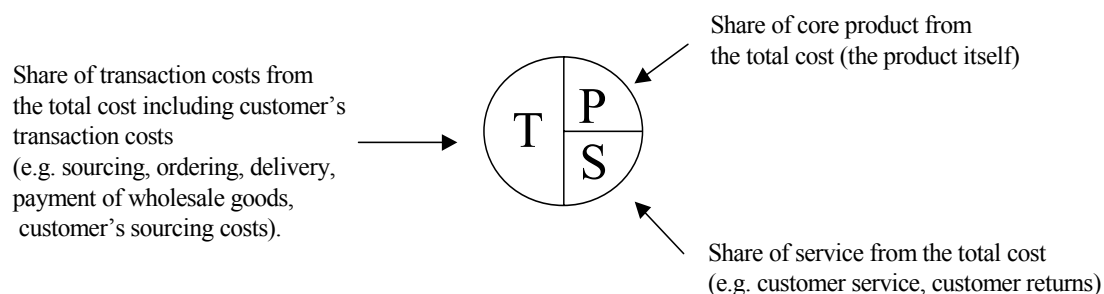

Figure 9. The Value Structure of a Firm's Offering (Karjalainen 1999).

5.2.4 Reception system costs

Investment in unattended reception system could, in the long run, be part of the cost of the home. However, it will take many years before the amount of these kinds of homes equipped with reception systems is substantial. This is why investment in unattended reception has to be seen as a separate investment. (Yrjölä 2003, p. 126.)

According to Yrjölä's studies, a standalone, private, single reception box costs from €500 to €1700 for a non-mass produced product. The price can be presumed to decline with mass production, but it looks likely that the investment in single box will be in the range of €1000. If this cost is spread over an eight-year period, assuming €50 annually for electricity, the annual cost of the equipment is going to be €175. This is 2.8 % of the grocery purchases per annum of a four-person household in Finland with 90 percent loyalty. (Yrjölä 2003, p. 126.)

According to a rather unrefined study, the estimated cost per building for a reception system (Homedoor equipment) could be between €3000 and €3500. This would mean 75–87 € per apartment. The estimation was done by resuming the cost of the last kilometre for the delivery and by taking into account a profit prospect on the basis of a 4-storey, 40 apartment building. The annual maintenance was estimated at 15–17 € per apartment. On the basis of the rent, the acceptable maximum monthly cost by customer would be € 4,5. (Homedoor 1, 2002, p. 10.)

5.2.5 Home delivery costs

One of the main problems in home shopping is its integration to logistics. The fundamental problem is especially in the "last mile", which is the most cost-intensive factor in home delivery. The problem is not in the logistics itself but the implementation of it to business. Home delivery at the moment is purely an add-on business and thus only creates more expenses to the retailer. The cost of home delivery is heavily dependent on the service model used, the market share and the business size. The home delivery of groceries seems closely analogous to waste collection, where high collection density is essential for efficient operation. (Yrjölä 2003, p. 76.) It seems that efficient home delivery can be achieved even with moderate market share. The cost-effectiveness of social and commercial services brought home depends strongly on the customer density and delivery time, which leads directly to the requirement of quick and clear delivery routes inside a residential quarter (Yrjölä 2003, p. 75). Interruptions, pauses and changes cause additional work. It is hard to find a profitable business model for home delivery because of immature unattended reception systems and because people are also prejudiced against the unattended home delivery solution. The reception model is affecting strongly the overall cost structure of supply chain. Yrjölä (2003) has

concluded that unattended reception has an important influence on overall cost structure of the supply chain since it is reducing delivery costs. However, the investments that a reception system requires should also be taken into account. (Yrjölä 2003, p. 1.)

There are many problems to be solved in transporting and delivering goods. For example different groceries require different transportation circumstances. For this reason transportation equipment has to be equipped with several temperatures for securing the cold chain of groceries. In view of the fact that the variation of demand, number of dissimilar small orders and different physical size of orders, it is difficult to reserve correct transportation capacity. (Jaakkola & Kämäräinen 2000, p. 42.) The efficiency of the delivery chain is strongly dependent on the existence of an intermediate storage system for the delivered goods and accessibility to the building. (Homedoor 1 2002, p. 15.) Transportation is an issue specially when the customers are receiving deliveries in person since transportation demand piles up to night hours. This is also causing problems in route planning. For example, if delivery routes are planned by delivery times, the transportation costs will increase remarkably. (Jaakkola & Kämäräinen 2000, p. 42.)

Another problem is that people usually have a certain date when they want to have groceries delivered. This is causing a problem with delivery density. For example, Streamline did one weekly delivery to customer. This could be good way to receive big weekly needed groceries but for little things needed the customer is forced to go local store adding up. But if the deliveries are done every time customer needs something, there is going to be high extra costs. It is inefficient to deliver small orders. Furthermore the distribution cost is more dependent on the time than distance and the time needed for a single delivery is dependent on customer density (Yrjölä 2003, p. 75).

5.2.5.1 Private home delivery

The starting point of home delivery service models was attended delivery in a certain time window. The problem with this service model is that to be efficient, it needs an enormous customer density: the delivery vehicle needs to travel around the distribution area and visit the same places many times a day to meet the promised time windows (Yrjölä 2003, p. 111.) If goods are delivered to customers in person, arranging transportation is problematic since the majority of customers won't be at home until night. Tight delivery windows and personal contact to the customer increase the delivery time and the long delivery times increase the delivery costs. On the other hand, manned receiving makes it possible to serve demanding customers personally (Jaakkola & Kämäräinen 2000, p. 40.) Making the time window larger will cut down service

costs, but the value of the service to most customers disappears. This would mean that the customers should be waiting for delivery for hours at home. (Yrjölä 2003, p. 111.)

5.2.5.2 Picking-up of goods

Some e-grocers offer the customer the opportunity to pick up a ready assembled shopping basket himself from the store (Yrjölä 2003, p. 112). An EGS business can be easily started this way, as the required investments will be small. There is no need for reception system in the customer end since no home delivery is done. This way all the costs of the home delivery go directly to the customer and the value of the service is limited to the shopping time saved (Yrjölä 2003, p. 112).

5.2.5.3 Collection points

The collection point is the most cost-effective operating model from the delivery point of view because several home deliveries distributed to several customers can be arranged in one stop. This shortens the time used per delivery, which will reduce delivery costs. (Jaakkola & Kämäräinen 2000, p. 40.) Because of the shared usage, the utilisation level of the facility is higher than in the case of customer-specific unattended reception. (Punakivi 2003, p. 95.) Punakivi's (2003) studies show that the most cost-efficient e-grocery home delivery model is based on unattended reception, which enables the optimal routing and scheduling of delivery vehicles. According to Punakivi (2003), home delivery transportation costs for logistician using the collection point concept are 55–66 % lower than those of the current standard home delivery model with attended reception and 2-hour delivery time windows. This cost reduction alone justifies the two to five year payback period of the investment required, even if there is only a fairly small number of deliveries per day (Punakivi 2003, p. 1).

The collection point concept is the most cost-effective solution for home delivery considering home delivery costs. However, the service level perceived by the customer only improves significantly if the collection point is located near the household. Furthermore, before delivery savings are achieved someone has to invest in reception system. Currently there are no e-grocers or other service providers using this concept, but its future potential is tremendous. (Kämäräinen et al. 2003.)

5.2.5.4 Private reception boxes or lockers

The private reception box has an effect on the efficiency of distribution: time used per delivery is longer than in a shared receiving box but it is considerably shorter than in private home delivery (Jaakkola & Kämäräinen 2000, p. 40). Using customer specific reception boxes or lockers in home delivery operations leads to a cost reduction of 44–53 %. Because of the high investments involved in customer specific reception boxes or lockers, the payback period, based on the cost savings, is 6–13 years. (Punakivi 2003, p. 1.)

5.3 Funding

In all of the reception systems someone has to invest in services and in the reception. Currently there are different kinds of reception boxes on the market and investments required in reception facilities are high and the costs vary significantly, depending on the type of the system (i.e. location, size, different temperature zones, electronics, etc.). Several parties can make investments in the possibility of unattended delivery. If a reception system is used, the owner of the locker or box can be the service provider who buys the locker system and rents locker or boxes to customers. This is how, for example, Streamline in the USA operates. The customer could also buy her own box or there could be third party financing the boxes. (Kämäräinen et al. 2003.) Most customers in Finland are anticipated to be private. Some customers are willing to invest in the unattended delivery infrastructure themselves, especially when building a new house, where an in-built reception system with two-way doors can efficiently be used as an additional fridge and freezer in the household. However, it will take many years until these customers are in the majority. (Yrjölä 2003, p. 165.) The most likely investor for the reception facility is a third party operator who could offer receiving facilities for both B2C and B2B customers, keeping the service open for many retailers and transportation service providers. (Punakivi 2003, p. 23.) The investor is interested in returns created by the service and the customer is interested in the added value.

5.3.1 Public funding

In Finland, the public stakeholder funding services can be the state, municipality or federation of municipalities (Nummelin 2003, p. 15). Public funding is an apparent source for investment for home services and an intelligent delivery and reception system in multi-storey residential buildings. Especially from the societal point of view, it is worthwhile to support independent living of elderly with home services, as the costs of independent living are much lower than the costs of living in different kind of institutions. (Siekkinen 2002, p. 16.)

Home services and home delivery can create large indirect savings to the public sector, which will increasingly be called upon to provide social services to the elderly or disabled (Palmer et al. 2000, p. 15). One example is that when analysing the working time of a municipal home nurse, approximately half of the working time was spent on grocery shopping. If the groceries were home delivered it would not necessarily save money, but the saved time would be used to the actual home care and social contact with the disabled or elderly. (Yrjölä 2003, p. 162, Kiviniitty 2003.)

Another example is that in Finland, it is considered beneficial to give aid to elevator installations in existing apartment buildings with no elevator if this makes it possible for a few aged inhabitants to live at home a little longer. (Siekkinen 2002, p. 16.) Integrating a reception system to the elevator would support independent living even more. This would create savings for municipalities since, if a person is in institutional care municipalities are responsible for all the costs, for example food, housing and medication. The Finnish Social Insurance Institution does not refund the costs that stem from medication or nursing, if the customer is in institutional care. In treatment of outpatients the municipality is not responsible for all the costs and the "customer" pays her nursing, food and housing to different service providers herself. (Nissinen & Santasalo 2002, p. 25).

In Finland, old people's services are funded mainly from tax revenues. Small parts of services are funded directly by customer, patient fees or allowances. Government participates in funding by paying government shares to municipalities. (Nissinen & Santasalo 2002, p. 25.) In interview there was an idea that there should be a regional service framework supporting business logic for tailored services. This requires interest and investments from public sector. (Kautto 2003.) The role of government and communities in developing home services with delivery in the future remains to be seen. But obviously, public sector would benefit if it developed different home services and from utilising reception systems in home delivery.

5.3.2 Private funding

In residential multi-storey buildings, owners (residents) of the apartments usually pay for the renovations directly and tenants indirectly (through increased rents). In future, we might think that embedded services are one component of the total value of the residential building. This means more valuable buildings, higher rents and higher resale values. In the rental sector this could potentially increase long-term leases, which in turn would mean lower costs as the cost for seeking new dwellers decrease. (Siekkinen 2002, p. 18.)

5.3.2.1 Customer as investor

The customer can be owner, landlord or tenant of the apartment or other user of home services. Basically the customer is willing to pay for the service he orders. Another issue is, whether the customer willing to invest in reception system? Home delivery services can be seen as one way to improve or upgrade overall the quality of a residential area, especially for those who are dependent on the assistance from other people (Homedoor 2 2002, p. 62). From the customer's point of view, the reception box is the easiest way of receiving goods, since this relieves the customers from visiting stores and from being at home when the goods arrive (Kämäräinen et al. 2003). The building owner's main interest is to improve the quality of his property, so the dwelling can have a good social acceptance (Homedoor 2 2002, p. 38). It can also be considered that the reception equipment will give a new image for the building. (Homedoor 1 2002, p. 10.) This new image will make the building more attractive for tenants and the owner can get greater rent return if the building is equipped with special services. This way the delivery system may also be considered as a new source of income since the value of the building rises. On the other hand, the owner or landlord may not be interested in investing in equipment because the predictable cost of equipment is high (Homedoor 1 2002, p. 9).

One of the biggest problems for the elderly and disabled is the lack of elevators. Installing an elevator in a building would especially ease the moving of elderly and disabled, but also other inhabitants. If an integrated reception system is applied to elevator it could provide one extra service more to inhabitants. An integrated service system could be one way to make it possible for ageing population to live independently at their homes longer. Home services with home delivery can be one way to improve the serviceability of a residential area as retailer consolidations are reducing the number of physical stores. This will heighten opportunity for home shopping, especially for those who are dependent on the assistance from other people (Homedoor 2 2002, p. 62). But on the other hand extra service may not be a tenant's actual demand at the moment. The delivery-reception system makes an extra cost for tenants. In the long run, the attitudes could change?

For installing a reception system to a building it is also necessary to have the agreement of the majority of the inhabitants. This can be a problem if majority of inhabitants is not willing to invest on system. One problem is also the division of costs among shareholders, since for example ground floor shareholder are not getting as much benefit from elevator as the top floor inhabitants. According to Finnish Housing Company Act (809/1991) the cost division can be based on apartment area, number of shares or to other basis that is approved in shareholder's meeting. Reception system itself requires investments but investing in ordering devices are also creating costs.

Elderly people may not be willing to invest in computers because the price might be too high for them. For those who have own Internet facilities at home, capital costs, running costs and maintenance become important issues. (Tatnall & Lepa 2003.) The customer is willing to invest in reception system and services only if the cost is reasonable and the returned service is evident. Furthermore, by using a reception system, it is possible to provide a fixed delivery frequency for the customers and even apply vendor-managed inventory principles to the households (Homedoor 1 2002, p. 10.)

5.3.2.2 Service provider as investor

Home shopping gives many advantages to the retailer compared to traditional grocery shopping. For example, if online shopping is used, the retailer is not positional. Retailers might be interested in investing in online shopping because the cost of a server-computer is nothing compared to the cost of a supermarket, but the problem is the home delivery (Homedoor 1 2002, p. 10). The service provider is a potential investor in the reception system since it can be a way to extend business. Additionally, it is seen that by offering online services, the service provider can enlarge the geographic service area covered, while taking the transportation restriction in account. By offering better customer service, the service provider can also gain higher market share through extra sales from both new customers due to higher reach and by winning competitors' customers. (Punakivi 2003, p. 43.) Functional housing stock could help service providers to improve their business and service processes and thus increase efficiency and productivity.

Another potential financier of reception systems is somebody making business out of it. For instance, by sharing the cost between several e-grocers and e-tailers of general and speciality merchandise there might be the possibility of creating a similar system as banks have done with their cash dispensers. (Yrjölä 2003, p. 165.) From the service provider's or logistician's s perspective, the reception concepts seems interesting, making possible the faster acquisition of new customers and higher growth rate (Punakivi 2003, p. 84).

If a service provider or third party invests in equipment, he has to make an agreement with the owner of the building and agreements with customers (Homedoor 1 2002, p. 10). One problem in this is sharing expenses of maintenance. This becomes obvious if the reception system is installed in the elevator. How will be the expense sharing done when the equipment belongs to service provider and the elevator belongs to building owner (Homedoor 1 2002, p. 10). Service providing actors are not necessarily interested in funding the changes needed in the housing stock. But from the construction sector point of view there are economic grounds to deepen the co-operation between the

construction sector and e.g. the home service providers so that the housing stock will be better suited for the elderly inhabitants. (Siekkinen 2002, p. 18.)

5.3.2.3 Construction companies as investors

Construction companies are normally working in the real estate business as producers. Their main object is to produce new buildings but they are also operating as real estate developers. (Olkkonen et al. 1997, p. 33.) By combining the roles of development, construction and life cycle management services, construction companies can create new business concepts.

The requirements for living are changing and future residents are demanding higher quality and new technologies to their apartments. Construction companies are potential investors in service, because the reception system will provide new services for future inhabitants in new constructions or in renovated buildings. Reception system is also likely to affect on buildings image positively. This may affect on flat demand and the buyers might be willing to pay more for the flat. (Homedoor 1 2002, p. 9.) Some builders of multifamily buildings explore the potential of flexibility and customisation in their designs as a differential in relation to their competitors.

If the cost of the reception equipment remained reasonable, the investment could be envisaged at the time of the construction of buildings (Homedoor 2 2002, p. 111). The problem is only that for example few new buildings are built in Europe. There is also a question about who will manage the equipment (Homedoor 1 2002, p. 9).

5.3.2.4 Real estate company as investor

Real estate companies are companies that are practising real estate business: ownership, utilisation and customer service related actions with business aims. (Rakli 2003). Real estate companies owning large dwelling stocks are potential investors. They want to have maximum profits from the rent returns. Dwellings with Design for All and new technologies are good investments since they have big markets for large population centres and in migration increase areas. Real estate companies can also profit from redeveloping old dwelling stock. This way a real estate company may gain more profits from rents.

New services can be seen as a new way to improve rent incomes. If the old real estate stock is renovated and new services are applied it can be seen that real estate stock with advanced services and amenities is creating higher rental levels.

5.3.2.5 Housing company as investor

A housing company is defined in the Finnish Housing Company Act in section 1 as follows: A limited-liability company is considered to be a housing company if:

1. its purpose is the ownership and possession of one or more buildings in which over half of the total floor space of the apartments is specified in the articles of association as residential apartments in the possession of shareholders; and

2. each share in it confers the right to the possession of an apartment or other part of a company building or real estate in its possession specified in the articles of association, either alone or together with other shares.

Housing companies are solely founded solely for owning property. The legal owner of the real estate is the limited company and the shareholders of this company. Housing companies are responsible for managing and up keeping of joint facilities. This is why they can be considered as potential investors. Reception facilities have been introduced in-built in to new homes, but what kind of applications can be built to multi-family houses? For example it could be a system with an intelligent lift combined with refrigerated boxes? (Homedoor 1 2002, p. 9.)

5.3.2.6 Haulier or logistician as investor

A new logistics structures offer enhancements and new business opportunities for both grocery and logistics companies. Important logisticians (like Post, UPS, and FedEx) have expressed their will to develop their e-business at European scale. For example, in Finland the Post, the national postal service provider, is the leading channel for mail order business, e-business and companies' postal service. The post has a large market share in Finland covering around two thirds of the parcel markets. (Punakivi 2003, p.49.) Hauliers and logisticians could be interested in investing in reception system, because of the saving in the cost of the last kilometre (Homedoor 1 2002, p. 10). On the other hand, hauliers and logisticians may not be interested in investing because of the cost of the equipment and managing of the equipment.

5.3.2.7 Real estate investors

Real estate investors are people or companies who have invested capital to real estates. The biggest real estate investors in Finland are pension companies, insurance companies, funds, foundations, associations, building companies and private persons.

Investors can make profitable investments and take part in developing housing. For example non-subsidised rental apartments for elderly represent secure investment for years as they have markets both in big population centres and in smaller localities (Sonkin et al. 1999, p. 176). Investor can make both profitable investments and take part in improving living conditions.

Real estates can be seen as one investment model among others. Real estates are good investing targets, since they provide regular income and predictable costs. Another aspect is that actual value of real estate is preserved. Other aspect in real estate investing is that real estate is a long-term investment and commodity. From the investor's point of view real estates are good investment targets due to the increase in value by extensions, fundamental improvements or by changing the purpose of use. Installing a reception system can be seen as an investment in real estate productivity since if new services are applied higher rents can be applied. This way investment in reception system can be seen as a tool to turn greater profits.

5.3.2.8 Employer as investor

Another option relates to the collective reception locker system in office buildings or residential areas. The employer can have two reasons to invest in reception facilities; firstly, part of the time saved by the employee can manifest itself as an additional amount or better quality of work. Secondly, companies often various groceries themselves and this provides a solution to the problem of how to shop for them. Sending somebody to a supermarket in Finland to do the shopping can easily cost much more than the groceries themselves. (Yrjölä 2003, p. 126.) In interviews, it was stated that employers could save money and time if personnel could make shopping more efficiently through collection point delivery (Elo 2003).

5.3.3 Public-private partnership

Public-private partnership (PPP) is a co-operative venture between the public and private sectors, built on the expertise of each partner that best meets clearly defined public needs through the appropriate allocations of resources, risks and rewards (Nummelin 2003, p. 8). In Finland, the public partner in public-private partnership can be the state, municipality or federation of municipalities (Nummelin 2003, p. 15). According to studies made, it is suggested that in the future, the municipalities are funding and co-ordinating social and welfare services but e.g. elderly people services can be bought from private service providers (Nissinen & Santasalo 2001, p. 8). One way to implement this is to use service coupons. In this case municipality gives a certain

number of services coupons to the customer. These service coupons are valid for a service provided by private service provider. This way, a customer gets the freedom of choice to choose to use private services instead of public services, but the wherewithal is still provided by public funds.

In future, this public-private partnership could take the form of a retirement insurance company or similar owning a sheltered home building and letting the building to a service provider, which is offering apartments and providing services for the elderly (Sonkin et al. 1999, p. 153). One of the advantages in public-private partnership is that it is offering more versatile and flexible service entities than public services. At the same time, expenses are better divided between public sector and customers. (Sonkin et al. 1999, p. 153.) In interviews it was expressed that, municipalities and companies need to co-operate in order to get synergy savings without lowering service level (Kiviniitty 2003). There should be a regional service framework supporting business logic for tailored services. This requires interest and investments from public sector (Kautto 2003).

5.4 Concluding remarks

Business logic links activities, actors and resources together, within and between stakeholders in buyer-seller relationships. In home services, it means linking customers, service providers, administration, maintenance and investor together.

Costs have nothing to do with value, which is established by the market and by the degree of customer acceptance. The customer is not interested a priori in the cost of the product she purchases, but it's value and price. Therefore, the consumer perceives as value, not just the price, but customer also receives the service (e.g. time saving or from psychological benefits such as image or a more pleasant shopping experience). Home shopping has been viewed as economising on resources from the customer's point of view, because there are no store hours, customer transportation costs, no waiting lines and no pushy salespeople.

Home services with delivery require new operating models in the supply chain since it is not efficient at the moment. The cost of home delivery is heavily dependent on the service model used, the market share and the business size. The major costs and problems in supply chain are in picking and delivery. Another major factor strongly affecting the overall cost structure of supply chain is reception model used since the distribution costs are depending more on the time than distance and the time needed for a single delivery is dependent on customer density.

Public funding is an apparent source for investment in home services and an intelligent delivery and reception system in multi-storey residential buildings. Especially from the societal point of view it is worthwhile to support independent living of elderly with home services, as the costs of independent living are much lower than the costs of living in different kind of institutions. There should be a regional service framework supporting business logic for tailored services. This requires interest and investments from public sector.

6. Example services

6.1 Home services

Home services are services provided to people's homes. They can be e.g. social services, cleaning or meal services. In Finland, these services are totally or partly provided by municipalities.

6.1.1 Social services of City of Helsinki for elderly

The City of Helsinki is providing home services, support services for home services and home care services. Home services are provided in the following sectors:

- meal service
- cleaning
- transportation
- home care service
- laundry service
- bathing service
- security service.

Services are meant to people with restricted viability. In each case services are applied from home service counsellor of residential area social service office and a social worker detects customers' service needs. Service need is estimated by information (e.g. information concerning health, viability and social networks) given by the customer. Home service counsellor makes a decision about providing applied service to customer. The Social Civil Department of City of Helsinki, private service providers, or public-private partnership of these service providers provides social services (Social Service Department of City of Helsinki 2003).

Public service's fees in Finland are regulated by the Social and Health Care Patient Fee act (734/1992). According to this act collected moderate fee of continuously and regularly given home services depends on the quality and quantity of service given, financial standing and the household size of customer.

6.1.2 Helsinki Catering

Helsinki catering is proving home meal service and shopping basket service. Home meal service started 2001 and it is now serving nearly 700 customers daily. Home meal service makes balanced and healthy diets for customers. Nutrition therapists plan the menus. The main objective of the service is to provide a meal service, which is supporting the home care and well-being of home service customers. The meals are cooked in food centres, are hospital-affiliated and the meals are delivered home to the customer. There are two warm and two cold lunch alternatives offered every day. Every meal includes main course, supplementary salad and a dessert. Special diets, holidays and special days are taken in consideration. Meals are delivered to the customer hot or cold depending on the order. Delivery is made between 10 and 14 o'clock. (Helsinki Catering 2003.) The order form should be faxed to the home meal service two working days before the desired delivery date. The delivery fee of grocery shopping delivery is 1 € if delivery is made with meal delivery and without meal delivery 3,4 €. Handling and pick-up fee is 1€ (Turunen 2003).

For home meal service users, it is also possible to order groceries and get a home delivery at the same time with the meal delivery. Customer can choose the day when the delivery is done but grocery home deliveries are done on working days. Order can be a single shot or regular. Beside meal and shopping service Helsinki Catering also provides services such as: observing eating, taking medication, guidance, meal warming, cold storage and checking the situation of customer (Helsinki Catering 2003).

6.2 Home shopping and delivery services

These services are grocery shopping services including different home delivery alternatives. The order is usually made either by phone or through the Internet and ordered items are either delivered to home or picked up from collection point.

6.2.1 Ruokavarasto

Ruokavarasto started offering online grocery shopping in 1998. Ruokavarasto's operation is based on actual stores and home deliveries. Ruokavarasto is operating by the supermarket as additional services at additional costs. The order of groceries is done in the website, the order is picked in the shop by the shop staff and then the order is delivered to customers' home. The EGS service is available only in Finland, in Helsinki, Hämeenlinna, Lahti, Pori, Rauma, Salo, Tampere and Turku.

Customer pays a service charge for picking and delivery. The charge is 9 € in Helsinki and 7 € in other places (Ruokavarasto 2003). The prices of the groceries are exactly the same as in the shop.

Ruokavarasto is also offering a Shop2Box service. In this service the groceries are delivered to collection point. This service is available in the metropolitan area of Helsinki. Customer makes an order through website. After the groceries are paid, customer gets SMS-message or e-mail, which includes order confirmation and the number of the reception locker. Collection points with reception lockers are located near customer's home or office. This is an unattended delivery model and the customer can pick up her delivery whenever it is suitable for her, but picking up has to be done before 24 p.m. (Ruokavarasto 2003, Shop2Box 2003.) Shop2Box works on credits bought by customer. Customer can reserve access rights to Shop2Box by credits. The credits are needed for reserving reception locker and order making. 300 credits cost 36 euros. This gives a customer access right for a month and Shop2box service can be used as often as needed in a month. Credits are bought from Internet portal by using web bank services. Making an order requires having a valid reception locker reservation. Reception locker can be reserved from a web calendar. The reception locker reservation and order can be made seven days before delivery. When the delivery is done, customer gets an SMS-message or e-mail, which contains PIN code for opening locker. (Shop2Box 2003.) The reception locker opens by calling a number, which is given in SMS-message or in e-mail. The reception locker is an intelligent refrigerator freezer combination, which also has room for dry matters (Shop2Box.).

Deliveries are made three times a day on weekdays and two times on Saturday. Time window in deliveries is three hours. The order has to be made two hours before start of the delivery. For example if customer makes an order at 8 a.m., she will have her groceries delivered between 11 a.m. and 14 p.m. (Ruokavarasto 2003).

There is a help-desk number and e-mail for problem situations. The down side of these functions is that they are offering help-desk services from 8 a.m. to 16 p.m. At other times customers can be in contact with Ruokavarasto Shops.

6.2.2 Webvan

Webvan was one of the first EGS-operators in the US. Webvan offered a large product line, involving existing grocers, sophisticated distribution centres and extensive company-owned delivery infrastructure (Palmer et al. 2000, p. 36). Webvan went out of business in summer 2001 (Kane 2003). One of the major problems in Webvan was that it totally depended on online sales. Webvan's strategy was having central warehouses,

where from deliveries were made. The idea in this was that warehouse may be cheaper than existing stores in the long run, but warehouse requires a great amount of initial capital and a well-developed infrastructure to get the groceries from the warehouse to the shopper. Webvan had high hopes since it had invested heavily in high-tech infrastructure. It was believed that this investment would translate into higher productivity and this would allow the company to beat out other online grocers and traditional supermarkets. Webvan workers would stand at automated carousels equipped with nearly 9 000 products. Higher worker productivity and the assumption that time-starved shoppers would respond overwhelmingly to the convenience of being able to order products from Internet portal 24 hours a day, were key elements of Webvan's strategy.

Webvan started its home delivery service with half-hour time windows, the smallest in the market (Yrjölä 2003, p. 112). However, later Webvan was forced to change the time window to one hour since the half-hour time window was too expensive. The delivery was accomplished by having a fleet of customised delivery vans to handle distribution. Webvan's executives believed that this would be so efficient, that customers would be able to shop at Webvan at the same or lower prices as they did at traditional grocery stores. The delivery was free for orders of $50 or more.

Two factors underlied Webvan's aggressive drive for growth. The first was the threat of emerging competition. Webvan executives believed the threat of competition made the company's drive for market dominance necessary. The second factor, easy availability of capital, made the drive possible.

Webvan got into rapid growth and began rolling out massive warehouses and smaller distribution centres. Over the following year, it came clear that Webvan was unable to get away from one simple fact; The Company was spending more money on acquiring products than it could make by selling them. Some analysts reckon that Webvan lost more than $130 per order, including depreciation, marketing and overhead. On July 9 2001 Webvan closed its operations and declared bankruptcy (Palmer et al. 2000, p. 28.).

6.2.3 Tower24

Tower24 is an unattended reception system. It is open seven days a week 24 hours a day. Tower24 is in use in Dortmund, Germany. It is basically an unattended warehouse tower.

Customer first registers on the service though the Internet. After giving an individual password, customer will receive personal customer number by e-mail for collection of

her parcel. In registration the computer allocates the nearest Tower24 collection point to customer by the given address. To make an order customer enters Tower 24 Internet site with customer number and customer's name and makes an order. Customer will be automatically notified by e-mail and SMS or voice-mail when her delivery arrives at Tower24. If customer does not collect parcel immediately, she will be automatically informed after 48 hours that her parcel is still waiting for collection. Before the parcel storage deadline has expired (7 calendar days), customer will be reminded again about parcel delivery. If customer is expecting several deliveries, she can check on the Internet which parcel has arrived. Customer goes to nearest Tower24 collection point and enters the personal customer number and individual password. After that, delivery comes from the Tower24 storage. Customer picks up the delivery and gets a receipt of the receiving order. If customer has received goods and she is not satisfied and would like to exchange by return. The customer takes goods back to Tower24 and enters file number listed on receipt.

7. Summary and conclusions

7.1 Summary

Stakeholders and services

The real estate and building cluster is partly evolving into a service business where physical facilities are considered as a part of the service system. Although most new home technologies have mainly been directed to new construction, citizens however, live in dwellings where the basic structures and solutions have been made tens of years ago. New technological solutions are needed for providing home services. One of the major reasons for this is that population in western countries is ageing quickly and therefore the demand for social services (e.g. meal service, cleaning, home shopping and delivery) increases. One way to provide new and better services to residential buildings could be to install integrated elevator/reception system to buildings. Installing an integrated system can be seen as improving the quality of living and services of inhabitants.

Stakeholders of the service chain can be divided into five actors; customers, traders or service providers, hauliers/logisticians, administration and maintenance. Three most potential customer groups are families with kids, wealthy adults and elderly & disabled. Home service system and home delivery would assist and improve their living. Wealthy adults and families with working adults have the required skills for using ICT and they possess assets for buying services to get more leisure time. The number of children also has an effect on shopping habits. From these groups' point of view home shopping or services using a reception system are attractive service models since most apartments are unoccupied during the working hours at daytime. Elderly and disabled people are another important customer category since they need assistance in living. Providing services to their homes is an important issue since the number of people in support need is going to increase as post-war generation ages and there is not institutional care available sufficiently.

Traders and service providers are responsible for creating the services. Service providers can be public or private entities. Synergy benefits are attained in service provision if public private partnership is utilised. Logistician or haulier is responsible for delivering ordered services or goods in time to the right place. Traders, service providers and hauliers/ logisticians are interested in new business opportunities related to reception systems.

A reception system has to be administered and maintained by an actor since administering the information system of the service is one of the most important tasks of

a functional system. Administrator is responsible for taking care of information technology and functionality related to system. It would be beneficial to centralise administration and maintenance to one service centre offering also help-desk services. Real estate corporations and maintenance companies are potential administrators and maintainers of home service systems since they have access to buildings and technical know-how.

Technology and logistics

With regard to architectural design requirements to logistics, constructional requirements in relation to barrier free and aesthetic design should be analysed. Normally, there is little space around buildings, especially in city centres, therefore the best way to apply new services to buildings is to utilise already existing constructional solutions. Example, of a home service utilising already existing solutions is an integrated reception system replacing an old elevator or basements modification to a collection point or converting building's basement or attic to collection point.

The largest problem in the home service supply chain is home delivery, since it is the most cost-intensive part in the supply chain. Possible scenarios for delivery concepts (picking up by customer from a collection point, private reception lockers, attended reception and integrated system) are compared in Table 4.

Table 4. Reception model comparison.

Reception model / action	Private home delivery	Picking up	Collection point	Private reception locker or box
Home delivery time window	Fixed delivery hours	Operating hours of the shop	Any time	Any time
Time used per customer	Long	Semi-long	Short	Short
Personal service	Yes	Yes	No	No
Final delivery point	Customer	Shop	Collection point	Reception locker or box
Customer's dependence	Has to be at home	Has to go to shop for picking up delivery	Has to go to collection point to pick up delivery	Independent
Investments in technology	No investments needed	No investments needed	Investment needed	Investments needed

Orders can be placed by using phone, fax, Internet, bar code reader, iTV or by specific ordering device. The key factors for choosing ordering method are the user interface and

the security. Security perception is one of the key factors in consumer's online service commitment. Surveys have indicated that both consumer and commercial users are in doubt concerning the security of the basic systems. Security also has an important role in home delivery, as with increasing home delivery volumes, the proportion of unattended deliveries is also likely to increase. This has led to the development of new secured reception systems.

Business model

A business model links activities, actors and resources together, within and between stakeholders in buyer-seller relationships. According to the literature study and interviews, home services and delivery can be supported by many different elements of interest from: building owner, developer/builder, inhabitant, haulier/logistician, service provider, employer and municipality (Table 5.).

- Building owner is likely to invest in a reception system as s/he may gain more profits from rents, and s/he may expect to get more value for her investment as new services improve the quality of the residential area. Building owner expects new service to influence on building's image positively.

- Developer/builder is interested in applying and installing reception systems to buildings since it can be considered to have an influence on buildings image, apartment prices and demand.

- Inhabitant is willing to invest in new services because it can be one way to achieve autonomy in living. Inhabitant sees new services as better services and way to ease living. Another reason is that inhabitant may this way achieve time and cost saving. Timesaving is achieved, as there is no need to actually go to a physical store, no customer transportation cost and shopping can be done at any time.

- Hauliers/logisticians, inhabitants, service providers and employers are also interested in investing in reception systems due to timesaving. Hauliers and logistician are interested in timesaving in delivering orders. Timesaving in delivery can be achieved most efficiently by using unattended reception systems.

- Service providers achieve timesaving in different ways. One way is that home services and home delivery create large indirect saving to the public sector which will increasingly be called upon to provide social services to the elderly or disabled. Home services with delivery can also be a new business opportunity for retailers.

Employers may be interested in providing reception system services at workplaces as the time saved by the employee can manifest itself as an additional amount or better

quality of work. Secondly, companies need all kinds of groceries themselves and this provides a solution to the problem how to shop for them.

Table 5. Stakeholders' interests.

Stakeholders	Building Owner	Developer/ Builder	Inhabitant	Haulier/ Logistian	Service Provider	Employer
New service •Chapter 2: Home services •Chapter 3: Stakeholders	△	△ ◆	△ ◆◆◆	△ ◆◆	△ ◆	
Time saving •Chapter 3: Stakeholders •Chapter 5: Business Logic			△	△	△	△ ◆
Cost savings •Chapter 3: stakeholders •Chapter 4: Technology and logistics •Chapter 5: Business Logic			△	△ ◆◆	△ ◆◆	△ ◆
Affect on building image •Chapter 4: Technology and logistics •Chapter 5: Business Logic	△ ◆	△ ◆◆	△ ◆			

△ = Findings in literature   ◆ = References to interwiews

The cost of service is not identical with the value of service, which is established by the market and by the degree of customer acceptance. The customer is not interested a priori in the cost of the product she purchases, but it's the value to her and price she pays for service, that matters. Therefore, the consumer perceives as value, not just the price, but also the service (e.g. time saving or from psychological benefits such as image or a more pleasant shopping experience). The added value customer gets from home shopping includes for example shopping at any time, no customer transportation costs and no waiting lines. If the home shopping is looked from this point of view it can been as economising on resources.

Home services with delivery require new operating models in the supply chain. The cost of home delivery is heavily dependent on service model used, market share and business size. Most of the service costs are caused by picking and distribution activities. Important factor in delivery cost structure is the reception model used. By using unattended reception huge savings can be achieved as more deliveries can be done at the same time. Delivery costs depend more on time than distance. And the time used for a single delivery is dependent on customer density.

Public funding is an apparent source for investment for home services and an intelligent delivery and reception system in multi-storey residential buildings. Especially from the societal point of view it is worthwhile to support independent living of elderly with home services, as the costs of independent living are much lower than the costs of living in an institution. There should be a regional service framework supporting tailored services. This requires interest and investment from the public sector.

7.2 Conclusions

Obviously, home services are needed and the demand for services is increasing since the population in Western Europe is ageing. Nonetheless, old people are not the only group to benefit from home services. Other consumer groups are going to benefit from new services also.

Services have to be received either in person or unattended. As an example, social services have to be received in person but item deliveries can be done using reception systems. Unattended reception box is the most comfortable way to receive items for the customer. Unattended is also the most cost-effective reception model to logistician since many deliveries can be done at same time.

According to the literature study and interviews, home services and delivery can be supported by many different elements of interest for building owner, developer/builder, inhabitant, haulier/logistician, service provider, employer and municipality. A closer look at stakeholder interests, the main interest for services found in literature and in interviews reveals three interesting focus points; new service, cost savings and influence on building image (Table 6.).

- One of the main reasons for investing in services is need for new and better services. New services are especially in inhabitant's and haulier's / logistician's interest. In addition, new services are offering to all investor groups either new business opportunities, added value or cost savings.

- The second focus point is cost savings. This is especially an issue for hauliers/logisticians and service providers. Hauliers/ logisticians and service providers are looking for cost savings by new supply chains. They are expecting home shopping and delivery to intensify and accelerate business processes.

- The third focus point is the influence on building image. Image is important to building developer/builder, because accessibility, new services and technologies of building are making building more attractive. Attractiveness increases demand and adds value.

Table 6. Focus points of potential investor interests.

Stakeholders	Building Owner	Developer/ Builder	Inhabitant	Haulier/ Logistian	Service Provider	Employer
New service •Chapter 2: Home services •Chapter 3: Stakeholders	△	△ ◆	△ ◆◆◆	△ ◆◆	△ ◆	
Time saving •Chapter 3: Stakeholders •Chapter 5: Business Logic			△	△	△	△ ◆
Cost savings •Chapter 3: Stakeholders •Chapter 4: Technology and logistics •Chapter 5: Business Logic			△	△ ◆◆	△ ◆◆	△ ◆
Affect on building image •Chapter 4: Technology and logistics •Chapter 5: Business Logic	△ ◆	△ ◆◆	△ ◆			

△ =**Findings in literature**   ◆ =**References to interwiews**   ⬭ = **Focus points**

There is a fundamental challenge in new-product development, which involves taking a vague concept for a new service or product that a particular market or customer segment will find valuable and turning it into an actual ongoing business proposition. Multiple individuals, functions, and increasingly even separate companies contribute to the concept's realisation.

Based on literature and interviews the most important opportunities, strengths, threats and weaknesses are integrated to Table 7.

Table 7. SWOT-analysis of home delivery services.

Home delivery services	
Opportunities and strengths	**Threats and weaknesses**
- service for all - new and/or better services for inhabitants - independent living of elderly and disabled generate cost savings for society - autonomy for families with children - new business opportunities - more leisure time for service users - reduction of traffic emissions	- not enough customers to create turnover - density of drop-offs is too small - inefficient cost structure - technical problems - high investments

The future research and development should concentrate on focus points found in this thesis: (1) services for inhabitants, (2) cost savings for haulier/ logistician and service provider, and (3) new services affecting building image for builder / developer (Table 6.).

Finally, the future service concepts and business actions will show how the listed opportunities, strengths, threats and weaknesses come true.

Acknowledgements

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Appendix 1: Interview framework

Customer needs

Expected aspects:

Target group of e-commerce from the perspective of the retailers

Questions (example):

Select the questions You like to use (or all of them .

Then ,use the ID number of the question connected to the answer – set (for instance 1,2, 3, 7, 15)

NOTE: the number 16 = "others" is meant for questions which do not fit to ready titles.

1	Who are/will be the users?
2	Characteristics of the user (age, persons living in the dwelling)
3	Who will be the "driver client" / target client? Who will benefit most? *(Table 1)*
4	The habits of the users when going to shopping.
5	Why users order deliveries at home?
6	Main products or categories that they buy
7	What are the expectations and the requirements of the tenants / architects / Social Registered Landlords concerning the new services such as those connected to the e-commerce (retailers experience)?
8	Which kind of marketing would be acceptable by the user?
9	Ex. Proactive marketing (sending messages with special offers)
10	What home services are used for residents in multi-storey buildings?
11	Who is funding and what?
12	Who pays and how much for the additional service? (forwarding expenses)
13	Acceptance of additional costs by the customer
14	Division of costs among the target group
15	Who is the owner of the box?
16	Others

Table 1. Target market.

Target market	Funding base	Sortiment
Low-income elderly ("driverclient")	Public	Everything
Middle-class families with children ("follower client")	Public-private	Bulk (toilet paper, flour, soft drinks …)
High-income elderly		Bulk
High-income families with children		Bulk
Dinks (double-income no-kids)		Bulk…everything
Wall street people	Private	Everything

Markets

Expected aspects:

Assessment of the potential market

- e-commerce problems concerning economic efficiency and profitability
- Rival products of HOMEDOOR
- The target group of the HOMEDOOR system (e-grocers or logistics service providers)

Questions:

17	Who (or how many) make up major part (80%) of the market?
18	Market shares
19	Business opportunities? (WIN-WIN-WIN)
20	Reduced social costs
21	Reduced delivery costs
22	Opportunity to offer new services (Which services?)
23	To which extent there is a public interest in different countries? (Nordic countries, Spain, the others)
24	Expectations concerning e-commerce, especially e-grocery
25	Is there an intention to build up or extend e-commerce business?
26	Are there existing systems that can reduce the costs?
27	Others

Virtual

Expected aspects:

- Weak points of the current systems

- Additional "virtual" systems like account, warranty, guarantee etc.

Questions:

28	How the ordering has been arranged? (call centre, go to shop, www, etc.)
29	User interface and portals (ordering platform)
30	E-solutions
31	Functionality, specifications
32	How to arrange the information flow?
33	Experiences about how the order is really done?
34	Number and percentage of orders via telephone
35	Using website (prevalence, difficulties, etc.)
36	Orders done in the shop that should be delivered at home
37	Number and "classification" of claims and suggestions
38	Others

Physical

Expected aspects:

- Organisation of the logistics
- Industrial standards that retailers already use in their logistical chain

Questions:

39	How to provide the storage system for deliveries?
40	Which kind of system the residents or the delivery companies prefer?
41	The delivery is packed in a "standard" hard box that can be stored inside the building
42	The delivery inside bags is placed in the box in the recipients building
43	What is the space available in majority of buildings?
44	What is delivered? Capacity need? Flexibility needs?
45	What is the extreme volume of the delivery?
46	What are the shape and weight of the articles etc.?
47	What kind of usability problems there might be especially concerned with citizens with mobility problems?
48	The logistics chains
49	Amount of orders per week and users?
50	Amount of orders that couldn't be delivered because there was nobody at home?
51	Which is the rate of home visits per delivery (is near 1 or higher)?
52	How long is the delivery time at home? (The time from shop to home and the time the delivery personnel stays at building)
53	Optimisation of space vs. optimisation of logistics? (Which will give faster payback?)
54	Is it retailer's problem to arrange the logistics?
55	Use of standardised systems in logistical chains? (Intelligent transportation systems i.e. boxes for cooling and heating to reduce the costs for e-grocery.)
56	Is the necessary logistics provided with own resource or with external service providers?
57	How the organisation of the logistics should arrange?
58	The security of the deliveries
59	Who are the distributors?
60	What is the distribution cost per delivery, per month, per shopping basket?

61	The BOX
62	Will the lift and mailbox be insurable?
63	How are food regulations applied for cleaning and calibration of temperature devices?
64	What provision is being allowed for vandalism and miss-use?
65	Will the lift mailbox be able to be maintained by a 3rd party (a maintenance company)?
66	Would recipients feel comfortable and secure delivering frozen food in an unattended system?
67	Should the box be optimised, so that it is never totally full?
68	Which kind of information about "box" state is needed? (empty or full)
69	Is it absolutely necessary to have temperature-conditioned boxes?
70	Others

Author(s)
Andelin, Mia

Title

Home Service Concept –
Technology, Logistics and Business Models

Abstract

The real estate and building cluster is partly evolving into a service business where physical facilities are considered as part of a service system. Applications of new technologies have mainly been directed to new buildings but new technologies for service provision should also be applied in old housing stock since new construction production is decreasing in Western Europe. New services to residential buildings are sought after, as the population is ageing.

This thesis introduces different home services provided to multi-storey residential buildings, stakeholders of services and their relationships and the technology and logistics of the service. The aim of this thesis is to examine business models of home services. The main objective is to find the business logic behind the home service. Research is limited to multi-storey residential buildings and a special emphasis is given to existing building stock and different reception systems.

This thesis is based on literature study and interviews. The literature study was carried out to illustrate some existing home services, logistic solutions and funding. Interviews among different stakeholders were carried out to determine the different viewpoints of different stakeholders. The patterns in the interviews and the literature findings overlapped partly.

Apparently, home services are needed in future. Potential customer segments are families, wealthy adults seeking high quality services, elderly and disabled people. But to create efficiency and turnover, services need a large customer density, which means that services should not be created for special groups but for everybody. The funding of services can be public, private or there can be a public-private partnership.

According to this thesis there are three main interests to invest in home services and delivery: (1) services for inhabitants, (2) cost savings for haulier/ logistician and service provider, and (3) new services affecting on building image for builder / developer. Finally, the future service concepts and business actions will show how the listed opportunities, strengths, threats and weaknesses of home services come true.

This study on Home Service Concept – Technology, Logistics and Business Models is a review of an open service concept and related business models. The theme is approached from real estate point of view. Various services in multi-storey residential buildings are addressed, combining approaches for technological development and business development.