



CHALMERS
UNIVERSITY OF TECHNOLOGY



Accessibility of goods and services during covid-19

Aiming for better inclusivity through urban logistics services

Master's thesis at Challenge Lab

LINDA-TRIIN AIT – MSc International Project Management

Department of Space, Earth and Environment
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2020

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MASTER'S THESIS 2020

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ABSTRACT

The covid-19 crisis extended the scope of pre-existing disadvantages in society and scaled up challenges and inequalities. Urban logistics services that are vital to getting access to goods and services were challenged. Different measures were taken to provide equal access to goods and services especially for the most vulnerable part of the population. The study is trying to expand the understanding of socially responsible urban logistics services by analysing the initiatives that emerged during the covid-19 crisis to achieve better inclusivity under crisis conditions. A literature review was conducted to create the theoretical framework and to be able to answer some research questions. Content analysis has been employed to investigate the content of the online sources. This was supported with two semi structured interviews. The findings were coded and analysed.

During the crisis, the on-demand economy grew together with several on-demand last mile delivery options, but also interest for social sustainability issues. A study identified different types of innovations such as organisational, delivery system, informational and technological. New collaborations were used with sometimes new actors, new types of services and business models to enable equal access to goods and services. Some new types of services involved contactless delivery and instant e-grocery or e-pharmacy. To achieve better inclusivity under crisis conditions socially responsible urban logistics services should offer safety to their workers and customers, enhance community involvement, philanthropy and ethics. Moreover, they should empower opportunities by offering choice to vulnerable customer segments in collaboration with other stakeholders, creating new business models, new services and using innovative urban logistics services in combination with value added services. While it will advance their business and make them more competitive, it will reduce the social and service exclusion in society.

Key words: urban logistics, last mile delivery, content analysis, urban logistics innovations, social sustainability, social inclusion, service inclusion, impact of covid-19, impact of corononavirus, emergency situation, contactless delivery, drone deliveries, crowdshipping, instant e-grocery, instant e-pharmacy, analytical framework, mapping the response, access to goods and services, vulnerable customer segment, e-commerce, on demand economy, social challenge, sustainability challenge.

Abbreviations

B&M stores – Brick and mortar stores
B2B - Business to business
B2C - Business to consumer
CSR – Corporate Social Responsibility
DaaS - Delivery as a Service
DM – Demand Management
FDM – Freight Demand Management
FSI - Freight Service Integrator
GRI - Global Reporting Initiative
HCL – Hyperconnected City Logistics
ICT - Information and Communication Technologies
ISI - Information Services Integrator
LSC - Logistic Service Client
LMD – Last-mile delivery/last mile logistics
LSP – Logistics Service Provider
LSR – Logistics Social Responsibility
MLP – Multilevel Perspective
NGOs – Non-governmental organisations
PI – Physical Internet
POD – proof of delivery
PUDO – Pick-up/drop-off location
SLI – Sustainable logistics innovation
TNM - Transportation Network Manager
TR - Transport Regulator
ULB - Urban Logistics Boxes

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Linda-Triin Ait

June 2020

1 Introduction

Living in the urban areas we are surrounded by the various goods and services that are essential to us all, such as access to food and medicine. Most of the things that we can buy from stores are transported there from somewhere else using various urban logistics services. There can be various actors, networks and transport modes involved. Although there are many innovative and transformative solutions to provide access to these goods and services, these may exclude some groups within the population, such as the elderly or people with special needs.

1.1 Sustainability and logistics

In times when most societies grasp the damaging impact of industries on both the environment and human health, sustainability has gradually become a central focus for businesses (Dethloff, Haasis, Kopfer, Kotzab, & Schönberger, 2015). The present economic, environmental and social/societal perspective expects companies to think “sustainably” (Gonzalez-Feliu, Semet, & Routhier, 2014). From the beginning, various actors at different scales have used the notion of sustainable development to discuss and frame desirable futures (Holmberg & Larsson, 2018). Sustainability is complex and multi-faceted, it can be approached and understood in many ways and different perspectives need to be integrated. Brundtland defines sustainability as meeting the present needs without compromising the needs of future generations (WCED, 1987, p. 41). Sustainable development entails that societies encounter human needs and do so by ensuring reasonable opportunities and by increasing productive potential for everybody (Grant, Trautrim, & Wong, 2017). Moreover, the United Nations (UN) has recognized Sustainable Development Goals (SDG) for Agenda 2030, that refers to sustainable development in three different dimensions: environmental, economic and social (UN, 2015c).

Although service industries are believed to have a small impact on the environment, logistics firms perform a strategic role in the sustainability initiatives throughout the supply chain acting as links between different actors (Uyar, Karaman, & Kilic, 2020). Moreover, operations of urban logistics are typically identified by their unsustainable impact (Macharis et al., 2014) and the transport sector is growing fastest in terms of the production of greenhouse gases and the consumption of energy in the European Union (Dethloff et al., 2015). Even though all three sustainability dimensions (environmental, economic and social) should be considered, most research in logistics or the supply chain sustainability discusses environmental dimensions in relation to the economic dimensions, while the social aspects or the combination of all three dimensions are less discussed (Seuring & Müller, 2008). Hutchins and Sutherland (2008) add that economic sustainability has been commonly addressed by decision-makers. Although, the environmental sustainability pillar has got an increasing amount of attention over the last decade, social sustainability pillars had still not been well-defined until recently. Similarly, in corporate social responsibility (CSR) research in the logistics sector, environmental (i.e. green) initiatives have been studied, while overlooking social elements of sustainable logistics performance (Uyar et al., 2020). As the economic and environmental aspects of supply chains have gained exceeding importance, still the human factor is fundamental to the management of any organization (Gonzalez-Feliu et al., 2014). It is important to consider both the intra-organizational stakeholders (e.g. the employees of the organisations or the trade unions), but also the inter-organizational

stakeholders (impact made from all others stakeholders) (Gonzalez-Feliu et al., 2014). The UN has also identified the need to strengthen the social dimension of sustainable development and advised to increase policy coherence, i.e. social inclusion (UN, 2015a). Moreover, they have set several sustainable development goals related to the social dimension, such as goal 9 to “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation”, goal 10 to “Reduce inequality within and among countries” and goal 11 to “Make cities and human settlements inclusive, safe, resilient and sustainable” (see Figure 1.1) (UN, 2015).

1.2 Ageing populations

Around the world there is a demographic trend of population ageing and the fastest growing age group is 65 and older (Mifsud & Attard, 2019; UN, 2019). Sweden’s population is expected to increase and the biggest growth, by 50 percent, will be citizens aged 80 and older, as the people live longer and many were born in this age group (SCB, 2018). This creates a challenge to make transport and mobility systems more accessible (Mifsud & Attard, 2019). Mobility at an old age is complicated, because of different dynamics. While old people today are much healthier, more active, more mobile, licensed to drive, more educated and working longer than before, they are also growing older than ever. They are still one of the disadvantaged transport groups (Mifsud & Attard, 2019) and current planning systems often ignore the accessibility requirements of ageing populations (Fitt, Curl, Dionisio, Ahuriri-Driscoll, & Pawson, 2019). In addition to the complexity of the existing situation, the current coronavirus crisis expanded the range and size of this marginalized population segment. Accessibility to goods and services is now more limited to both elderly and sick people.

1.3 The current crisis and challenges

The coronavirus (covid-19) created a crisis, where people and systems around the world are being tested and social sustainability has become even more critical. The UN described the situation to be worse than a worldwide health crisis that is spreading human suffering, killing people, and upsetting people’s lives, but also as an economic, social and human crisis (UN, 2020). The World Health Organization (WHO, 2020) have categorised the coronavirus as a pandemic that is attacking the core of our societies. Governments and authorities on different levels used different methods to limit the spread of the virus. Most countries closed their borders, institutes and companies limited social gatherings and encouraged or ordered people to self-quarantine, stay home and avoid social contact to minimize the risk of getting infected and/or spread the virus especially among risk groups (Folkhälsomyndigheten, 2020; Regeringskansliet, 2020; WHO, 2020). Several everyday activities became less or not at all accessible for many (Ronge, 2020; Rydberg, 2020). People who are most vulnerable are the ones in quarantine, sick or/and in a risk groups, like the elderly (age 70 and older) and people with chronic diseases. The elderly are particularly vulnerable to the danger of infection from covid-19, specifically those with chronic illness such as cardiovascular disease, diabetes and hypertension (UN, 2020). While older people are struggling with bigger health risks, they are also less skilled when it comes to supporting themselves in isolation. This creates segregation and need for help certain tasks such as being able to get access to food and medicine.

1.4 Growth of e-commerce and ICTs

The increased use of Information and Communication Technologies (ICTs) and digitalisation in general has created new opportunities and changes in society and people's lives. It has changed the way people communicate, get access to products and services, it has also changed the way they consume, buy and use things. Moreover, it has resulted in the growth of e-commerce, different logistics solutions and services to support this (GreenBiz, 2019; Postnord, 2020; Roos, Holmberg, Hansson, Karlsson, & Kristensson, 2019). In 2019 the worldwide retail sales from e-commerce were 3.53 trillion US dollars, while in Sweden it was 87 billion SEK (Clement, 2019; Postnord, 2020). The revenues are expected to double in 2022. While e-commerce has been growing and crossing different borders, by reaching more people and areas, still the main target customers and users for these services are young, active, high social status, living in urban or sub-urban areas (Postnord, 2020; Roos et al., 2019). Thus, it excludes part of the population that already has been less integrated and suffered from reduced access to transport and new innovations due to their location or lack of skills. This could contribute to the digital divide, that Velaga, Beecroft, Nelson, Corsar, and Edwards (2012) described and result in inequalities and gaps in society.

During the Coronavirus crisis people needed, were urged or forced to stay home to avoid getting sick or spread the virus thus more people in society became segregated. More people had limited access to physical services, as they were in quarantine and/or sick. Buying food or medicine from the stores became a challenge for many (Apoteksförening, 2020). While some lacked the access, others over-consumed and put several online services into high demand creating shortage of some products or/and delays in delivery times (Coop, 2020; Mathem, 2020). Changes in the environment created different initiatives and solutions by different actors trying to manage the crisis or to help the people in need.

Currently the main discussion about sustainability in e-commerce has been mostly the environmental aspect in logistics, packaging and returns (Postnord, 2020) while the social aspects have been less discussed. Therefore, this study will concentrate on a social sustainability pillar in order to analyse social challenges/inequalities due to accessibility of logistic services for marginalised people during the time of the coronavirus crisis. The thesis will touch upon the UN SDG: 9-inclusive and sustainable industrialization and innovation, 10 -reduced inequalities, 11-sustainable cities and communities and indirectly 12-responsible consumption and production (see Figure 1.1).



Figure 1.1: Illustration of the seventeen goals for sustainable development with extra focus on goals 9, 10, 11, 12 (UN, 2015b).

1.5 Thesis context

This thesis has been written at Challenge Lab, which is an experimental space at Chalmers University of Technology for systems of transformation towards a sustainable future creating a dynamic environment for master students with different educational and cultural backgrounds (Challenge lab, 2020). Together with academia, students are in charge of connecting different companies, projects and initiatives to find leverage points in the system and then initiate and suggest solutions to help society to progress. Students have been trusted to have an ability that reaches beyond other actors in society to be able to mediate the change. The goal is to solve sustainability challenges within the region together with different stakeholders from the private and public sector. Using different methods and tools provided by Challenge lab, students can find places to intervene from when it comes to the complex, socio-technical system. The main theme of this year's Challenge lab is "the mobility challenges within Västra Götaland region" and it is divided into three sub areas: mobility of people, mobility of goods and mobility in/of tourism. This thesis will study and analyse the topic of mobility of goods in the urban area. The thesis is composed of two phases, The first phase focuses on understanding the problem in a multi-stakeholder context and socio-technical system and the second phase is meant to study the literature, create a theoretical framework, provide a data collection, analyse the findings and suggest some solutions.

The first phase at Challenge lab lasted four weeks and included several lectures, workshops, dialogues and discussions. Students were introduced to new tools and methods to harvest the ideas and build their thesis work on. The aim was to formulate the right question to be able to solve the right problem: find a challenge, that is big enough to make a difference, but small enough to be able to tackle. To identify the gap within the system, the backcasting process was used, based on Holmberg and Robert (2000) and Holmberg and Larsson (2018) (see Figure 1.2). Backcasting is a methodology of planning for potential future problems, that are complicated at hand and when current developments are the cause of the problems (Holmberg & Robert,

2000). It allows for a departure from an unsustainable present to define new conditions and achieve new goals. The lighthouse within the backcasting process is a source for joint meaning in a group and enhances the coordination of reflexive activities and creates mutual understanding (Holmberg & Larsson, 2018). This process is divided into four steps. As sustainability can be understood and tackled in several different ways (Holmberg & Larsson, 2018) the first step is to define the needed sustainable future, with the help of the lighthouse covering the ecological, economic and social sustainability dimension and adding a dimension on ‘human needs & wellbeing’ in Figure 1.3. For this step students were encouraged to define the joint understanding for the desirable sustainable future for mobility in the Västra Götaland region and asked to create a lighthouse of their own to inspire and support the conversations further.

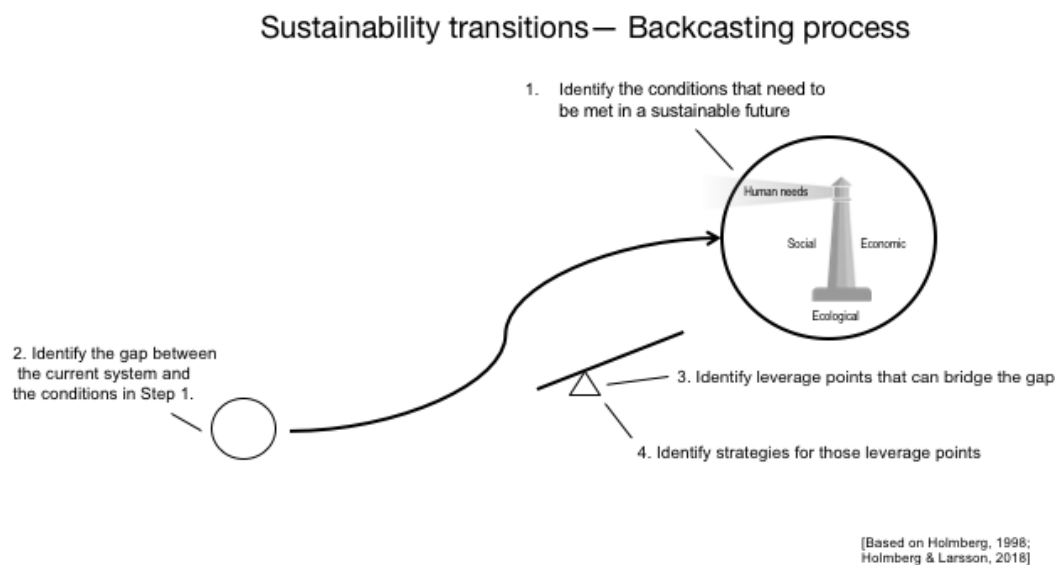


Figure 1.2: Illustration of the Backcasting process guided by the lighthouse: the sustainability transitions in four steps (Challenge lab, 2020; Holmberg & Larsson, 2018).

The second step in the backcasting method is to map the current system in comparison to the desired future to be able to detect gaps/challenges (Holmberg & Larsson, 2018). At this stage, the mobility theme is divided into three sub themes: personal mobility, goods mobility and tourism. At first the students mapped the system, using a method called the World Café (Foundation, 2020). This meant that students wrote their ideas about the system on post-it notes and presented them on a whiteboard under different sub-themes. While three of the students were responsible to administrate one of the boards, other students circulated between these to be able to discuss, add and remove ideas.

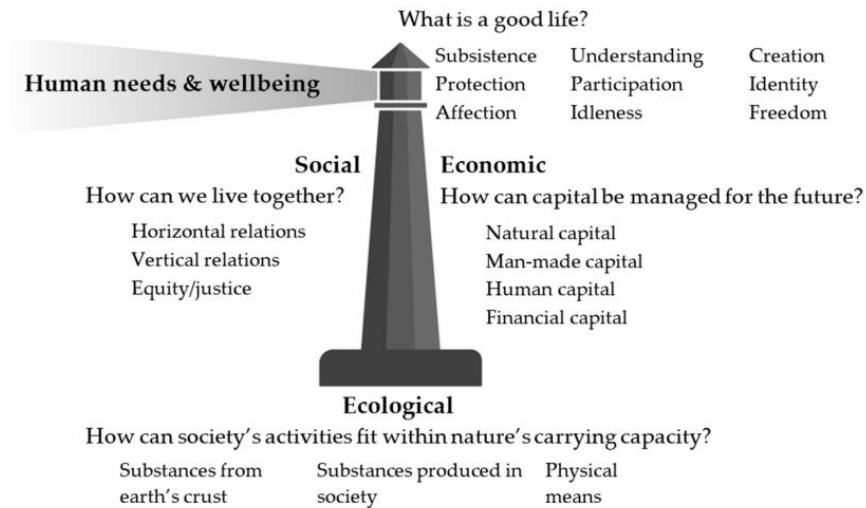


Figure 1.3: The conceptual framework visualized in a “lighthouse” model aims to inspire and support conversations on sustainable futures (Holmberg and Larsson, 2018, p. 13)

To organize, structure and cluster these ideas into different categories MLP theory (Geels, 2005) was used. Functions within society are achieved by sociotechnical systems, that contain clusters of associated elements, e.g., knowledge, artefacts, cultural meaning, markets, regulation, infrastructure, supply networks and maintenance networks (Geels, 2005). A system innovation is a transition from one sociotechnical system to another. These co-evolution processes involve changes in technology and other elements. Systems innovation can be identified on different levels, e.g., national, regional or sectoral innovation systems. Moreover, there are interlinkages between co-evolutionary processes and elements. In the systems of innovation approach the main focus is on the performance of systems rather than the change of systems (Geels, 2005). Multilevel perspective (MLP) focuses on technology and highlights the co-evolution of society and technology. In the MLP the system innovations happen as there are multiple levels of linkages between the outcomes of developments. When these processes link up and reinforce each other (“circular causality”) then system innovations happen (Geels, 2005).

Presenting and visualising findings on the thematic boards enabled to create the collective understanding about the current system made it possible to continue developing them within different groups. Within the theme of goods mobility some key findings about the current regime were: online shopping as a dominant way to purchase and deliver food, in relation to norms/trends – fast fashion and same day deliveries, knowledge on truck driving, research on sustainable supply chains, roads as dominant infrastructures, combination of local, regional and national laws for logistics.

Secondly students held three different stakeholder dialogues, as previously divided sub themes. At each dialogue different stakeholders from the industry and academy were present and students were themselves responsible for different tasks during each dialogue. Findings from the World Café and dialogues were merged by the groups, that students had placed themselves into, to then continue working with the different subthemes.

The third step in the backcasting method is to identify the leverage points in the spaces where a minor intervention can make a bigger impact in connecting the gaps (Holmberg & Larsson, 2018). Students were encouraged to find the gaps between these two states to formulate the potential leverage points and research questions to be able to work with during the master's thesis process. In step four, strategies are created to be able to work with the leverage points, e.g., through the testing processes (Holmberg & Larsson, 2018). Students then chose different leverage points to continue working with and did additional research to understand if there were interest and opportunity to create a strategy for the thesis work. During this process many strategies were created and tested.

A leverage point that was identified during the first phase of the thesis process within the topic of mobility of goods in Västra Götaland region was the growing trend of ICTs and e-commerce creating sustainability challenges, i.e. environmental (emissions from last mile deliveries and reverse logistics) and social (segregation and exclusion). At the beginning of the second phase additional research was conducted on the topic while also the crisis, that coronavirus (covid-19) emerged, continued to escalate and spread globally. It reinforced and expanded the social inequalities and challenges in society and logistic systems. Segregation and exclusion due to lack of accessibility to logistic services spread into wider demographics to include more citizens of different age groups, that were part of the risk groups, having chronic diseases, sick or for some other reason had to isolate themselves. This added extra pressure on logistics service providers and new challenges occurred within the supply chains (e.g. labour issues). Thus, the aim of this thesis was developed in continuous interaction between the initial leverage points derived from the first phase and the current health crisis going on in the research environment.

1.6 Purpose and research questions

The purpose of this thesis is to expand the understanding of socially responsible urban logistics services during the covid-19 crisis. It aims to find out how to satisfy the accessibility to goods and services required through innovative and socially responsible urban logistics services. To operationalize this purpose, two research questions were developed:

- What are the emerging urban logistics service solutions focusing on last-mile delivery in response to crises, such as covid-19?
- How can socially responsible urban logistics services be leveraged for achieving better inclusivity under crisis conditions?

This study addresses the lack of empirically-based research of socially responsible urban logistics systems to become inclusive by using innovative urban logistics services enabling access to essential goods and services in order to reduce social and service exclusion.

1.7 Limitations and scope

The research focused only on initiatives offering access to essential (food and medicine) goods and services in urban logistics systems during the time period of February to May 2020. The research is limited to the mobility of goods and will thus not consider the mobility of people. The study was conducted in Sweden in the Västra Götaland region during a time of emergency namely covid-19, when people were encouraged to practice social distancing, at risk of getting ill and relying often on ICTs. Thus, all evidences are collected using ICTs, online resources, or/and semi structured online interviews. The number of initiatives and analysed sources were limited. Moreover, the analysis was restricted to online sources that were posted on media sites, company documents, appeared through search engines or/and discussed in two semi structured online interviews. Thus, findings are conditioned on these initiatives, and may not necessarily reflect all initiatives that appeared on other platforms and in other sources.

2 Literature review

For centuries logistics activities and mobility have been essential to economic development, social well-being and society's standard of living (Grant et al., 2017; Macharis et al., 2014). Transport and logistics are foundation and pre-conditions of worldwide businesses and trade (Lu & De Bock, 2016). All fields of life in the public, private and business areas are influenced a lot by and depend on the availability of logistics systems and effectiveness of logistical processes (Dethloff et al., 2015). Freight transport is a crucial element for modern economy and urban ecosystems (S. Anderson, Allen, & Browne, 2005). Urban regions can be disadvantaged without effective freight delivery systems. An efficient transport system is the backbone of a contemporary society and its economy, such as direct and indirect transport costs (pollution, congestion, etc.), infrastructure use and accessibility (Müller, Rudolph, & Janke, 2019). Urban logistics is increasingly important and creating high demand for freight transport services (Browne, Allen, Nemoto, Patier, & Visser, 2012). Furthermore, globalisation and technological innovation have increased the importance of logistics and mobility all over the world (Macharis et al., 2014). However leading transport regime is pressured: congestion on many roads, legislation claim zero-emission vehicles, the growing digitalization of society and the economy needs new levels of flexibility, speed, and individuality in non-physical and physical mobility (Müller et al., 2019). This pressure concludes in mass effects in growing cities. The ability of road-based mobility appears to be limited. For the future changes are needed regarding the use of infrastructure and technologies, and the design of delivery concepts and services, market organization and collaboration, regulation and planning, but also behaviour (Taniguchi & Thompson, 2018). Dablanc et al. (2017) highlight four impacts and problems connected to urban logistics and their potential to disturb urban logistics services and connected policies in European cities are (1) business models, (2) freight data and trips, (3) work conditions and labour legislation, and (4) local public policies. While focusing on business models in urban logistics, it is essential to take their inclusivity into consideration particularly in relation to marginalized segments of the large populations living in contemporary urban areas (Fisk et al., 2018; Maragiannis & Ashford, 2019). Because due to the rising impact of e-commerce, digital technologies combined with societal challenges such as ageing populations, lack of access to education or information (Fitt et al., 2019; Velaga et al., 2012). New, fragmented and marginalized market segments that need urban logistics services emerge. While advancing their innovative approaches for achieving competitiveness in the global marketplace (Bocarejo S & Oviedo H, 2012), urban logistics service providers should not neglect these segments. Thus, to stay ahead in the contemporary worldwide marketplace, business organisations must continuously look for innovative approaches to advance their competitiveness (Bocarejo S & Oviedo H, 2012). Moreover, it is important to understand urban logistics services and their inclusivity when it comes to marginalized segments of the population.

In order to understand these issues and opportunities this part will look into current urban logistics literature including e-commerce and innovation related with this context, socially sustainable logistics services and inclusive service design. Following sections will be about these literature streams. The first part is about the urban logistics system and the impact of e-commerce to urban logistics, then some of the innovative urban logistics services are explained. The second part explains the sustainability in logistics, social exclusion. The third part aims to explain a theory about service exclusion and inclusive service design.

2.1 Urban logistics systems

There are different terms and concepts used to refer to and explain the mobility of goods in urban areas (Gonzalez-Feliu et al., 2014; Macharis & Kin, 2017; Taniguchi & Thompson, 2015). Macharis and Kin (2017, p. 61) define city distribution as “the movement of goods within urban areas”. Taniguchi and Thompson (2018) add that the urban freight transport system contains movement of all goods to, in and from the city. While Taniguchi (2001, p. 2) define urban logistics as “the process for totally optimizing the logistics and transport activities by private companies in urban areas while considering the traffic environment, the traffic congestion and energy consumption within the framework of a market economy”. Gonzalez-Feliu et al. (2014) defines urban logistics as the pluridisciplinary field that aims to analyse, understand and study the different logistics schemes, organizations, stakeholders and actions planning connected to the development of the diverse goods transport systems in a city zone and connect these in a holistic way to reduce the main nuisances linked to it. According to Allen and Browne (2010) urban freight transport and logistics includes the collection and delivery of goods and provision of services in cities and towns. Urban logistics is the systemic view of the problems associated to freight movements within urban areas (Crainic, 2008). In this study the term urban logistics will be used interrelatedly of other terms and will refer to freight transport systems and provision of services in urban areas.

Urban logistics aims to decrease the harm linked with freight transportation in urban areas while supporting the social and economic development of the cities (Crainic, 2008). It includes goals and ideas to optimize advanced urban logistics systems. The fundamental idea is to view decisions and specific stakeholders as parts of a combined logistics system. The setting in the city is very diverse and complex since different economic sectors are hosted and provisioned by several different supply chains (Giret, 2019).

Boudoin, Morel, and Gardat (2014) discuss, that the logistics companies develop fundamentally on economic and geographical conditions. Companies invest in vital tools for the management of their flow's by using data on consumption, production, and infrastructures. Meanwhile the set-up capacities and infrastructures result from pre-existing transport equipment, land opportunities, or even a market awareness. Logistics is a major part of the urban planning as it consumes surfaces, generates traffic and create employment (Boudoin et al., 2014). Urban logistics shares the same infrastructure with the passenger transport on city roads (Müller et al., 2019). Thus, they act in a similar official framework, cooperate with and suffer from inefficient infrastructure settings.

There are multiple and changeable possible organizational structures as these are influenced to outputs (production and waste) and inputs (goods consumption) of products (Boudoin et al., 2014). Depending on the type of activity and demand (volumes and products to deliver, surfaces) the points of delivery can take different forms. The most organisational characteristics of urban logistics structures are similar to logistics operators (Allen & Browne, 2010). Urban logistics solutions must be integrated in the global supply chain(s) of the delivered goods and considered in a global (sustainable) supply chain management point of view (Allen and Bowne, 2010).

Efficient urban logistics activities aims to increase the performance of urban distribution systems (Cagliano, De Marco, Mangano, & Zenezini, 2017). The

fundamental concepts of urban logistics are coordination and consolidation (Crainic, 2008). In the core of the goods supply mechanism is the urban logistics spaces, as they are borders between urban and interurban, public and private, consumer and producer (Boudoin et al., 2014). Consolidation takes place at so-called urban consolidation centres (Crainic, 2008), that is a logistics facility, located close to the urban area that it serves such as a whole city or just a centre or a specific site (i.e. airport, shopping centre, hospital or major construction site) (Browne, Allen, & Leonardi, 2011). Urban consolidation centres enable companies to be closer to the customers without increasing the amount of vehicles and to operate the last mile delivery with more environmentally friendly alternatives such as walking, electrically assisted tricycles, clean vehicles etc (Boudoin et al., 2014).

City being an economic and geographical space where there are public and private sectors decision makers (Boudoin et al., 2014). The performance of the logistics system depends deeply on the unity of the choices taken by the actors from both sectors (Boudoin et al., 2014). Public and private spheres are different, but balancing parts of a complex urban system. Although having different functions, needs and temporalities, linkages exist and are under progress. Public sphere folds the users and the institutional actors, including the urban decision makers, the residents and their representatives (Boudoin et al., 2014). They may lack the same vision of the urban logistics position and their awareness is focused on a specific problem or another. Private sphere includes two main groups of professionals, such as the shippers (receiving or sending the goods), and the logisticians (operating the storing, the transport, the conditioning) (Boudoin et al., 2014). Every actor is affected by the urban environment and the market, in a competitive context. These private actors cannot overlook social fundamentals, innovation is often related to marketing, inflexibility of supply chains have to be linked with flexible segments and the value of time is vital (Boudoin et al., 2014).

In this sector it is more challenging to come up with sustainable solutions, as there are several different actors with different (and often conflicting) interests involved (Macharis et al., 2014). These challenges are enlarged, because of the limited space of urban goods transport and the interaction with personal transport (it is proven that inefficiency of goods transport is a consequence of the nuisances' in personal transport). Also for each stakeholder the concept of sustainability is different (Gonzalez-Feliu et al., 2014). Even though all of them relate to the Kyoto protocol, they do not have the same value to each of the elements (economic, environmental and social) which makes it complicated to present an integrated vision to evaluate solutions and proposals (Gonzalez-Feliu et al., 2014). Although in the cities citizens and the local authorities are the most affected by the sustainability problems, while the private companies have the scope to influence the solutions to improve sustainability (particularly carriers, and implicitly the shippers) (Macharis et al., 2014).

2.1.1 Urban logistics actors and stakeholders

All movements and stakeholders are components of an integrated logistics system (Crainic, 2008). "Stakeholder is an entity or individual that can reasonably be expected to be significantly affected by the reporting organization's activities, products and services, or whose actions can reasonably be expected to affect the ability of the organization to successfully implement its strategies and achieve its objectives" (GSSB, 2018 , p. 15). Stakeholders can be the ones invested in the company (such as shareholders and employees) and the ones having other associations to the company

(such as workers who are not employees, suppliers, NGOs, vulnerable groups, local communities or other civil society organizations, among others) (GSSB, 2018).

The urban logistics system contains many different operations and stakeholders, varying from large logistics service providers (LSPs) to self-employed truck drivers and from full truckloads delivered to warehouses to small parcels delivered by vans (Taniguchi & Thompson, 2018). Thus, it consists of different stakeholders with wide range of stakes and aims making it difficult to pursuit collaborative actions (Gonzalez-Feliu et al., 2014). Taniguchi and Thompson (2015) add, that urban logistics problems are challenging in managing different stakeholders with different viewpoints toward urban logistics.

Taniguchi and Thompson (2015) listed four main stakeholders in urban logistics, such as shippers, freight carriers, administrators, and residents. While Gonzalez-Feliu et al. (2014) divides them into public stakeholders, like politicians, public transport managers, urban planners, regional or national expert services, who have a vision of shared wellbeing and goal to decrease the freight transport nuisances while generating employment. Then there are private stakeholders, like transport and logistics operators, shippers, wholesalers, retailers, real state stakeholders, tertiary activities, etc, who has a vision of economic efficiency and goal to decrease expenses and/or increase quality of service.

A perfect illustration of the customer-supplier relations concerning organizations contributing in the delivery of door-to-door logistic services is the value chain (Boschian & Paganelli, 2016). It includes different types of users' companies such as:

- The Logistic Service Client (LSC) is the user acquiring the door-to-door service solution, usually representing a distribution or manufacturing company.
- The Freight Service Integrator (FSI) is the user offering the combined door-to-door service to the LSC, usually representing a 3PL company, a freight forwarder, or the LSC itself through its logistics division.
- The Logistic Service Provider (LSP) is the user offering logistic and transport services supporting to the door-to-door solution such as carriers for the different modes of transport, warehousing and handling companies.
- The Information Services Integrator (ISI) are the organizations offering the information infrastructure to enable to integrate the logistic services by the LSC, FSI, and LSP.
- The Transportation Network Manager (TNM) are the organizations responsible of managing the transportation infrastructure sustaining the door-to door movement such as city traffic managers and rail activities.
- The Transport Regulator (TR) are the organizations getting all mandatory reporting and checking about the delivery, in order to ensure that all services are done according to present rules and regulations.

Three first categories (LSC, FSI, LSP) are perfect illustrations of users relevant only from the viewpoint of functions, i.e., to represent roles that are performed in the door-to-door services (Boschian & Paganelli, 2016). Although the real market setting is more complex, and no single firm can fit in just one position. The other three (ISI, TNM, TR) have supporting position in the Reference Value Chain, representing companies not directly participating in the facility of logistic services although contributing the

information, physical and regulatory infrastructure needed by these Services (Boschian & Paganelli, 2016).

Logistics Service Providers (LSPs) are one of the most important group of freight carriers in urban areas (Cagliano et al., 2017). As they are pursuing the promised goals of urban logistics efficiency having interest in ensuring cost-effective urban delivery in reasonable cost, while dealing with customer-oriented services, delivery flexibility, short delivery times and high schedule reliability. LSP productivity is measured by their service efficiency and realisation of customer's requirements (Cagliano et al., 2017).

In addition to these actors, it is important to include customers and consumers as stakeholders too (Halldórsson & Wehner, 2020). First, they are citizens living in these urban areas. Second there are some services that they have to fulfil to complete the urban logistics services. Thus the end consumer is part of the value chain, when they receive the goods at home (passive role) or by collecting the goods at a store or pickup point (active role) (Halldórsson & Wehner, 2020)

Boschian and Paganelli (2016) explain the importance of networking and relationships for logistics firms, as having linkages within and outside the supply chain. To advance and sustain long-term strategic alliances with partners to improve performance in the areas of product tracking, product handling, information flow technology, and other process and product advancements is vital for logistics companies. Holguín-Veras, Amaya Leal, Sanchez-Diaz, Browne, and Wojtowicz (2018) add that stakeholder engagement is crucial in urban logistics since the position that various mediators involved in urban supply chains (e.g., shippers, hauliers, receivers), and the several trade associations, and public-private bodies, e.g., business development districts, that might support in changing the way in which freight activity is carried out. Collaboration in logistics can occur at both transversal (authors comment "horizontal") and longitudinal levels (Macharis et al., 2014). Longitudinal collaboration can be defined as the handling of shared management issues in a supply chain with stakeholders of different levels, primarily the ones in direct relation with each other. In order to ensure improved joint planning of a common supply chain. Horizontal collaboration can be defined as the partnership amongst a group of stakeholders of diverse supply chains operating at the same levels and having similar needs. The goal is to find synergies between different supply chains at certain stages to find gains and savings individually (e.g. service quality, cost, lead time, or their combinations) (Macharis et al., 2014).

2.1.2 E-commerce and its impacts on urban logistics

The Internet has changed the way business is done (Mourya & Gupta, 2014). The revolution of the Internet has steered to the evolution of online business around the world (Oláh et al., 2018). Currently the commercial tools are in total transformation (Gonzalez-Feliu et al., 2014). E-commerce is more than additional way of working; it is additional worldview and an important part of competitiveness (Oláh et al., 2018). E-commerce takes place when goods are bought and sold over the Internet. Ordinary trading of goods is becoming less popular and more companies are integrating online services into their business processes. This creates blurry line between traditional B&M commerce and e-commerce (Mourya & Gupta, 2014). E-commerce defined as doing business over the Internet might cover any transactions between the people and organizations within a society, although B2B and B2C are stated to be more important in terms of market size (Nemoto, Visser, & Yoshimoto, 2001).

E-commerce sector grows extensively and draws new schemes of urban deliveries and additional organizations (Gonzalez-Feliu et al., 2014). Current development of e-commerce makes urban logistics more vital (Taniguchi, 2001). In this segment most developments are partly due to growing volumes generated by Internet and mobile technology and products (Taniguchi & Thompson, 2018). Innovative e-business technologies have driven to significant changes within supply chains such as alternative ways of doing business, enhanced visibility and changes to delivery channels, with new intermediaries (Allen & Browne, 2010). With the rise of B2C e-commerce the parcels and express mail deliveries have changed significantly over the last decade and is likely to develop even more in the coming years (Taniguchi & Thompson, 2018).

E-commerce has caused the transformation of entire distribution system (Dablanc et al., 2018). There are two models for distribution in B2C e-commerce such as: (1) goods flow along current physical distribution channels, using existing channels of postal networks and express firms, (2) last-mile delivery (LMD) includes transport over short distances using smaller trucks and is supported by the delivery depots in the region (Dablanc et al., 2018). Moreover, retailers or their LSP have created a new physical distribution channel to supply goods to consumers. It means that logistics operations can be situated at existing stores/facilities or in execution centres, that serve e-commerce orders (Dablanc et al., 2018).

Lim, Jin, and Srari (2018) define the last-mile logistics (LMD) as the last section of a business-to-consumer (B2C) parcel delivery service, from the order penetration point to the final consignee's chosen destination point. Where the order penetration point means the location of inventory (e.g. retail store, execution centre, manufacturer site) and execution process is started by a consumer order. The final consignee preferred destination point in the location where an order is delivered. The order delivery phase includes picking, packing, and delivery. (Lim et al., 2018). Distribution structure means the steps from order execution until the delivery to the final consignee's preferred destination point. It contains the picking modes (e.g. warehouse or store-based), transportation, and reception (e.g. consumer-pickup) (Lim et al., 2018).

Halldórsson and Wehner (2020) includes, that last-mile logistics (LMD) relates to logistics activities in the last phase of the supply chain, where goods are moved to the end consumer at the point of consumption (POC) from the retailer at the point of sales. Transport for LMD can be done by logistics service providers (LSPs) with commercial vehicles (such as heavy or light trucks), or carried out by the consumers themselves with private vehicles, bike, walking or similar as it's done during a conventional shopping trip (Halldórsson & Wehner, 2020). Dablanc et al. (2017) includes crowdshippers into this list, where the LMD is made by other private persons using their own means of transport (more detailed description in section 2.1.3).

LMD distribution structure contains the linear movement of products from source to customer and have three basic forms (Lim et al., 2018): (1) push, when product has sent to customer's postcode by someone other than the customer, (2) pull, when product has pulled from the source by the customer; and (3) hybrid, when product sent to an in-between site and then pulled by the customer (Lim et al., 2018). There is a large variety of last mile delivery options associated with e-commerce:

- “Click and collect” is where end consumers orders goods online and pick up at store (Halldórsson & Wehner, 2020), special facility or distribution centre (Dablanc et al., 2018) and then bring them home. Often applied by e-groceries.

- Using PUDO (pick-up/drop-off location)/pick up point (PP), often located in the entrance of supermarkets, where customer will collect goods, that are pre ordered online. Pickup points are normally located close to the end consumer's and often within walking distance in urban areas (Halldórsson & Wehner, 2020).
- Locker stations operate similarly to PP although the lockers usually belong to LSPs or managed by online retailers (Halldórsson & Wehner, 2020). It is used for local parcel deliveries and often placed near to central hubs, such as railway stations
- Home delivery or a specific address (e.g. workplace) (Dablanc et al., 2018) after consumers have ordered goods online (Halldórsson & Wehner, 2020). Delivery time must be aligned between the end consumer and the LSP. There is an emerging variety of home delivers for food by scooters or bike.
- In-car delivery when the LSP delivers goods to the consumer's car (parked in a certain urban area during a particular time slot) after the consumer has orders goods online (Halldórsson & Wehner, 2020). Temporary access to the trunk of the car is provided by the mobile application. Currently only available in large cities.

These deliveries are operated from conventional regional platforms, platform situated near big cities or from stores used as collecting sites (Gonzalez-Feliu et al., 2014). E-business in B2B, B2C and C2C creates new markets and encourage new mobility systems (personal and freight) and new delivery patterns (cross and multi-canal). Now logistics must show “agility and ubiquity”. This trend strengthens the need of closeness to customers and motivates reinvestment in urban centres (Gonzalez-Feliu et al., 2014). LMD has become a critical source for market differentiation, encouraging retailers to invest in a numerous of consumer delivery innovations (e.g. autonomous delivery solutions, lockers, buy-online-pickup-in-store, and free delivery upon minimum purchase levels) (Lim et al., 2018). Customers get deliveries at home, at work or via relays, reliant on the quality and the nature of products ordered (Gonzalez-Feliu et al., 2014). Consumers care about flexibility and convenience that LMD offers (Lim et al., 2018). In the business to business (B2B) and the business to consumer (B2C) cases the e-commerce offers a good prospect for an individual, quick, direct and low-cost commerce (Taniguchi, 2001). In order to determine the method or the efficiency to choose a distribution structure to fulfil the consumer needs while relating to the habits of product types, Lim et al. (2018) created a list of 13 variables that may impact the structural forms of LMD, such as consumer physical convenience, consumer geographical density, consumer time convenience, demand volume, order response time, order visibility, product availability, product variety, product customisability, product freshness, product margin, product returnability, and service capacity (Lim et al., 2018). The key changes in the coming years in this sector are: (1) the further aim to please the final receivers (i.e. better customer intimacy), and (2) the ambition to do the last mile deliveries the cheapest way (Taniguchi & Thompson, 2018).

The last mile problem refers to the issues in the final part of the supply chain that the rapid growth in the amount of parcels has drawn attention to (Dablanc et al., 2018). In B2C e-commerce one of the main challenges is the last mile delivery to the consumer. It is especially difficult in the e-grocery commerce to combine customer convenience, profitability and traceability (Dablanc et al., 2018). According to Taniguchi and Thompson (2015) small size deliveries are criticized to cause more traffic, although it

is likely that total volumes of km would not change, as the last-mile delivery substitutes passenger shopping trips. Meanwhile Dablanc et al. (2018) claim that growth in e-commerce increase the amount of freight vehicles in urban areas, ruled by small vehicles and medium to large trucks are rather less important. Some relationships that the growth in e-commerce will affect the urban mobility of goods: (1) higher revenue in e-commerce results in higher parcels volume, (2) instant deliveries increase diversity of urban logistics, (3) e-commerce creates need for reverse logistics, (4) switch between shopping trips and deliveries, (5) urban traffic due to e-commerce depends on the substitution of personal travels (motorized or non-motorized shopping trips) to parcel deliveries (Dablanc et al., 2018). Moreover, the growth of e-commerce revenue increases parcels volume, although the increase of urban logistics is lower than the growth of e-commerce sales (Dablanc et al., 2018). Still in urban areas the growth of e-commerce and same-day delivery services has increased freight movements adding more traffic congestion, pollution, noise, and greenhouse gas emissions (Ballare & Lin, 2020).

For the logistics service providers (LSPs) the (market) demand has changed (Müller et al., 2019). First an execution system where customer had to be pick up parcel at the post office and the efficiency was improved by fleet management software, tour optimization software, barcode etc. To improve the excellence of the service ICTs were applied to track-and-trace services, online processing, and information. Now the LSP have a multiple delivery options for customer satisfaction such as adaptive and special PUDO/pick-up point, parcel boxes and narrow time windows (Müller et al., 2019). On-demand economy is gradually impacted the urban logistics and changed from push (vendor- and logistics driven) to pull (customer-driven) concepts (Huschebeck & Leonardi, 2020). In order to stay competitive and profitable in such a fast-changing setting, LSPs must design more efficient and flexible logistics systems. For retailers, on-time and fast delivery will influence customer loyalty and demand. Moreover current LMD options are considered unsustainable with respect to the triple bottom line (Huschebeck & Leonardi, 2020). Although, currently several LSPs extend and modify their urban fleet such as electric delivery scooters, cubicycle and vans in different capacity, sizes and modified operation ranges (Huschebeck & Leonardi, 2020).

E-commerce is one of the main drivers for urban logistics innovations in relation to green operations, new operators, and the use of new modes of vehicles (Dablanc et al., 2018). It also impacts the location and the type of new UCC, as e-retailers are getting (spatially) closer to the customers, in order to serve them more rapidly. Digital market places can contribute to defining new services and products by increasing the supply of possibilities for deliveries of parcels and other goods, and offering matching services (Dablanc et al., 2017). E-commerce will influence parcel deliveries and returns, the tracking of vehicles and shipments and its execution, and Cloud services that allows the data sharing to make supply chains functions synchronously, are going to be even more important in future (Grant et al., 2017). All of these matters will influence the sustainability of transport.

2.1.3 Urban logistics innovations

Innovation is critical in order to have a successful logistics service (Flint, Larsson, Gammelgaard, & Mentzer, 2005). Logistics innovation is any logistics service that is seen as helpful and new to a particular audience. It can be internal audience where innovations advance operational efficiency or external audience where innovations will

serve clients better. Logistics innovation emerges out of understanding to use the unmet or poorly served customer needs and then develop new services that better respond to these needs (Flint et al., 2005). Improved urban logistic performance would have improved societal effects in terms of resource and service efficiency (Lim et al., 2018). According to Daugherty, Chen, and Ferrin Bruce (2011) logistics service innovation capability is the skill of the company to develop new innovative logistics services. Improved logistics service can advance relationships with customers, create competitive advantage, increase customer loyalty, and make market activities more efficient (Daugherty et al., 2011).

Most urban logistics initiatives, ideas and projects seem to embrace one of the solutions to realise a more stable distribution of the assistances of moving freight in and out of the city and the economic, social and environmental nuisance and cost related with these activities, mostly in big and congested urban zones (Crainic, 2008). Numerous innovations and projects aim to improve urban logistics by reducing motorized traffic to reduce CO₂ and greenhouse gas emissions in urban areas (Patier & Browne, 2010). Most innovations can be divided into three groups: (1) consolidation of goods flows in the city (achieved through new concepts such as consolidation centres or new organisation); (2) use of new non (less) polluting vehicles (e.g. electric powered vehicles); (3) regulation (usually focused on restricting certain types of activity by time of day, size/type of vehicle) (Patier & Browne, 2010).

Innovative logistics services are becoming feasible due to overall technological progress and new methods for logistics and supply chain management (Dethloff et al., 2015). Continuous technological development has supported industries to transform the way they work and conduct their business (Bocarejo S & Oviedo H, 2012; Grant et al., 2017; Lu & De Bock, 2016). Technology allows service companies to advance their effectiveness and efficiency, and to improve their services. There is a rising need for improved logistics services due to the increased knowledge of new capabilities offered by future technologies. Not just expanding the range of logistics services as well as improvement of logistics processes and their enhancement in efficiency are becoming extra significant and can be realized by developing new technologies for information processing and logistics management. Furthermore Dablanc et al. (2017) expect the coming years will have a stronger focus on improving services and ensuring the quality of services through the application of technology, from the growing partnerships between organisations or change is consolidation.

In the logistics sector there is the strong focus on reducing costs and improving efficiency (Macharis et al., 2014). The change has to be made in a tough social and economic situation that could make the process more complicated but also encourage creativity and forces to leave old patterns. While most firms avoid the risk of novelty, often initiatives are private and the logistics providers just follow the initiatives led by shippers (Gonzalez-Feliu et al., 2014). To be able to take a relevant step it is necessary to allocation resources to this cause.

More sustainable logistics development demands for innovative thinking (Björklund & Forslund, 2018) from the private and public sector (Allen & Browne, 2010). To create more sustainable logistics service offers LSP could merge technological innovations in production and consumption with logistical processes by extending the new service portfolio or business models (Gruchmann & Seuring, 2018). It should be done together with other partners in the supply chain or by themselves and not just work on improving their relationships to the focal firm as resources. Key component for a future transport

system that is sustainable and intelligent is an innovative, advanced and integrating approach for logistic and supply chain (Lu & De Bock, 2016).

To achieve a thorough and appropriate evaluation of the logistics innovation it is important to consider the condition such as the socioeconomic context and main trends (increasing energy costs, ageing of the population, local policy etc) (Patier & Browne, 2010). Further it is important: (1) to evaluate the global supply chain (upstream and downstream). (2) to carry out a pre analysis, such as the development, with and without the innovation, considering the targeted objectives; (3) to demonstrate visibly the bias established by specific services' users or choices; (4) to guarantee the confidentiality of commercial data; (5) to identify the limitations of the project; (6) to find the projects which combine several types of innovations (the impacts can be supplementary or cancel each other out) (Patier & Browne, 2010).

There is a need for improved understanding of the process behind successful execution of sustainable logistics innovations (SLI), which is a combination of two emerging areas, logistics innovation and sustainable innovation. SLI is defined as: "The implementation of a for-the-firm new, or significantly improved, service, process, or organisation in a logistics activity, that contributes to a more environmentally and/or socially sustainable development" (Björklund & Forslund, 2018). In the SLI process there are four phases: (1) idea creation (including activities as setting the stage and customer clue gathering); (2) choice of ideas; (3) idea development (including activities as clarifying, reflecting, negotiating, business analyses); and (4) execution and learning (including inter-organisational learning) (Björklund & Forslund, 2018).

Below a selected sample of urban logistic innovations are reviewed. The aim is not to present an exhaustive list, but to give an overview of the logistics innovations in order to build a framework around different urban logistics innovations. As suggested by Hyard (2013) innovations can be divided into different categories, such as: (1) organisational; (2) delivery system; (3) informational; (4) technological. In Table 2.1 these different innovations are presented in the different categories.

Table 2.1: Dividing innovations into four categories and sub-categories.

Categories	Innovations
Organisational innovations	Demand management
	Omni-channel setting
	Organisational structure
Delivery system innovations	Crowdshipping
	On demand/ Instant delivery
	Pick up points
Informational innovations	Big data
	Delivery as a Service (DaaS)
Technological innovations	Drones
	Electrification, automation and robots
	Physical Internet

2.1.3.1 Organisational innovation

Organisational innovations involve the methodological/organisational function consisting of organising collective techniques or knowledge (Hyard, 2013). These trajectories of innovations consist of reorganising the routines and procedures for the behaviour of users. Below different examples of organisational innovations are explained.

Organisational structure

Service becomes a key differentiator when market environment is extremely unstable and competitive (Daugherty et al., 2011). In order to enhance service innovation ability and to achieve better performance, firms must better manage and understand controllable internal factors such as organizational structure. Daugherty et al. (2011) studied three organizational dimensions, that are related to logistics service innovation capability and their market performance: (1) decentralization, where decision-making tasks are divided among multiple individuals at the lower levels in a firm's hierarchy, (2) formalization, emphasise on following procedures and rules when working, (3) specialization, where jobs are narrowly defined in terms of required skill, knowledge, and experience (Daugherty et al., 2011). Organizational structure being a business resource can contribute to a sustainable competitive advantage. They found that formalization and decentralization show positive results to a firm's logistics service innovation abilities. As most companies face rough competition and have to differentiate their offerings from their competitors, then by choosing the right organisational structure to develop logistics service innovation capabilities may improve performance and a set to differentiate from others Daugherty et al. (2011).

Demand management

Freight demand management (FMD) is one of the public sector initiatives to improve urban logistics activity and focus on fostering practices and policy that aims to change the behaviour of the receivers of goods (Holguín-Veras & Sánchez-Díaz, 2016). It aims to influence the demand creator to increase efficiency and economic productivity; and enhance sustainability, environmental justice and quality of life in urban logistics systems. These initiatives focus on adjusting the time, destination, frequency and mode used to make deliveries, to decrease the negative externalities created. It includes variety of initiatives, including receiver-led consolidation programs, voluntary off-hour delivery programs, spread out pickup/delivery programs. It is essential to encourage the consumers of suppliers to adjust their ordering practices. Changes in the destination of deliveries seek to influence receivers to change the destination of the goods they collect (Holguín-Veras et al., 2018). FDM is defined before as targeting the receivers of supplies (i.e., establishments ordering deliveries), because that will have an effect on freight traffic. This is from a freight transport perspective but from a retailer or e-retailer perspective this concept can be adapted to consumers only instead of all receivers. Furthermore, this can be merged with the more general concept of demand management.

It is important for the retail industry to remain responsive to customer needs and reach higher efficiency in distribution, as this will affect firm's competitiveness. Demand management (DM) methods can be used to customise services for different customers while improving the overall efficiency of the distribution system (Lau, 2012). The choice between responsiveness and efficiency should start with a good understanding of the requirements and the characteristics of the different market segments. After considering supply chain capabilities and boundaries company can use demand management methods, such as pricing scheme, market segmentation, and vendor-managed inventory, to reach higher distribution efficiency through consolidation and centralisation while remaining reactive to customer needs (Lau, 2012).

Omni-channel setting

To sustain and increase future development opportunities companies should focus on and aim to develop omni-channel strategies (Oláh et al., 2018). Novel omni-channel delivery models include DAAS, on-demand delivery model, "showroom" concept stores, unmanned delivery (e.g. drones, ground robots), in-store digital walls, and additive printing (e.g. 3D print) (Lim et al., 2018). Moreover, merging functions and roles between traditional brick and mortar (B&M) and online retailers. It is common for retailers in the omnichannel setting to operate parallel in multiple distribution structures (Lim et al., 2018). Pick-up/delivery to alternative locations initiative aims to use of alternative origins or destinations, such as post offices and delivery lockers, or distribution mini depots and local freight collection (Holguín-Veras et al., 2018).

In an omnichannel retail environment, consumers can get information by visiting shops or do it from distance (Bell, Gallia, & Moreno, 2014). To pick up items, they can choose to visit a store or products are delivered to their home. Many traditional retailers have online stores and offer online ordering with picking up packages at their stores (Click and collect) (Taniguchi & Thompson, 2015). Therefore, offering customers wider choice of products and give certainty that ordered products are available when they are going to pick them up. They do not have to pay delivery fee or wait for home delivery. This enables the traditional retailers to compete with online stores (Taniguchi & Thompson, 2015).

2.1.3.2 Delivery system innovations

Delivery system innovations involve the non-technological changes in the delivery system. Below different examples of the delivery system innovations are explained.

On demand/Instant deliveries

E-commerce is changing the consumer and business behaviour (Ballare & Lin, 2020). Smart phone apps like Blablacar and Uber have created on demand transport services and transformed the urban mobility setting and are expected to reform the urban logistics sector as well (Dablanc et al., 2017). Current advances in mobile IT allow the receiver to require improved service in relations to reliability (compared to

expectations, predictable, place under any circumstances and on the expected moment in time), responsiveness, compliance, and customization (Taniguchi & Thompson, 2018). Parcel carriers are already testing new solutions ranging from click-and-collect offers, individual parcel boxes, evening delivery services and same-day delivery options. Moreover, new on-demand last mile distribution concepts are changing the structure of the urban delivery fleet by using flexible courier personnel or alternative modes of transport. Instant booking, steering, real-time tracking, and rerouting of deliveries expect urban transport operators to respond faster and employ new ways within urban environments (Taniguchi & Thompson, 2018). Although on-demand deliveries are novelty now, soon it will be expected (Branson, 2018).

Furthermore, instant delivery services offer on-demand delivery in two hours (Dablanc et al., 2017). This is done by connecting couriers (either private individuals, independent contractors, or employees), consignors and consignees via a digital platform. There is emphasize on the limited timeframe between an order and a delivery as well as the use of spread data retrieved with a common and standardized technology.

Innovations in the urban supply chains contain different forms of click-and-collect and PUDO (pick-up points) solutions and the extreme growth in algorithms and technologies supporting instant deliveries brings also new businesses linking suppliers, customers, and independent couriers, often using bicycles (Dablanc et al., 2017). Although instant delivery is advanced in urban areas, supported by innovative solutions and new business models, it is often limited to grocery and foods delivery (Dablanc et al., 2018). Moreover, the growth of instant delivery entails logistics facilities to be closer to customers to be able to reduce the delivery time (Dablanc et al., 2018).

While instant deliveries in general are rising fast the dominant workforce behind instant deliveries are self-employed couriers using their own vehicle (bicycles, cars or vans) at their own expense and risk (Dablanc et al., 2017). Because customers are unwilling to pay for these services, self-employed courier cyclists have low or lack of job security and demanding work environment. Thus, the concerns with instant deliveries are the increasing road safety and bike traffic, labour conditions of couriers and the sustainability of the business model (Dablanc et al., 2018).

Crowdshipping (Crowd-sourced deliveries)

Novel technologies will generate a strong sharing economy which will impact the daily routine of businesses and individuals (Taniguchi & Thompson, 2018). Due to cost efficiency and price benefits for consumers, business models for sharing will be popular. Resources, goods and services will be shared in economic settings (B2B, C2C and B2C). Sharing economy grows rapidly and generates innovative business models in different sectors and uses collaborative consumption and logistics (Lim et al., 2018). Collaborative logistics allows the sharing of capacities and assets in order to reduce freight and increase utilisation, while its success depends on developing a logistics ecosystem of appropriate stakeholders (including institutions) (Lim et al., 2018).

Crowdshipping is where private drivers offer to execute delivery jobs for other people on trips they would make anyway (Behrend & Meisel, 2018). Crowdshipping is a sharing mobility service, that uses the crowd to deliver goods (McKinnon, 2016).

Crowdshipping are mostly infrequent deliveries made by private persons using the available capacity they have while using their own means of transport (bicycle or private car), therefore it somewhat characterize a subsection of instant deliveries (Dablanc et al., 2017). It makes use of the excess capacity of available transport means by using planned trips to perform such deliveries (also called crowdsourced delivery, collaborative logistics, crowd logistics or cargo hitching) (Behrend & Meisel, 2018). Crowdshipping applies crowd sourcing to the personalised delivery of cargo (McKinnon, 2016). By creating new informal logistics networks for the distribution of small items it chances ordinary people into couriers (McKinnon, 2016).

It is suitable for e-commerce and presents a prospect to improve the efficiency of LMD (Gatta, Marcucci, Nigro, & Serafini, 2019; Serafini, Nigro, Gatta, & Marcucci, 2018). It has the most impact potential to e-commerce and food/groceries-related deliveries (Serafini et al., 2018). Crowdshipping is innovative and has growth potential – environmental and economic. It offers more flexible service at a lower cost than traditional transport services (Punel, Ermagun, & Stathopoulos, 2018). Crowdshipping has potential to reduce congestion, cars on the road, and environmental impact. Moreover, it should be advanced as an “environmental-friendly” service, by focusing on the use of public transport (Serafini et al., 2018). Crowdshipping could help to the progress of a localised type of PI in urban areas in which the goods carrying capacity of freight and personal vehicles is pooled, shared and used more (McKinnon, 2016).

Crowdshipping is still rather rare as, although an efficient use of available resources, there is an issue of insurance and tax, when private user deliver goods by using their own vehicles to generate a profit (Dablanc et al., 2017). The main barrier for development is the dependence on irregular drivers, as it might cause safety, trust, and privacy issues on behalf of the customers (Punel et al., 2018). Even more development of crowdshipping may be hindered by the higher risk of package to be damaged, stolen or lost, although online platforms usually do background checks on the couriers to ensure their trustworthiness (McKinnon, 2016).

Pick up points

Pickup points are places to pick up parcels that are ordered by mail or online (Taniguchi & Thompson, 2015). There are different types of pickup points, such as (1) parcel service points (operated) and can found in supermarkets and stores or (2) pack stations (without an operator using lockers).

Urban Logistics Boxes (ULB) are crossing points between the customer and transporter without any human contact needed at transshipment location (Boudoin et al., 2014). The main advantage with this solution is the control of time. ULB can be mobile (container with diverse shapes and sizes) or fixed (deposits, sieves, parcel boxes). While a microhub is a local transshipment facility for packages having an automated parcel station (APS) as a core physical component, that allows customers to drop off (and sometimes also pick up) packages (Ballare & Lin, 2020). To collect packages from APS is usually made by entering a mobile number and the access code. Both ULS and APS are located in accessible public or private spaces, such as at transit stations, shopping centres, gas stations, etc to provide an easy access (Ballare & Lin, 2020; Boudoin et al., 2014). A microhub have two functions: storing and sorting. While the reception of the

parcel/acknowledgment of the delivery is changed, these boxes declined in various shapes (lockers, premises, automatons) and are mainly adapted to online purchase (e-commerce) (Boudoin et al., 2014).

Some authors have suggested that the combination of the Microhub and crowdshipping (M+C) for the last mile deliveries are likely to reduce truck trips and truck miles of travel, and reduce congestion in urban areas (Ballare & Lin, 2020; Browne et al., 2011). After crowdshippers have collected the packages and brought to the microhub, they are sorted, placed (via automation or by crowdshippers), and then stored in locked boxes labelled by delivery zip code in an APS, until they are picked up by the carrier's in-house delivery fleet and transported to their corresponding destination microhubs (service zones) (Ballare & Lin, 2020). Although they would reduce peak hour congestion in urban areas and delivery costs, the success of the M+C delivery model depends on the willingness of crowdshippers to complete the delivery requirements (Ballare & Lin, 2020). By increasing the compensation paid to crowdshippers would reduce the cost-competitiveness of the delivery model. Moreover, this delivery paradigm is more suitable to the areas with high to medium customer densities and less suited for areas with low customer densities. By locating the microhubs in the urban areas based on the historical demand data could make the M+C delivery paradigm more cost-competitive (Ballare & Lin, 2020). Browne et al. (2011) demonstrated that through extra consolidation efforts and the use of electric vehicles there is possible to accomplish further reductions in total travel distance, greenhouse gas emissions and contributes to air quality improvements and noise reductions.

2.1.3.3 Informational innovations

Informational innovations involve the function of treatment of information, such as dealing with codified information and treatment of information flows within and outside the firm, tracing/tracking (Hyard, 2013). Below different examples of informational innovations are explained.

Delivery as a Service (DaaS)

“Delivery as a Service” (DaaS) indicating new models built on service-oriented delivery and business procedures in compliance with customer need and expectations (Huschebeck & Leonardi, 2020). DaaS concentrates on collaborative logistics solutions that may be more sustainable and convenient, while the advancement and up-scaling of sustainable logistics solutions is the aim. Urban logistics solutions that are DaaS driven can be characterised as: (1) Matching freight operations with mobility activities such as merging parcel pick up with travel to work; (2) Collective use of transport systems using private and public infrastructure in the city; (3) Changing traffic flows related to transport of goods from freight gravity points to decentral UCC (Huschebeck & Leonardi, 2020).

Big data

Big data is available on the freight vehicles, flow of goods and information by collecting data using RFID (Radio Frequency Identification), GPS (Global Positioning Systems) devices, but also the IoT (Internet of Things) (Taniguchi & Thompson, 2018). Big data can influence on managing, analysing and operating urban logistics systems. It has the capability of shifting competition by altering corporate ecosystems, transforming processes, and enabling innovation.

2.1.3.4 Technological innovation

Technological innovations involve use of new technology (Hyard, 2013). Below different examples of technological innovations are explained.

Electrification, automation and robots

Currently most future studies talk about autonomous vehicles in logistics the way to achieve a substantial cost saving by lower or avoiding cost for the driver (Huschebeck & Leonardi, 2020). In the longer term autonomous vehicle technology will impact urban logistics (Taniguchi & Thompson, 2018). It will aim to increase productivity to a higher level. As physical activities such as loading vans and trucks, driving, delivering goods are elements of high cost in urban logistics, thus automation and intelligent robotizing hold the promise of reducing costs and make supply networks with more hand-over points affordable (Taniguchi & Thompson, 2018).

In electrification there are financial, technological and other aspects that can hamper its adoption in urban logistics (Jaller, Otero-Palencia, & Pahwa, 2020). It is seen more suitable for food and retail delivery. On the use of light electric vehicles and electric bikes are the most likely alternatives for the last mile deliveries. As these vehicles are inexpensive, they do not entail complexity for their driving and are ready to be implemented. There is a diversity of options already offered. Taniguchi and Thompson (2018) expect that electric propulsion alternatives will be used in the future, such as cargo bikes and robot technology. For the last mile delivery, the appearance of automation and electrification technologies is on the horizon (Jaller et al., 2020).

There are important developments in the trucks and light vehicles arena for automated vehicles, that manufacturers are generally interested for the long haul (Jaller et al., 2020). There are several tests conducted around the world to use totally automated vehicles for the freight movement still there are some barriers that do not allow the diffusion of these methods. Mainly the laws and regulations that hinder their free operation. Although automated, remote controlled delivery trucks and delivery robots are tested in small scale, they are still technology in progress (Huschebeck & Leonardi, 2020).

Müller et al. (2019) argues that recent efforts to improve efficiency by automating and electrifying the traditional vehicle technology are short-term solutions, as they do not reduce transport demand and will not result in congestion-free cities. Still they might

to be used to serve as a liner service between fixed routes and stops such as between hubs (Huschebeck & Leonardi, 2020).

Drones

In recent years drones are one of the most studied technologies in logistics (Kirschstein, 2020). They blend technological characteristics matching recent trends in transport industry and society like and agility, autonomy and flexibility. Parcel delivery is one of the most common application setups among the different concepts for using drones in logistics. Drones are often declared to be an eco-friendly mean of transportation as they are electric vehicles.

Müller et al. (2019) review airborne drones to be competitive in the future as an alternative to the well-developed car/truck regime. Alternative mode of transport such as ground and airborne drones, electric cargo cycles, are considered to be new transport options for parcel delivery services (Müller et al., 2019). In Europe the drone delivery concept is in the experimental phase. Current regulatory see threats and hazards from drone deliveries and only allow trials and test in the urban areas. They cannot compete with trucks in the truck's market and market rules. Currently delivery drones are explicitly designed to serve the niche market of on-demand instant deliveries (Müller et al., 2019). In the LMD mass market the drone-concept and features are not yet technologically and economically competitive alternative and the use of drones seems to be limited to special or niche market. Taniguchi and Thompson (2018) believes drones to become for explicit delivery purposes.

Drones can be a good use for electric mobility, automated technology sector (Müller et al., 2019). The drone is essentially constructed to be autonomous. Advantages with airborne transportation is efficient transport using by offering an upgrade of infrastructure capacity available in three dimensions. Moreover Kirschstein (2020) claim that often a static drone-based parcel delivery system needs more energy than a truck-based parcel delivery system mostly in urban areas where customer density is high and truck journeys are relatively short. Although for drones there is no need for spending on supporting infrastructure (Müller et al., 2019). For airborne delivery there is just the need for loading, departure, reception, and unloading. The social efficiency gain is tremendous compared to building and maintaining roads, tracks, and channels in the past and future. in technological and organizational terms, the airborne drone would represent a new quality level for ecommerce traders and their distribution channels (Müller et al., 2019).

Physical Internet

Hyperconnected City Logistics (HCL) is a system, that combines and links ideas and principles of urban logistics and Physical Internet (PI) via collaboration and sharing of resources between shippers working in the same urban setting (Crainic, Gendreau, & Jemai, 2020). This will make substantial enhancements in the efficiency and environmental footprint of urban logistics networks (Crainic et al., 2020). While PI itself is a novel idea for logistics and freight transportation aiming to advance the economic, social and environmental sustainability and efficiency of the way in which

physical objects are supplied, transported, stored, realized, and used globally (Crainic et al., 2020). PI offers a complete framework combining automation, digitalization, modularization and sharing economy (Huschebeck & Leonardi, 2020). By using these principles along the supply chain can achieve great saving.

Although there are different innovations and developments in transport sector, it is unclear how these different services can improve mobility and provide access to destinations that were earlier unreachable (Mifsud & Attard, 2019). Moreover, if these advantages are equally distributed to all groups in society, as well as people with accessibility problems (vulnerable ones). Digital divide could be the possible social effects of virtual mobility, as there is a gap in access to ICTs that is defined by person's traits (Kenyon, Lyons, & Rafferty, 2002). People who face social exclusion are highly likely experience digital divide. Digital divide is supported with the absence of relevant content for all groups and the inefficient marketing. Moreover, individuals which face mobility-related exclusion are more exposed to virtual-mobility-related exclusion. (Kenyon et al., 2002). At the same time Goldfarb and Prince (2008) claim, that giving the opportunity, people on the wrong side of the digital divide would use the internet more and participate in many of the online activities officials have stated as the goals of access subsidies. Often internet usage is affected by the value individuals receive from the internet (Goldfarb & Prince, 2008). The adoption and usage of internet follow various patterns. Moreover, service inclusion suggests that all consumers have the capability to get the same level of value that is fundamental in a marketplace exchange and it must be designed and applied through methods to service systems (Fisk et al., 2018)

2.2 Sustainability in logistics

In this part the importance of social sustainability in logistics will be discussed, therefore the discussions around environmental sustainability aspects in logistics are excluded. Different terms, actors and indicators in socially responsible logistics are presented. Finally, the concept of social exclusion will be explained.

2.2.1 Socially responsible logistics

There is a growing concern about environmental (i.e. global warming) and social (i.e. human rights) problems around the world and the business community is focusing on the corporate social responsibility (CSR) (Uyar et al., 2020). CSR is the companies' voluntary involvement to a sustainable development concerning economic, environmental and social dimension (Björklund, 2010). Social responsibility means, that company shall meet social objectives while doing business (Grant et al., 2017). Socially responsible business must voluntarily allocate real company expenditure to encounter the values and objectives of society. Moreover, socially responsible companies assign more importance to issues such as ethical conduct, community involvement, and gender equality (Murphy & Poist, 2002). Popescu (2015) adds that the outcomes of sustainability efforts ultimately influence which sustainability attempts

are taken on (personalised sustainability is benefit for a supply and competitive advantage). To be able to make great progress, firms must set social responsibility as part of the values and not just as an obligation (Grant et al., 2017). Lacking these values, regulations and codes of conduct will not make much difference.

Researchers and businesses have identified several competitive and economic benefits of CSR strategies and practices (Björklund, 2010; Grant et al., 2017). Uyar et al. (2020) add, that the communication of socially and environmentally responsible actions is considered to be very important to demonstrate the importance of CSR issues in a firm, to strengthen relations with the stakeholders, to achieve a competitive advantage, and to improve company reputation and image. According to Macharis et al. (2014) on the long run sustainability will be vital to be part of the logistical sector and advances the firms competitiveness. Moreover, often LSPs work on very low profit margins and by reducing environmental and social impacts they could improve their economic performance (Piecnyk & Björklund, 2015).

Many companies have created standards and guidelines, that can guide businesses with different parts of CSR to be incorporated in their social responsibility act (Björklund, 2010). One of the most relevant and known frameworks for reporting and measuring performance connected to CSR in a standardized way is the Global Reporting Initiatives (GRI). In GRI the logistics and transport sector addition address explicit reporting needs of the sector providing guidelines for transparent disclosure of different indicators relevant to firms involved with the movement of goods (Piecnyk & Björklund, 2015). GRI defines sustainable development, that meets current needs without compromising the needs of future generations (GSSB, 2018). Sustainable development includes three dimensions: economic, environmental and social, referring to broader societal and environmental interests, rather than of specific organizations (GSSB, 2018).

Murphy and Poist (2002) defines socially responsible logistics to pursue socially valuable results along with economically helpful results in responsible logistics manager decision making. Carter and Jennings (2002) find, that Logistics Social Responsibility (LSR) examines issues that relate to socially responsible logistics management. There is the inter-relatedness of company actions in the areas of the environment, human rights, philanthropy, ethics, safety and diversity. Social responsibility is viewed as a vital component for corporate strategy (Murphy & Poist, 2002). They found that logistics companies use two main strategies to respond to social responsibly issues: first by creating codes of ethics/social responsibility and second increasing the education and training of logistics personnel. Third strategy was to report social responsibility efforts/accomplishments (Murphy & Poist, 2002). By developing written policies such as a code of ethics or ISO 14000 certification and opening communication lines, and increasing the amount of official coordination across organizations or functions in the supply chain could be the way to overcome the barrier in coordinating objectives and activities of intimal functions or external members of the supply chain (Carter & Jennings, 2002). Moreover LSP has a vital role in the supply chain to facilitate LSR (Gruchmann, Schmidt, Lubjuhn, Seuring, & Bouman, 2018). LSPs interact and connect with other companies in the network, having a strategic role in supply chain-wide sustainability initiatives (Piecnyk & Björklund, 2015). Currently LSPs do not satisfy the sustainability demands by their stakeholders' (Gruchmann & Seuring, 2018). In order to become more sustainable LSP and shippers must make the

changes in their operation as transportation is often subcontracted to LSPs (Macharis et al., 2014).

2.2.2 Social sustainability indicators in logistics

Carter and Jennings (2002) classified LSR social practices into six topics such as (1) diversity, (2) ethics, (3) working conditions and human rights, (4) safety, (5) philanthropy and (6) community involvement. Moreover Murphy and Poist (2002) identified most important social LSR issue to be the ethical behaviour and safety-related issues (including employee health and safety, safe movement and storage of products).

However, Björklund (2010) listed different social aspect and indicators applied by GRI and examples from the logistics literature to be: (1) labour practices and decent work such as employment, labour/management relations, occupational health and safety, training and education, diversity and equal opportunities; (2) human rights such as investment and procurement practices, non-discrimination, freedom of association and collective bargaining, child labour, forced and compulsory labour; (3) society such as community, corruption, public policy, compliance; (4) product responsibility such as customer health and safety, products and service labelling, marketing communication, compliance. Meanwhile Piecyk and Björklund (2015) made the content analysis of CSR reports published by LSPs and found different indicators dominated the GRI framework. They noted that the consensus of understanding the CSR in the logistics sector has yet to be reached. Although most reports cover social aspect of labour practices and decent work, and some indicators concerning social performance (anti-corruption and community initiatives). They also identified three areas missing from the GRI's reporting framework, such as academic involvement, humanitarian logistics, and employees' health support activities (Piecyk & Björklund, 2015). Moreover, UN (2015b) has a goal to reduce inequalities within and among countries and social inclusion being a human right to achieve an equal society. In Table 2.2 summary of different social sustainability indicators from the literature are presented.

Table 2.2: Summary of different social sustainability indicators from the literature

Social sustainability indicator	LSR	GRI	LSP	UN SDG
Diversity	X	X		
Ethics	X	X		
Working conditions and human rights	X	X		
Safety	X	X		
Philanthropy	X			
Community involvement	X	X		
Academic involvement			X	
Humanitarian logistics			X	
Employees' health support activities			X	
Reduce inequalities				X

2.2.3 Social exclusion due to accessibility

Kenyon et al. (2002) defines social exclusion as the interplay of many different factors, which because in denial of access, to a group or an individual, to participate in the political and social life of the community, resulting in reduced quality of life and tempered life choices, chances and decreased citizenship. Thus social exclusion happens, when people living geographically in a society, but cannot be engaged in its conventional activities (Bocarejo S & Oviedo H, 2012). Kenyon et al. (2002) adds, that mobility dimension to social exclusion could be seen as a lack of access to sufficient transport with the experience of social exclusion by decreased accessibility, to social networks, opportunities, services and goods, strengthening other factors and aspects of exclusion. Bocarejo S and Oviedo H (2012) define social exclusion due mobility as the process where an inexistence or insufficiency of proper means to move, individuals are not able to participate in the political, economic and social life of the society which leads to a reduced accessibility to opportunities. There are no certain or consistent indicators to assess the better access to opportunities, particularly for the most vulnerable parts of the population (Bocarejo S & Oviedo H, 2012). Moreover, mobility-related exclusion affects individuals at different levels - the personal and the community (Kenyon et al., 2002).

The main purpose of mobility is to provide access (Kenyon et al., 2002). Lack of access to sufficient mobility creates lack of access to social networks, opportunities, services and goods. Currently there are inequalities in accessibility and connectivity to transport infrastructure and services (Velaga et al., 2012). There are several and complex cause-effect connections between accessibility limitations and economic and social limitations, and their mixed impacts on life opportunities (Farrington & Farrington, 2005). Accessibility dimension means not just location as a cause, but also characteristics of people, groups and communities that provide less accessibility. These characteristics are to be linked to fundamental connection. Most often used method to define accessibility combines impedances and opportunities (Bocarejo S & Oviedo H, 2012).

While aiming more sustainable transport, alternatives to physical movement should be considered (Cirella, Bąk, Kozlak, Pawłowska, & Borkowski, 2019). In order to achieve more social justice and social inclusion accessibility has been recognized as a conventional policy goal (Farrington & Farrington, 2005). Without greater social inclusion social justice cannot be reached. This entails that individuals have access to a variety of activities considered as normal of their society. Thus, more social inclusion requires more accessibility which often involves the use of transport and mobility. Transport as the solution for access shortcomings is slowly changing to become more holistic view on accessibility that includes broader range of methods than merely (transportation)-based mobility. Accessibility is about the life opportunities available to individuals. However it is not enough alone for social justice and social inclusion, still it is a crucial one. (Farrington & Farrington, 2005).

2.3 Service inclusion through service design

Services function is a social phenomenon as humans are engaged in services and service systems (L. Anderson & Ostrom, 2015). Services and clients operate inside the

sociocultural ecosystems that are a crucial and under explored area of well-being. The picture of well-being is incomplete without adding this aspect. As individuals and consumers, we spend a lot of time engaged in a range of service systems and services, which influence almost every part of our lives. According to Fisk et al. (2018) we live and work in a service systems, like families, cities, states, countries, companies, organizations and authorities. Service influences our well-being and our lives as persons, families, employees, and communities (L. Anderson & Ostrom, 2015). Service systems have had problems and been unfair throughout the history (Fisk et al., 2018). Moreover, they have created service exclusion, when they intentionally or not knowingly do not include or sufficiently serve customers in a fair manner. Currently the service sector has not tackled how service establishments could offer quality of services to all consumers, involving the ones who enter service systems or organizations with vulnerabilities, disabilities, non-traditional roles, or migrant and refugee status.

Service inclusion being a human right and UN sustainable development goal to achieve an equal society, where everyone has equal rights and opportunities whatever of eg. age, religion, gender, ethnicity, functional variation and other status (UN, 2015b). Fisk et al. (2018) describes service inclusion happening when all customers could receive the same level of value that is essential in a marketplace trade, requires equal system that offers customers fair access to a service, fair treatment during a service and fair opportunity to exit a service. Even more service inclusion must be designed and applied through methods that shift all service systems into inclusive life-encouraging practices. Service inclusion indicates that all consumers have the capability to get the same level of value that is fundamental in a marketplace exchange. Hence, inclusive services enable opportunities, offer choices [...] for all members in the service system (employees, clients, communities, etc.) and supports to increased well-being at collective and individual levels (Fisk et al., 2018).

According to L. Anderson and Ostrom (2015) transformative service research (TSR) concentrates on generating “uplifting changes” meant at enhancing the families, persons lives (both employees and consumers), society, communities, and the ecosystem more generally. TSR puts decreasing and increasing of well-being in the centre. Service theory and research is built on the value co-creation and focused less on the value destruction or negative service. Negative service/co-destruction may occur due different reasons, including the lack of desire consumer’s has to be in a situation to need the service, the ill-being or chronic nature of the consumer’s status, prejudices, power dynamics, trade-off choices concerning service design that might disadvantage some customer groups, marginalization, and/or stress (L. Anderson & Ostrom, 2015). When users interact with service providers they could lack appropriate resources, knowledge and social network, worsening difficulties and causing casting and discrimination that may result in stressful, unproductive and damaging service encounters (Fisk et al., 2018).

Although social exclusion could never be entirely removed, it can be decreased through service design, that accounts for diversity of humans and by making this way resources accessible to consumers that enable access to services (Fisk et al., 2018). This will result with improved personal well-being and quality of life throughout the population. Real fairness in service design must be inclusive at all levels – personal, society and national. Fisk et al. (2018) recommends the holistic, complex service design method for service systems development. While the inclusion is personal experience and dependent on persons own frame of reference and experiences in life, therefore service inclusion

should focus on person's opinions already at the design phase. It is a challenge to meet everybody's service needs and it requires new methods when designing the service systems, concepts and meetings (Fisk et al., 2018). Inclusive design connects the user genuinely during the design process, communicating practices and integrating individuals unique expertise as technological interventions and is inclusive by including diversity (Maragiannis & Ashford, 2019). In Europe inclusive design is applied and it goes beyond gender, ethnicity, age, and disabilities to concentrate to provide conventional solutions on additional excluded groups.

According to Fisk et al. (2018) service inclusion is multifaceted and include enabling opportunities and offering choice. Empowering people via access to services and co-create and receive valued service. Effective service should allow customers to feel, think or do things that they could not do before. Service companies can decrease the amount of vulnerable and disadvantaged consumers by empowering opportunities. Inclusion must empower opportunities for vulnerable consumers to become value creators instead the victims of disservice (Fisk et al., 2018). Academics as well as practitioners has commonly emphasized and acknowledged, that it is not appropriate to apply the generic and traditional "one size fits all" approach anymore (Dethloff et al., 2015). Otherwise some customer groups are being over- or underserved. All persons should have complete rights to be served and not discriminated or disserved (Fisk et al., 2018). The shopping channel has a significant role in many socially excluded respondents lives (Dennis, Bourlakis, Alamanos, Papagiannidis, & Brakus, 2017). While virtual shopping channels could be seen more accessible compared to traditional B&M stores, they may offer an alternative for disabled customers and thus offset the negative impact of the social exclusion (Oláh et al., 2018).

Moreover, LSPs must overcome the high degree of homogeneity across current logistics practices that permits easy imitation by other companies (Gruchmann & Seuring, 2018). Due to their complexity the social benefits of logistic services are particularly hard to imitate. It is necessary to increase service divergence as markets become more competitive (Lu & De Bock, 2016). A valuable source for differentiation of LSPs are use of innovative ICTs in combination with value added services (Dethloff et al., 2015). It can be done by offering different services to different locations and offering a bigger variety of channel and service options for the customers. Sustainable service offering can be also seen as a way for differentiation and innovation (Pieczyk & Björklund, 2015). To solve resistances for more sustainable logistics services choices by the consumer, it is important to reach a situation and context-dependent arrangement of the different distribution channels due to mobility preferences of the consumers and regional settings (Gruchmann et al., 2018). Logistics service offers should be personalised to particular target groups since sustainability value-belief-norms (Stern, Kalof, Dietz, & Guagnano, 1995) could impact the logistic and consumption choices of different groups (Gruchmann et al., 2018). Considering that population is aging around the world service organizations must understand the realities related with serving increasing numbers of disabled consumers (Fisk et al., 2018).

Overall, holistic advertising, communication, but also pricing structures, must set to encourage sustainable "logistics" lifestyles, consumption behaviour and empower consumers (Gruchmann et al., 2018). Often the costs linked to sustainable or environmentally friendly products are generally passed on to the customers and while most consumers still want to avoid logistics service fees as part of the product, making the appreciation for logistics services and its sustainability effects low. To enlarge the

consumer's awareness, it is important to communicate and to justify higher prices for more sustainable logistics services. Retailers must help LSPs by emphasizing the gains of sustainable products (Gruchmann et al., 2018). Communication is an important factor to encourage everybody to act sustainably and raise awareness of important trade-offs to be considered in sustainable development (Oláh et al., 2018). Also, sustainability could be promoted by an organization through economic factors e.g., quality products, low prices, as well reduced transport charges. By increasing customers' consciousness of online shopping, overcoming risk perceptions reducing order lead times, retailers could stimulate and convince customers to adopt healthier shopping patterns while nudging them (Huyghe, Verstraeten, Geuens, & Van Kerckhove, 2017). For retailers it is also important to ensure the safety of their websites, as shopping online demands a higher level of trust for consumer (Oláh et al., 2018). It is crucial to collaborate and to share responsibility between all stakeholders in the virtual market. E-commerce is powered by social interaction where consumers can comment and get direct feedback via e-services and e-support provided by salesperson on online platforms. Since consumer demands are changing over time communication between consumers and companies have been made possible (Oláh et al., 2018).

Moreover information exchange and logistics measurement capabilities increases the transparency and reliability of LSPs' practices within the whole supply chain (Gruchmann & Seuring, 2018). It offers the opportunity to design new business models which require that LSPs can lead the implementation of further LSR practices. Logistic companies must define and consider new business models as alternative to their current practices and approaches by addressing customer needs more efficiently and offering new services to customers through traditional and new forms of value (Boschian & Paganelli, 2016). If the business model plan is not adjusted accurately to the competitive setting, then outstanding governance, leadership, high goods and technology do not determine sustainable gainfulness (Popescu, 2015).

2.4 Synthesis

Urban logistics presents freight movements and supportive services in urban areas. Urban logistics services aim to increase the performance of the urban distribution system making it more efficient by coordinating and consolidating. It is a notion that includes different stakeholders, organisations, logistics schemes that act in a dense environment having public and private sphere. While goods mobility shares the same infrastructure with personal mobility, thus they share the issues and need to cooperate. Moreover, citizens and customers are stakeholders, as they use or complete urban logistics services. Figure 2.1 illustrates the different literature streams that affect urban logistics and that was discussed above. It shows different aspects such as e-commerce, innovations and social responsibility influencing the urban logistics system and must be considered.

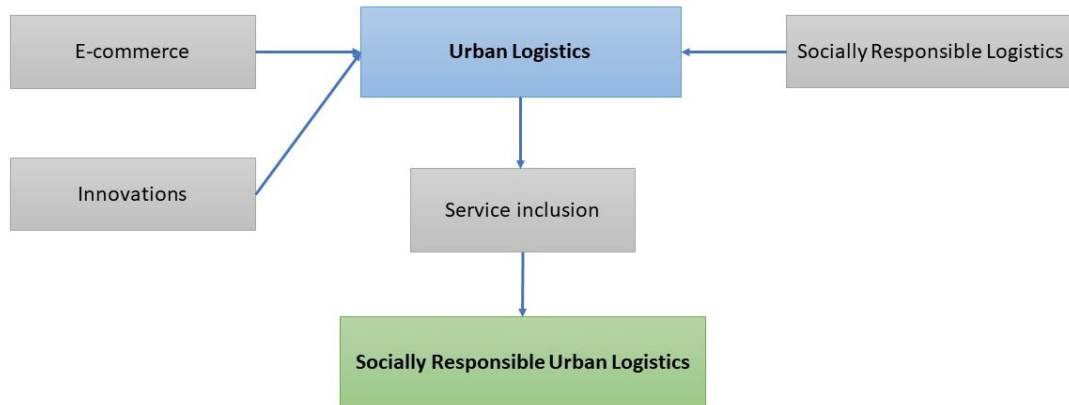


Figure 2.1: Illustration of the literature review.

E-commerce is impacting the urban logistics system and drawing new schemes of urban deliveries and organisations. E-commerce influence parcel deliveries and returns, the tracking of vehicles and shipments and its execution. Last mile delivery is the last (or first) part of the parcel delivery service and provides large variety of delivery options. E-commerce has changed the urban logistics into customer driven concept and is one of the main drivers for urban logistics innovations. E-commerce can contribute to defining new services and products by increasing the supply of possibilities for deliveries of parcels and other goods and offer matching services.

Meanwhile, globalisation and technological developments have created need for new business models and improved logistics services. Urban logistics is impacted on innovations and different trends. Innovative solutions will enhance the urban logistics system. Most innovations in this sector aim to consolidation of goods flows in the city, use of new non (less) polluting vehicles or regulation. These new developments will change the market and challenge the future sustainability of the companies. Currently these developments exclude some part of the population. Although services could appear to be more accessible, they may lack alternatives for different groups in a society. One must have a socially responsible approach to urban logistics for achieving inclusivity and to reach for the UN SDG. Inclusive design connects the user genuinely during the design process, integrating individual's unique expertise and communicating practices as technological interventions and is inclusive by including diversity. More sustainable logistics development demands for innovative thinking. Sustainable service offering is the way for differentiation and innovation. If these are applied well then urban logistics services can achieve service inclusion. Urban logistics should use e-commerce, innovations and social responsibility as a leverage to achieve service inclusion and for an effective transition to socially responsible urban logistics. Figure 2.2 has been created to illustrate different dimensions of socially responsible urban logistics system.

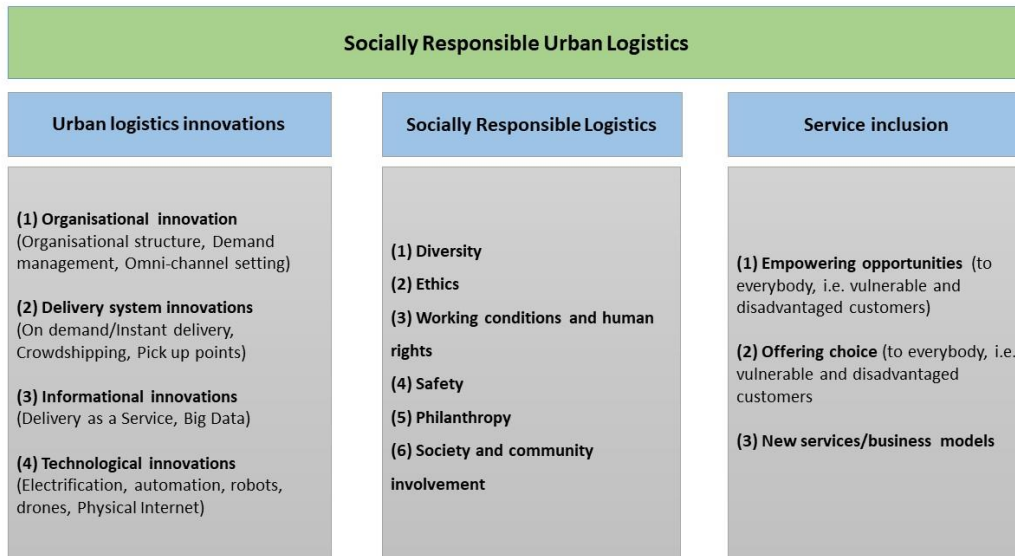


Figure 2.2: Analytical framework developed from the literature review. The dimensions that must be considered in order to develop inclusive Socially Responsible Urban Logistics.

3 Method

In this chapter the used methods in the second phase of the research is explained. This study is using deductive content analysis approach combined with some semi structured interviews during the time of the emergency, such as pandemic covid-19.

3.1 Research design

At the beginning of the study the aim of the study concentrated mostly on the urban logistics services in the context of e-commerce and the aging population, as they were the ones most disadvantaged groups. Meanwhile the corona crisis (covid-19) happened, and scope of the study enlarged together with the crisis. While there already existed disadvantages in the system, the crisis extended the scope and scaled up the challenges and inequalities in the region. Thus, the aim of the study became more generally about the access of the goods during the corona crisis while the elderly people were still the most affected ones.

According to McMillan (2000) content analysis can be used in the dynamic communication setting such as web and it brings the communication ideas into focus (McMillan, 2000). Thus, content analysis has been applied to investigate the content of the media sites (news, articles, social media), company documents (homepages, reports, webinar). This was supported with some semi structured interviews. Content analysis is a research method used for defining of the visible content of communication in the objective, systematic, and quantitative way (Berelson, 1952). Content analysis usually includes five steps such as (1) formulate the research question or the hypothesis; (2) deciding the sample; (3) identifying the coding categories; (4) teaching the coders and (5) interpreting and explaining the coded data (McMillan, 2000). Although the fourth step includes teaching the coders has not been applied, since the study has been conducted by one person, different steps used throughout the study are illustrated in Figure 3.1.

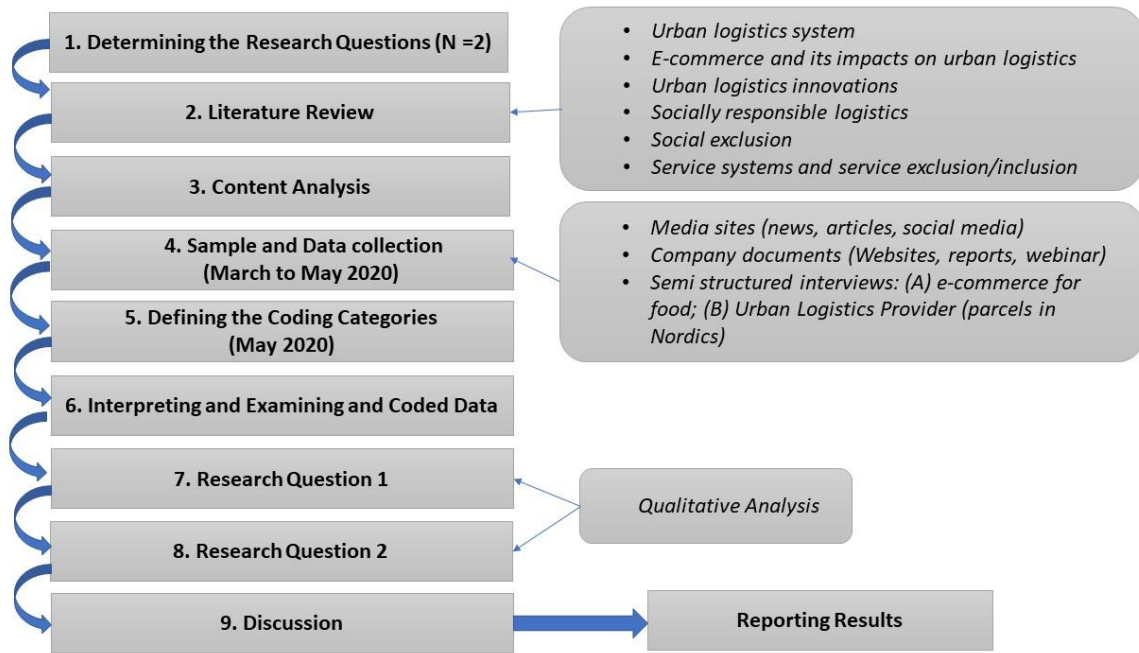


Figure 3.1: Illustration of the used method (Content analysis study).

3.2 Sampling and data collection

As discussed by McMillan (2000) the second step in the content analysis is deciding the samples. Also it requires to know about the findings from earlier research to know your topic of the study (Yin, 2015). Thus, using snowball method to theoretical part of the study the literature review was conducted in order to understand the context and characteristics of the urban logistics system, e-commerce and its impact on urban logistics, urban logistics innovations, socially responsible logistics, social exclusion and service systems, exclusion/inclusion. Literature review provides a snapshot of the diversity of theoretical approaches presented in the literature. It does not cover all the literature instead offers an informative and focused evaluation of purposefully selected literature to answer specific research questions. Based on the literature review the analytical framework was created as shown in Figure 2.2. These were the basis for the data collection and the analysis.

As for researchers the Internet is a rich resource to be able to use as: a research tool, a field of study, and for academic communication (Margolis & Pauwels, 2011). The search motor “google” was used to detect different solutions provided during the time of an emergency such as pandemic covid-19. The samples were collected during the period from March to May 2020, when all different initiatives emerged, and crisis occurred. Example of the keywords that were used to find the initiatives from the internet were: “access to goods and services during corona”, “logistics + covid-19”, “last mile delivery + covid-19”, “e-commerce + corona”, “e-commerce + covid-19” etc. First the data was collected by observing the developments around the world and within the country (Sweden) to detect the emerging logistics service solutions focusing on the last mile delivery during the Coronavirus crisis. This included the collection of secondary recourses about the actual events and initiatives covered by different media

sites (news, articles, social media), company documents (websites, reports, webinar), applications etc to then place them into different categories. Only data published in Swedish or in English was used.

Analytical framework presented in Figure 2.2 gave basis for the interview guide for semi-structured expert interviews with different stakeholders (see Appendix 1: Interview guide, expert interviews). Stakeholders were different logistics service providers (LSPs) presenting private and public sector during the time of the pandemic covid-19 such as municipality (e.g. responsible for the different social services - hemtjänst, äldreboende), companies e.g. grocery stores (traditional B&M/online), pharmacy (traditional B&M/online) etc. In total several organisations were contacted by e-mail among them four grocery stores, three online food home delivery providers, one online pharmacy, two regular pharmacies, public authority for elderly support and one parcel delivery provider. While only two respondents had time for an interview. Semi-structured expert interviews were conducted online using VoIP media with the (A) e-commerce for food company; (B) logistics service provider for parcel deliveries in Nordics. Skype creates new opportunities by letting people to be in contact around the world in a time financially affordable and efficient way (Lo Iacono, Symonds, & Brown, 2016). Moreover, for qualitative researchers, VoIP facilitated interviews work well as a feasible alternative or complimentary data collection tool, without substituting face to face communication entirely. The interview focused in the solutions and offerings, that were provided during the coronavirus crisis and prior the crisis, but also their social sustainability efforts. Both interviews were conducted in English, recorded and transcribed with the approval from the interviewees. Moreover, study was conducted from distance without any physical contact with the research objects or stakeholders, using different online tools and web sources.

3.3 Data analysis

To answer the research questions the selected samples were examined using deductive content analysis of a text as an empirical evidence, in which coding and categorization is a crucial element (Halldorsson & Macbeth, 2011) and a third step in the content analysis (McMillan, 2000). Analysis is twofold, as first aim is to understand what were the initiatives that emerged to provide equal access to essential goods and services during covid-19 crisis. Then to understand how these different urban logistics initiatives could be applied to achieve better inclusivity under crisis conditions.

To be able to map the response that urban logistics system had an analytical framework (shown in Figure 2.2) created through literature study was used. For the data sampling there are two sets of evidence used. First, all initiatives were mapped and recorded. The first dataset is based on the various online sources covering different aspects of last mile delivery services during the covid-19 around the world. Each source was added in the table with the valuable information such as the illustrative words from original field notes/source, whose initiative, type of solution, actors involved, date published or collected and the source with the link/file. Illustration of collected data can be seen in Figure 3.2.

Category	Delivery mode	Literature code (level 3)	Illustrative words from original field notes/source	Company/Provider (Label 1)	Type of solution	Actors involved (in delivering the solution)	Source	Date	Link/File name
innovation	instant delivery		Fresh groceries and pharmacy products from the local stores delivered in 40 minutes by foodies using walking or bicycles as a delivery mode. Online service is in Swedish and in English.	E-commerce company Citizens (Consumer) State Local authorities Other solution provider (Label 1)	Peer to peer Online (web site) Store-based Smart device - based (App)	E-commerce company Citizens/Consumers State Local authorities Other actors (Label 1)	Yemba	24-mar	https://www.4.se/nyheter/ny-lagst-halvor-ill-med-matlag-og-de-computer
innovation	on demand delivery		For everyone's safety, we are currently avoiding physical contact at the time of delivery. We therefore place the goods outside the door, call and confirm that you receive your goods.	e-grocery	Online (web site)	e-grocery, LSP, consumer	Mathem	24-mar	https://www.mathem.se/artiklar/covid-19
innovation	instant delivery		Contactless delivery is set by default. This enables your order to be left at your door without contact to ensure as safe a delivery experience with us as possible. Drivers are advised to minimize contact with customers and avoid touching the handles of the delivery bag.	e-grocery	online, (Peer to Peer)	e-commerce, LSP, citizens, consumers	Foodora	24-mar	https://www.foodora.se/en/contact/covid19?r=1
innovation	instant delivery		Orders which have been in areas with widespread transmission are kept at home. They will receive full pay for their missed work hours.	e-grocery	online, (Peer to Peer)	e-commerce, LSP, citizens, consumers	Foodora	24-mar	https://www.foodora.se/en/contact/covid19?r=1
innovation	instant delivery		Cooperation between Coop and the non-profit organization "Äldrekontakt" (translated to eng. Elderly Contact) help isolated elderly people to buy food by bringing together elderly people with volunteers in the immediate area. Contact with the elderly takes place by phone, being much appreciated by this group, and the food box is left outside the door to reduce the risk of infection. To facilitate the purchase, the volunteers who shop for an elderly person can pay with a digital purchasing service in Coop's stores, so that they do not have to spend money themselves. The payment is then processed afterwards via invoice and is adjusted based on the payment method that the elderly person has access to.	NGO/grocery store	online, store based, peer to peer	Grocery store, NGO, citizens, consumers	Coop	01-mar	https://www.coop.se/global-portal/pressmeddelande
innovation	instant delivery		During the time of covid connecting volunteers with people who need help around the world.	NGO	online (web site), Smart device (App)	NGO, citizens, consumers	Helping Hands	24-mar	https://www.helpinghands.org/
innovation	instant delivery		Helping Hands is for the Vulnerable and Elderly Against Coronavirus. To help you buy groceries or ask for help with shopping if self-isolation is not possible, we are offering financial and practical support. If you need help, please contact us.	Social media	Others, platform				

Figure 3.2: Example of data coding.

Next, deductive content analysis (general to specific) was used to understand full meaning behind these chosen initiatives. During the analysis phase all these different types of solutions/innovations were coded and placed into different categories using analytic framework (Figure 2.2). For this purpose, each chosen initiative was given initial code such as innovation, social responsibility or other. Based on these categorizations, additional sub categorization (level 2) and finally literature code (level 3) was done to divide all these different initiatives. Example of different coding categories are presented in Table 3.1, where one example could be the initial code being “innovation”, category code being “organisational” and literature code being “Demand management”. The database search was conducted in the limited timeframe from March to May 2020. Database research was stopped until there was a theoretical saturation and the findings started to repeat themselves. Out of 187 different posts that were collected from various online sources 75 presented various initiatives.

Table 3.1: Examples of coding categories used for data analysis.

Initial code (Level 1)	Category code (Level 2)	Literature code (level 3)	
Innovation	Organisational	Demand management	
		Omni-channel setting	
	Delivery system	Crowdshipping	
		On demand/ Instant delivery	
		Pick up points	
	Informational	Digital tools	
	Technological	Drones	
		Robots	
		Autonomous vehicles	
		Electrification	
	Social sustainability	Socially Responsible Logistics	Health & Safety
			Working conditions and human rights
Ethics			
Philanthropy			
Community involvement			
Service inclusion		Offering choice	
		Empowering opportunities	
		New business model/services	

In order to understand the local Swedish context better the primary database evidences included two semi structured expert interviews with urban logistics providers. Finally, the findings were compared and analysed. Using coding and content analysis enabled to compare the results with factors identified in the literature review and provide insight into what are the opportunities to create more inclusivity by LSP in the urban areas during the crisis situation.

3.4 Research Quality

As stated by Halldórsson and Aastrup (2003) in order to evaluate the research efforts of the researches using qualitative research approach on logistics problems, then issues such as (1) credibility; (2) transferability and contextualism and (3) trackability and explicitly should be taken into account. One of the main limitations of this study is that

the research is done by the sole coder. However, data source triangulation was used to address validity and to approve findings (Golafshani, 2003). Credibility of this paper is provided by combining secondary sources (online such as media, company documents, webinar), supported with primary sources (semi structured interviews). Although findings are specific to the context by triangulating with the data around the world transferability has provided. Moreover, different theoretical perspectives have been used to give contextualism to the findings. Trackability has been considered by providing links to the original sources and the dates when and where these were collected or published.

4 Findings

In this chapter, the results from the collected and analysed data are presented. The results are based on the secondary data and supported with interviews. Secondary data was analysed using content analysis and semi structured expert interviews support or help to elaborate on these findings. The aim is to map the respond and measures taken during the covid-19 and which patterns occurred. All interviews were conducted using an interview guide, see Appendix 1. More detailed coded results from the secondary data and semi-structured expert interviews can be found in Appendix 2, 3, 4, 5, 6. Analysis is based on the dimensions and framework developed through the literature study (shown in Figure 2.2). The findings gave insight what are the emerging logistics service solutions focusing on last-mile delivery in response to the covid-19 in order to leverage these for achieving better inclusivity under crisis conditions.

4.1 Research context

At the end of December 2019 China notifies the World Health Organization (WHO) of an unknown virus that has caused 41 incidents of pneumonia in the city of Wuhan, Hubei Province (SVT, 2020a). In March 11, the coronavirus outbreak becomes a pandemic and the first person in Sweden in upper 70s dies in covid-19 (SVT, 2020a). While most countries chose to completely shut down the whole country, Sweden chose to keep the country fairly opened and require the citizens to take responsibility themselves by social distancing, limit gathering, practice high hygiene, stay home when ill or feeling some of the symptoms (Public Health Agency, 2020, Webinar). Most professions have been advised to work from home (distance) the capacity possible or close the ones that has a lot of public interference (such as gyms, theatres, hairdressers, swimming pools, concerts etc). Public assembling was restricted up to 50 persons. According to Krisinformation (2020), the risk groups are people 70 year old and older, people with high blood pressure, cardiovascular disease, lung disease (not asthma), severe obesity, diabetes, but also pregnant are advised to stay at home and avoid all social contacts (SVT news, 2020). Moreover, immigrants and elderly seem to be more vulnerable and affected from the disease. According to authorities *“People living in socio-economically vulnerable areas were at a higher risk of contracting covid-19 so seriously that they need hospital care.”* (SVT news, April 2020).

Although there were restrictions for people to travel in- and outside the country, border crossings for freight transport was constantly allowed all over Europe (Webinar, 2020; UK, 2020; UPS, 2020). Also noted by EU (2020): *“The European Commission’s response to the COVID-19 pandemic prioritises keeping citizens healthy. This includes keeping essential transport moving, for example to transport medical supplies and other essential goods.”* Furthermore, there was always a risk that situation will worsen and there will be harder restrictions. This meant changes for the urban logistics environment, having new regulations and risk, it also created the new demand for the urban logistics services.

According to Supply Chain Effect (2020) there was 32 % growth in e-commerce B2C segment and parcel deliveries during the period of February to March. B2B shipments have decreased as many stores and restaurants were closed (Webinar, 2020). Meanwhile there has been a change in the products segments. There was a decline for some products segments, such as fashion and clothes, while there has been an increase of pharmacy products, groceries, handcrafts and ICTs (Supply Chain Effect, 2020;

Carufel, 2020). Because there was demand surge, the transit times increased and existing services could not cope with it, causing lot of pressure on urban logistics services and service providers.

The corona virus being a deadly disease made people worried and forced them to follow new regulations and isolate themselves. As people stayed home, they started using more online services, such as e-commerce (e-grocery, e-pharmacy). Companies providing the services struggled to manage the demand, but also social distancing and new hygiene requirements, as well as personnel getting sick. To combat all these new issues companies and other stakeholders used different innovative methods to get and provide access to goods and services to all people taking actions to stop the virus from spreading. The analytical framework illustrated on Figure 2.2 has been used to be able to answer the research questions and to map the response that LSP had during the time of corona crisis. Below different findings are presented.

4.2 Urban logistics innovations

In order to provide access to goods and services during the pandemic, there were different innovative solutions used. These innovations have been divided into different categories such as: (1) organisational; (2) delivery system (3) informational; (4) technological. Summary of the findings is presented in Table 4.1. Below these different innovative solutions are discussed in more detail.

Table 4.1: Summary of different innovative solutions used during covid-19.

Urban logistics innovations	Categories	Sub-categories	Illustrative quotes/evidence
Organisational	Demand management	Time-based measures	Grocery stores open earlier for risk groups in corona times
			LSP adjusted the timeframe for their evening deliveries from 5 to 9 pm to start from noon until 9 pm, but also making some deliveries on Saturdays
		Price-based measures	“Free of charge home delivery in Gothenburg area”
		Quantity-based measures	“Several supermarkets have limited the sales of certain products to avoid them selling out completely.”
			now order from a list of 47 essential items over the phone and pay for the items when delivered.
			For prescription drugs, we dispatch for a maximum of 90 days.
			The acceptance weight for the parcels was increased from up to 2 kg instead up to 4 kg.

		Combination of price- and quantity-based measures	“Vejbæk-Zerr decided that if anyone bought two bottles of hand sanitiser at his supermarket, the second would be priced at 1,000 Danish kroner”
	Omni-channel setting	Merging offline and online functions	B&M stores merging functions and roles between offline and online services
		Expanding ordering and delivery system options	ICA has added to the regular e-store a meal app Ica Pronto, where you can order selected items and ready-made food from a local Ica store directly to your doorstep.
			Retailers extended their omni channel setting by joining the collaborative e-grocery services. This allowed them additional ordering and on demand delivery with instant deliveries
Delivery system	Crowd-shipping	Peer to peer	Help elderly people in the neighbourhood with the grocery shopping by handing out pieces of paper into older people's mailboxes
		NGOs/ aid organisations	“Financial transactions are managed via FIKK so that both aid seekers and volunteers can feel secure.”
		Collaboration	Grocery store and NGO join forces to help isolated elderly people to buy food or prescription drugs by bringing together elderly people with volunteers in the immediate area.
	On demand/ Instant delivery	Instant e-groceries and e-pharmacy	Grocery stores and pharmacies started to offer instant delivery service
		Contactless delivery	“This enables your order to be left at your door without contact. Drivers are advised to minimize contact with customers and avoid touching the handles of the delivery bag.”
	Pick up points	Home delivery	Grocery stores and pharmacies started to enable home deliveries
		Alternative origins or destinations	To order products by phone, pay and collect their goods at the pharmacy or outside the building
			Possibility of ordering delivery of rural mail carriers. The recipient then does not have to go

			to the agent and can calmly wait for home delivery
		Contactless delivery	For home delivery, the physical contact was limited or avoided completely by placing goods behind the door or at the parking lot
		Employment	Employment extra personnel. Store employees becoming LSP
Informational	Digital tools	Training new personnel	To set up screens to meet and train new personnel contactless
		Customer service	Digital way of communicating with the end customer. To get answers to the questions regarding where the shipments are, about the invoices
		Digital signing	Digital signing for home deliveries, which meant that after receiving the order, that has left by LSP outside the end customer's door they will receive a SMS with a link where customer confirms receiving the order
Technological	Drones	Contactless delivery (Avoiding human contact)	Drones where used to deliver medicine to elderly by an LSP company when delivering prescription drugs from a pharmacy to elderly residence
	Robots	Deliver contactless and kill viruses	autonomously kill viruses and bacteria with ultraviolet light, but also deliver food in the hospitals
		Unmanned supermarket	wholly unmanned supermarkets to buy essential goods in the epicentre of the outbreak
	Autonomous vehicles	Unmanned delivery	Food and necessary medical supplies were transported to health-care professionals and the public in infected areas with autonomous vehicles.
	Electrification	Electric cars	Pharmacy using electric cars to make home deliveries.

4.2.1 Organisational innovations

Companies used different organisational innovations to manage the new demand and new restrictions such as demand management, omni channel setting. Below these findings are discussed in more detail.

Demand management (DM)

New restrictions and need to protect the public health, changed the demand and the way organisations were able to work during pandemic. Companies used various DM methods to regulate the customer demand and their responsiveness.

Time based measures. Some retailers used DM by adjusting shopping times for in-store shopping. This was seen when different grocery stores offered specific timeslots for grocery shopping for elderly or risk groups. Such solutions were introduced to separate different market segments and protect the more vulnerable consumers. A similar time-based solution was applied to e-groceries as well when some stores offered special delivery times for the elderly consumers' online purchases. Such solutions were provided to assure access to food products by the segments of the population who cannot leave their homes. Evidence for this can be seen here: "*Coop is trying to ensure that seniors 70+ get their food. Therefore, specific delivery times for that group have now been added.*" (Coop, 2020).

The other reason to adjust time was to avoid congestions in the network. As example LSP for parcel deliveries adjusted the timeframe for their evening deliveries from 5 to 9 pm to start from noon until 9 pm, but also making some deliveries on Saturdays.

Quantity-based measures. In order to prevent stockpiling and having problems with the supply of certain products such as toilet paper, personal hygiene products, durable food products (pasta, rice etc) retailers limited the sales of these products per person or per household. The example could be seen here: "*Several supermarkets have limited the sales of certain products to avoid them selling out completely. The move comes as supermarkets continue to try to stop customers stockpiling*" (BBC UK, 2020). Some pharmacies used quantity-based measures to limit the sales for prescription drugs and avoid stockpiling, as discussed here: "*We prioritize orders with prescription drugs (delivery up to 4-5 working days) as well few other medicines. For prescription drugs, we dispatch for a maximum of 90 days*". (Apoteket, 2020).

In order to ensure that all customers get access to essential products, even the ones that are not comfortable or familiar with online shopping, can now order from a list of 47 essential items over the phone and pay for the items when delivered. (Charged retail UK, 2020). On another hand to manage the higher capacity of parcel deliveries LSP for parcels increased acceptance weight for in Mailbox parcels from up to 2 kg instead up to 4 kg (Webinar, 2020).

Price-based measures. DM was used by regulating the price by adding an extra cost or removing the delivery cost. The additional surcharge was added by the LSP for international parcels and freight shipments to manage responsiveness. Meanwhile free home deliveries within certain area was offered by e-grocery, sometimes for special customer group. An example of free home deliveries can be evidenced here: "*Free of charge home delivery in Gothenburg area*" (Spice on Wheels, 2020).

Combination of price- and quantity-based measures was evidenced when grocery store tried to stop people from stockpiling and charged the second item much higher price: "*On the weekend, Vejgård-Zerr decided that if anyone bought two bottles of hand sanitiser at his supermarket, the second would be priced at 1,000 Danish kroner*" (The Local, 2020).

Omni-channel setting

During the spread of the covid-19 several grocery stores and pharmacies started to extend their omni-channel settings, when merging functions and roles between offline and online services. As customers were having issues of going to the traditional B&M shops, grocery stores and pharmacies added more channels to enable access to their goods and services.

Merging offline and online functions. Some retailers made it possible to order goods by phone, by website or/and by app and then to be picked up from the store or delivered home. Other type of solution was discussed when regular pharmacy started offering new service, that allows customers to order products by phone, pay and collect their goods at the pharmacy or outside the building (Apoteksgruppen, 2020). Furthermore, they started to allow to pick up medicines by someone else than customer themselves when having a mandate as discussed here: *“The employees will meet the customer outside the pharmacy to pick up/deliver the order. Customer could also pay via swish app”* (SVT News, 2020).

LSP for parcels discussed of merging offline and online customer support when customers can get information about their shipments and invoiced by phone, online chat or online account. (Webinar, 2020). This has enabled them to manage the higher demand and made the interaction with customers more efficient.

Expanding ordering and delivery system options. Some retailers extended their omni channel setting by expanding their ordering and delivery system options and merging e-grocery with readymade food. In some cases, it was done alone, or others joined collaborative e-grocery services. This allowed retailers an additional ordering and pick up option (Coop, 2020; Vembla, 2020; DI, 2020; Apoteksgruppen, 2020; UberEats, 2020). Collaboration was done with other stakeholders, such as other LSC, FSI; LSP, ISI. In some cases, it included even new investors (DI, 2020). An example of grocery store expanding their services can be evidenced here: *“ICA has added to the regular e-store a meal app Ica Pronto, where you can order selected items and ready-made food from a local Ica store directly to your doorstep.”* (The Local, 2020).

4.2.2 Delivery system innovations

Different delivery system innovations were used by different actors such as crowdshipping, on demand/instant deliveries and pick-up points. Below these findings are discussed in more detail.

Crowdshipping

During the covid-19 several crowdshipping initiatives emerged. This was discussed when volunteers offered their help for the risk groups in their neighbourhood with their everyday tasks such as grocery shopping, walking the dog or posting a letter, but also with language issues (SVT News, 2020). These were advertised online or offline. An evidence of this is discussed here: *“Volunteers in the Järva area have now started Järva assistance, which helps isolated neighbours with cases and disseminates community information in several languages.”* (SVT News, 2020).

Several online platforms were created to connect volunteers with people in need. Some volunteers created online site to mediate the volunteers and people in need, example in

social media (Facebook, 2020) or special websites to help to offer better matching opportunities (Helping Hands, 2020; Vi mot Corona, 2020).

Some aid organisations mediated volunteers and aid seeker and offered support the financial transaction. This was done to facilitate safer crowdshipping process between the parties. This can be evidenced here: *“Financial transactions are managed via FIKK so that both aid seekers and volunteers can feel secure.”* (FIKK, 2020).

Collaborations. Some municipalities had collaboration with other organisations to help to perform the home deliveries for the risk groups, such as volunteers from aid organisations or church (City of Gothenburg, 2020; Apoteksgruppen, 2020). The other type of solution was the collaboration between the grocery and NGO to help isolated elderly people to buy food or prescription drugs by bringing together elderly people with volunteers in the immediate area. One example is discussed by Coop (2020) where they connect elderly with volunteers through NGO. The contact with the elderly took place by phone, being much appreciated by this group, and the food box was left outside the door to reduce the risk of infection. The volunteers who shop for an elderly person can pay with a digital purchasing service in stores, so that they do not have to spend money themselves. The payment is then processed afterwards via invoice and is adjusted based on the payment method that the elderly person has access to (Coop, 2020).

On-demand/Instant delivery

During the covid-19 crisis on-demand deliveries as well as instant deliveries (delivery less than 2 hours) became more popular. While people avoided traditional stores and restaurants, they started to order food and medicine online to be delivered at their doorsteps (Allt om Stockholm, 2020). More grocery store, pharmacies and restaurants joined these different collaborative online platforms providing instant deliveries (DI, 2020; Breaking Views, 2020; Apoteksgruppen, 2020). More restaurants joining instant deliveries has been noted here: *“In March, almost 500 percent more new restaurants joined Uber Eats compared to January. This is the highest percentage increase in Europe, according to a press release.”* (Allt om Stockholm, 2020). Moreover, during March more people were employed by instant delivery providers. As discussed here: *“During March Foodora employed about 300 people. This is an indicator of the large increase in sales”* (Allt om Stockholm, 2020).

Instant e-groceries and e-pharmacy. Although previously instant deliveries have been common to order food from restaurants, during the pandemic several grocery stores and pharmacies started to offer this service as well (UberEats, 2020; Foodora, 2020; Digital trends, 2020). Some expanded this by joining the collaboration with the e-grocery platform others created their own solutions. Evidences for the pharmacy offering instant deliveries in collaboration with LSP is discussed here: *“We offer home delivery for those living in Stockholm via the logistics company Airme. They automate and optimize in real time to always deliver fast, flexible and sustainable deliveries to your home.”* (Apoteksgruppen, 2020).

Evidenced of retailers joining the collaborations with e-grocery platform has been discussed here: *“Uber Technologies’ food-delivery unit, known as Uber Eats, on April 1 announced a string of deals with retailers including French grocer Carrefour, Galp Energia gas stations in Spain, and Brazilian pharmacy chain Pague Menos. UK-based*

rival Deliveroo on March 23 announced a tie-up with Marks & Spencer's stores at BP gas stations." (Breaking Views, 2020).

Some examples include grocery store and pharmacies joining collaboration with different actors, such as application provider, grocery stores or pharmacy and investors (DI, 2020). Often these instant deliveries were using flexible courier personnel and alternative modes of transport.

Contactless delivery. During the covid-19 the demand for contactless deliveries were offered in order to protect customers and personnel. This was done by delivering packages behind the door and informing about the delivery by phone. To regulate the e-groceries to be contactless for instant deliveries are evidenced here: *"Contactless delivery is set by default. This enables your order to be left at your door without contact to ensure as safe of a delivery experience with us as possible. Drivers are advised to minimize contact with customers and avoid touching the handles of the delivery bag."* (Foodora, 2020).

Pick up points

As discussed, home deliveries became popular during the covid-19 crisis. Due to that some companies struggled to service all the new and old customers, especially in the case of e-grocery and e-pharmacy. In several cases it has resulted with longer delivery times and less options to select from (Coop, 2020a; Mathem, 2020; Khaleej Times, 2020; Apoteket, 2020).

Home deliveries. Traditional B&M grocery stores and pharmacies started to offer home deliveries. As people were not allowed or avoided to go to the B&M stores, some grocery stores started to enable home deliveries when they started "Doorstep Delivery". Customers could call to the nearest store to place their order that then would be delivered at their doorstep. An example of this is discussed here: *"We have initiated Doorstep Delivery services. Get your daily needs delivered at your doorstep. Call the nearest store and place your order. Delivery at your doorstep. Pay at home."* (The Economic Times, 2020).

New actors. Home deliveries were even offered by public authorities. In order to ensure that citizens stay at home and prevent people from panic-buying (stockpiling), the corporations started to deliver groceries, vegetables, and medicines to people's homes by leveraging information from their waste management route they have been conducting. The solutions provided home delivery for groceries and medicine in collaborations with supermarket and medical shops. An example of this is described here: *"To end the commotion and prevent people from panic-buying, the municipal corporation of Tirupati requested supermarkets and medical shops in the city to initiate home delivery of provisions and vegetables."* (The Better India, 2020).

The new application that provides access to digital doctor consultations and home delivery service for medicines bought online with different language options was also discussed (Sina, 2020).

For parcels also more people preferred to choose home delivery. Different pickup points have been offered such as home deliveries, in mailbox, and to service points. Using service points for parcels showed to be very successful to manage the bigger capacity of online deliveries. Some companies enabled to pick up the parcel from the serviced point by someone else than a receiver (Postnord, 2020).

Interviewee B discusses that in March company launched their own network of service points, that became very successful and enabled them to manage the bigger capacity of on demand parcel deliveries for B2C customers. Moreover, they are planning to almost double the size of these in the near future (Interviewee B).

For safety reasons the pickup for the parcel from the serviced point was enabled to be done by someone else with the digital notification. This is evidenced here: *“If you do not feel safe leaving home but still choose to receive delivery to one of our service points, you can ask a relative for help to easily retrieve their package at the service point by using PostNord App and BankID and forward the digital notification to the person who is to retrieve the package.”* (Postnord, 2020).

The other safety measure was to allow customers in the rural areas to avoid going to the service point some LSP companies offered additional home delivery solution at the rural areas using mail carriers. Instead of delivery to the service point the delivery would be done at home. This has been discussed here: *“There is the possibility of ordering delivery of rural mail carriers. The recipient then does not have to go to the agent and can calmly wait for home delivery.”* (Postnord, 2020)

Contactless delivery. In order to practice social distancing most companies have made it possible to avoid physical contact at the time of the delivery. For home delivery, the physical contact was limited or avoided completely by placing goods behind the door or at the parking lot (Postnord, 2020; Interviewee A; Interviewee B). Example of this can be seen here: *“For everyone’s safety, we are currently avoiding physical contact at the time of delivery. We therefore place the goods outside the door, call and confirm that you receive your goods”.* (Mathem, 2020).

To avoid direct human to human contact some parcel deliveries were done without customer acknowledgement, as discussed here: *“In the traces of Covid-19, numerous consumers require to leave the packages outside the door, sometimes without acknowledgment”* (Postnord, 2020).

Employment. There has been a need to higher new staff, because of the new volumes, but also as more employees have become sick or recommended to stay at home because of the higher safety requirements. The higher requirements have been discussed by interviewee B: *“There was more sick personnel at the beginning of the crisis and stayed home when having any mild symptoms.”* The evidence of employment of extra drivers has been discussed here: *“There has been necessity to bring in extra drivers. Up to 60 to 70 % extra capacity they have had to bring in to accommodate all of the volume that has been ordered by the end consumers.”* (Webinar, 2020).

The other solution was when retailers became logistics service providers as grocery stores and pharmacies took orders by phone and then delivered them at the door outside the shop to avoid sick people coming into the stores (Apoteksgruppen, 2020; SVT News, 2020)

4.2.3 Informational innovations

In this part informational innovations are discussed. Although three different ones were listed in the literature study, there was not much evidence found of using them during the corona crisis. Instead additional category has been discussed called digital tools.

Digital tools

Digital tools were used to enable contactless training of new personnel and enable customer service. This was done when LSP for parcels was testing a new pilot project to set up screens to meet and train new personnel contactless (Webinar, 2020). Also, the use of different customer service tools that they have implemented digitally and offline, such as chatbot. It is a digital way of communicating with the end customer and to be able to avoid longer customer service lines. To get answers to the questions regarding where the shipments are, about the invoices. Because they are getting faster answers to their questions, they are experiencing higher customers satisfaction. Furthermore, the new online "Customer account" is used by customers to get answers about their shipments.

Digital signing. In order to practice social distancing at the delivery many companies introduced digital signing for home deliveries. This meant that after receiving the order, that has left by LSP outside the end customer's door they will receive a SMS with a link where customer confirms receiving the order (Webinar, 2020; Postnord, 2020; The Local, 2020).

4.2.4 Technological innovations

Covid-19 crisis changed the global economy and made companies to look for innovative technological solutions as discussed by Bjoern Klaas, CEO of Protolabs: "*a crisis can also be a catalyst for innovation and a way to force companies to think new in order to survive.*" (Transport och Logistik, 2020). Different technological innovations were used by different actors such as automation, robots, drones and electrification. Below these different solutions are discussed in more detail.

Drones and robots

Corona crisis has changed the setting and global economy and made drones and robots more present. (Transport och Logistik, 2020). In order to reduce the risk of virus spreading drones have been used to deliver goods.

Drones enabled social distancing with fast delivery for time sensitive medicines. Drones were used to deliver medicine to elderly by an LSP company when delivering prescription drugs from a pharmacy to elderly residence at the USA largest retirement community, with over 135,000 residents, during covid-19 as discussed here: "*Drone transport is a fast alternative to time-sensitive medicines and is also a good solution in times of social distancing. Drone supplies are also convenient for those who cannot visit a physical pharmacy and at the same time help protect those who work in health care.*" (Transport och Logistik, 2020).

Robots were used to enable food delivery during covid-19 (Forbes, 2020). In order to reduce human to human contact robots are being used, as they are not vulnerable to the virus. Robots were used to autonomously kill viruses and bacteria with ultraviolet light, but also in the hospitals (Forbes, 2020).

Drones and robots have been used to offer contactless deliveries of food and medicine in most affected areas. These were used by e-commerce and LSP companies to deliver mostly food and medical equipment to most infected areas, but even other last mile supplies. It was noted by Supply Chain Effect (2020) that a big e-commerce company

was using their own LSP company to deliver food and medical equipment in the affected areas with autonomous drones and robots (Supply Chain Effect, 2020).

Unmanned supermarket. Some e-commerce companies have opened wholly unmanned supermarkets to buy essential goods in the epicentre of the outbreak (Charged retail UK, 2020; Supply Chain Effect, 2020). This allows customers to buy their everyday goods without having physical contact with store staff. The goods are read and paid automatically when the customer leaves the store.

Autonomous vehicles and electrification

Autonomous vehicles were used in some cities and hospitals to fight the coronavirus by avoiding human to human contact at the time of the delivery. Food and necessary medical supplies were transported to health-care professionals and the public in infected areas (MIT Technology, 2020). Autonomous vehicles were delivering food and other supplies to help patients (Autofuture, 2020). Moreover, autonomous fleet shuttle has been delivering Covid-19 tests to drive-thru test centres.

Electrification is used by the pharmacy, as announced by Apoteksgruppen (2020): “Automate and optimize in real time to always deliver fast, flexible and sustainable deliveries to your home. In addition, the majority of these deliveries are fossil-free thanks to cargocycles and electric cars.”

4.3 Socially responsible logistics

New virus created new risks for society, and it made social issues more vital to handle. Although this crisis put most people into risk and excluded from society for shorter or longer period, still some groups were more vulnerable. People who were most at risk and vulnerable were the risk groups, but also people living socio-economically vulnerable areas and immigrants (American Public Media, 2020). As discussed here: “People living in socio-economically vulnerable areas were at a higher risk of contracting Covid-19 so seriously that they need hospital care” (SVT news, 2020). Moreover, measures taken into place alienated the migrants and minority communities (New York University, 2020).

While these people cannot go out for shopping because they are at risk, they might also lack the skill for online shopping. Service exclusion could be evidenced when service offerings were excluding part of the population in society, especially the vulnerable ones, such as elderly, disabled, immigrant (language barrier) etc. Service exclusion was happening when services were provided only in one language. This could be evidenced when e-grocery stores have not more than one language option on their website or the payment methods are not flexible (The Local, 2020). Although online services suite well for the different risk groups and people with low mobility issues who cannot go to physical stores themselves, it can be still quite expensive to use these services (Interviewee A). The sensitivity of the cost is discussed when an elderly woman explains the home delivery cost for her groceries to be a double that she has used to pay as evidenced here: “92-year-old Kerstin is forced to pay SEK 370 to bring home the grocery bag, being almost double the cost that she is used to pay.”

The other issue that has been noted when encouraged to ask for help from others is the trust, that is evidenced here: “She knows that there are help groups on Facebook, but

points out that it is difficult to know how to handle help from people you do not know.” (Strömstad Tidning, 2020).

As it could be noted some groups were more vulnerable during covid-19 and segregation issues were expanded. Meanwhile new risk of getting infected and stopping the virus from spreading created higher health and safety requirements for the companies. In order to protect their customers and employees, but also regulate and manage the demand, different measures were taken by different type of companies. In Table 4.2 both socially responsible logistics and service inclusion initiatives are presented. Then socially responsible logistics solutions are discussed and analysed and Section 4.4 elaborates service inclusion through service design.

Table 4.2: Summary of the social sustainability initiatives during covid-19.

Initial code	Category code	Literature code	Findings
Social sustainability	Socially Responsible Logistics	Health & Safety	Wearing protection at work
			Disinfecting all surfaces
			Safety measures in entire supply chain
			Special shopping hours for risk groups
			Enable social distancing at shops
			Alternative ordering and pick up solutions
			Offering protection for the customers and delivery partners (masks, plastic cloves etc)
			Contactless delivery
		Working conditions and human rights	Flexible work arrangements
			Limiting access to the facilities
			Changed store hours
			Enable high hygiene at work and social distancing
			Provide free masks
			No-loss on self-quarantine programme for employees
			Help during self-quarantine time
		Philanthropy	Help to provide free meals
			Gather and support different initiative around the world fighting covid-19

			Provide essentials for front line workers, self-quarantined individuals or/and isolated population	
			Rise funds and donations the help different sectors	
		Community involvement	Enabling tipping/donations to local businesses	
			Lose the delivery fee for the restaurants	
			Increase the delivery capacity	
			Support local authorities	
		Service inclusion	Offering choice	Enable to buy groceries and readymade food in the same app
				Alternative pick up or delivery options
	Alternative customer service channels			
	Alternative payment methods			
	Empowering opportunities		Alternative ways of ordering and delivering goods	
			Free delivery for the vulnerable	
			Special opening hours for the vulnerable	
			Special delivery times for the vulnerable	
			Alternative language options for the services	
			Alternative payment methods	
			Offering access to the vulnerable through collaboration	
	New business model/services		Use of technological innovations to enable access to goods and services for the vulnerable	
		Support the new ways of doing things		
		Expanding assortment		
Merging different services into one solution				
Additional pick up/delivery mode				
	Using technological innovations to provide access to goods and services.			

4.3.1 Health and safety

To make it safe to everybody companies made it possible to minimise or avoid physical contact as much as possible when shopping/ordering groceries or medicine, at the time of the pickup and at the delivery by adjusting the current offering or offering additional services, example omni channel solutions.

For safety reasons grocery stores offered special shopping hours for the risk groups or elderly (SVT news, 2020). Some companies offered a special service for the risk groups (elderly) to shop or order from their local grocery store or pharmacy online, by phone or via mail (Apoteksgruppen, 2020; DI, 2020).

Customers and employees were offered different social distancing and hygiene options at the traditional B&M grocery shops. Most stores had restrictions for their customers when entering the shopping facilities. Customers were asked to keep high hygiene and to encourage social distancing. These restrictions were presented on the boards or signs at the entrance, sometimes together with the free pair of plastic gloves or/and masks to use by the customers. This is discussed by the grocery chain representor here: *“The company is also keen on the hygiene of the staff at the supermarket and concerned about the safety of their customers. We are having sanitisers at the entrance and we ensure all customers enter with a mask and gloves”* (Khallej Times, 2020). Social distancing and hygiene has been encouraged in the shops by retailers when making colourful markings with the tape on the floor and having installed the plexiglass at the cashier between the customer and the cashier to avoid the direct contact when making the payment (DN, 2020; Fri Köpenskap, 2020). It is also noted here: *“Several stores have set up plexiglass at the checkout. The cleaning has increased and there are sticker decals in the floor that encourage the customers to keep a distance from each other.”* (SVT News, 2020).

For safety reasons several stores have disinfected the facilities and have measures to protect the employees by minimising the human to human contact when changing the store hours as explained here: *“To ensure the safety of our Patrons and Employees while we restock the shelves, we have temporarily changed our store hours.”* (Patelbros, 2020). Similarly, hygiene was prioritized by omni channel grocery stores, who used several protective measures, when asking their employees to wear masks, gloves, disinfecting all surfaces (including packaging), and working with suppliers and delivery partners to confirm that entire supply chain is taking all safety measures (Subziwalla, 2020). For the reuse of packaging they disinfect and sanitize each packaging item before they are redelivered and adding large plastic bags with every order for customers to place their bags. Other companies stopped taking back reusable packages and returned goods for safety reasons (Mathem, 2020).

Customers have been offered to order food online and have contactless home deliveries. On demand food or parcel delivery provider were often placing goods outside the door, call and confirm that the customer has receive the goods or/and by using digital signature via SMS or webpage (Postnord, 2020; Interviewee A; Karma, 2020). Some instant delivery provider sett the contactless delivery by default when placing an order (Foodora, 2020).

Alternative ordering and delivery methods. In some cases, the food delivery could be done at home or at the pickup point (parking lot) (Spice on Wheels, 2020). While there were long waiting times for home deliveries then some companies prioritised or even offered free home delivery for the elderly. As evidenced here: *“With enormous pressure*

on e-commerce and long waiting times for home delivery, Coop is trying to ensure that seniors 70+ get their food. Therefore, specific delivery times for that group have now been added.” (E-handel, 2020).

4.3.2 Working conditions and human rights

Most companies were working in accordance with the guidelines of the government regulations and/or WHO. This meant to instruct their employees to work from home when possible, not to go to work when showing signs of illness, avoid close contact with anyone who shows signs of illness, wash their hands, use hand sanitizer regularly. This was discussed by DHL (2020): *“We encourage flexible work arrangements, adapted to different roles”*. Interviewee B also discussed limited access to their facilities, by not allowing visitors into the building and personnel that could work from distance were working from home.

To meet the customers demand and protect their employees, companies made changes in their services and routines, in the production, in the sorting process, employees’ routines and in the delivery process. This is discussed by Interviewee A: *“Second challenge has been a higher demand on hygiene and cleaning routines. Many customers are worried and anxious about their food safety. They have done number of actions (changes) in the production and in the delivery system.”* This meant that all their drivers ensured good hand hygiene by disinfecting their hands, having contactless delivery, not allowing items to be returned, expanded cleaning routines in delivery cars, in warehouses and offices.

Good working conditions were evidenced when e-grocery stores provided masks for delivery partners, no-contact delivery, no-loss on self-quarantine programme for employs to motivate to stay at home and delivery will be done based on safe zone and availability of food in specific area (Grofers, 2020; Swiggi, 2020). Moreover, some companies support their drivers even with their rental vehicle during the self-quarantine time as evidenced here: *“We have worked with our global rental partners to ensure that any driver diagnosed with covid-19 or individually quarantined can return their car with no penalty. We are also working with our US rental partners to allow no-penalty returns for any driver who wishes to return their rental car.”* (UberEats, 2020).

4.3.3 Philanthropy

Philanthropy could be evidenced when Nordic-capital, Norrskan, Dagens Industry initiated a new collaboration with different initiatives around the world that were gathered to fight covid-19 and its implications (Action Against Corona, 2020). Among others are actions and initiatives covering logistics and social inclusion. One of this is a collaboration between different actors to provide access to goods and services during the covid-19 as discussed here: *“Several of Sweden's leading food chains are joining forces to facilitate food purchases for people who need to isolate themselves due to the corona virus. The venture receives million grants from the H&M Foundation and is part of the Action Against Corona campaign, which the Norrskan foundation and Dagens industri started.”* (DI, 2020).

Philanthropy was discussed when e-grocery store provided free meals and contribute additional donation to the hospitality sector. An example of this is discussed here: *“Uber Eats will work with local governments to provide at least 300,000 free meals in*

the United States and Canada. Authorities can request assistance by emailing. Uber will match every contribution up to \$3,000,000 as a donation to the National Restaurant Association Educational Foundation's Restaurant Employee Relief Fund." (UberEats, 2020).

There are examples of philanthropic organisations working to provide essentials to frontline workers and self-quarantined individuals by raising funds jointly for covid-19 prevention and help of those affected (State of the Planet, 2020). Other philanthropic organisations worked to strengthen the access to community services for vulnerable and isolated populations. To collect donations and partner with community foundations they provide economic resources to service vulnerable and isolated population by delivering food. Some of these organizations have a strategic partnership in which each non-profit organisation manages a different logistical exponent of the initiative (State of the Planet, 2020).

Philanthropy was also evidenced when a football club started a charity campaign delivering food packages for old and handicapped fans during the coronavirus lockdown. This was done in collaboration with an e-grocery service provider (Anadolu Agency, 2020).

4.3.4 Community involvement

While normally restaurants pay high logistics costs for offering home delivery service, during covid-19 some companies were supporting local restaurants by taking away the delivery fee for them as evidenced here: *"We've waived the Delivery Fee for the more than 100,000 independent restaurants across US and Canada on Uber Eats."* (UberEats, 2020).

Community involvement was discussed when e-grocery store supported local authorities, enable donations to local restaurants and give donations. An example of this is discussed here: *"For a limited time, users can make donations to restaurants when placing an order. Restaurants receive 100% of these funds."* (UberEats, 2020).

Similarly, some community involvement enabled tipping the local businesses. An example of this is discussed when e-grocery enables tipping for local businesses by allowing to add a tip to every order customer makes and 100% of every tip will go to this food business customer has tipped (Karma, 2020). The other solution was enabling tipping the delivery partners when customers of e-grocery can add a tip and show their support and appreciation (Swiggi, 2020).

Some offered to help the local community by saving good food not going to waste and selling it half a price, but also supporting the local hospitality sector by increasing the delivery capacity between grocery stores, restaurants, and wholesalers directly to the consumer's doorstep as discussed here *"With Karma, food is always half price and now you can get it delivered to your door, within Stockholm. Save good food from being thrown away."* (Karma, 2020). Interviewee A also discussed one of their companies sustainability initiatives being a food health for all people and minimize food waste. Having this as a goal could be seen as a community involvement, although currently it was not clear how do they practice this during covid-19 crisis.

4.4 Service inclusion through service design

Although in some countries municipalities offer home service to the citizens, that are disabled and need help in their everyday tasks such as the personal care, heating the food, dishes, shopping, cleaning and other household tasks (Göteborgs Stad, 2020), these services became challenged when many more people needed help and belonged to the risk groups while lacking the prerequisites for these services. To enable equal access to goods and services during covid-19 especially for the vulnerable population then different service offerings, empowering opportunities and business models emerged as discussed below.

4.4.1 Offering Choice

Offering choice could be evidenced when grocery stores included new services on their e-grocery services to enable buying groceries and ready-made meals from the same application and then delivered to the customers instantly as discussed here: *“added to our regular e-store [...]the meal app Ica Pronto, where you can order selected items and ready-made food from a local Ica store directly to your doorstep.”* (The Local, 2020). Usually grocery stores ready-made meals tend to be cheaper than the restaurant food and therefore it makes home delivery for ready-made meals more affordable for different customer groups.

Offering choice can be evidence also when a pharmacy chains were offering different pick up options for the risk groups, an additional option of collecting their medicine outside the building or even by an acquaintance when having a mandate (Apoteket, 2020). This allows sick people or risk groups practice social distancing as now they can pick up orders outside the building or send someone else to pick up the order for them.

Offering choice could be seen when different payment methods are offered as discussed when pharmacies enabled to pay via app called Swish: *“When you pick up your order, one of our employees will meet you outside the pharmacy, where you can easily pay via swish.”* (Apoteksgruppen, 2020). Although it offers choice for the customers to pay via an application in their smartphone and avoid using cash or payment card. However, this solution requires owning an application and smartphone, connected with their Swedish bank card and social security no. In order to be inclusive, it is important to continue offering other payment methods as well, that support various vulnerable customer segments.

Offering choice is when an LSP offered additional delivery option as discussed here: *“Different delivery options: home delivery or parking lot”* (Spice on Wheels, 2020). Additional delivery options to rural areas, as can be evidenced here: *“There is the possibility of ordering delivery of rural mail carriers. The recipient then does not have to go to the agent and can calmly wait for home delivery to his home.”* (Postnord, 2020). These solutions offer a choice to enable vulnerable customers to practice social distancing while still getting access to goods and services.

Offering choice to use different customer service channels and there to manage the demand can be seen when LSP used omni-channel functions, by phone, online with the chatbot and online with the membership account, where people could get info about their shipments (Webinar, 2020). This will enable access to goods and services for more customer groups as people can choose the communication channel most suitable for them.

4.4.2 Empowering opportunities

Empowering opportunities could be evidenced when service providers equipped the vulnerable market segments with tools, channels, information etc to enable access/choice/involvement in value creation and not to be discriminated. During covid-19 most vulnerable customer segments were the risk groups, but also the ones that have issues of using ICTs. Empowering opportunities could be evidenced when grocery stores started to open earlier for risk groups but also to offer alternative ways of ordering and delivering goods during covid-19 as was evidenced when grocery stores and pharmacies offered seniors other ways to order their groceries and medicine from the local store or pharmacy using different channels such as smart device (app), phone or email (DI, 2020). Moreover, they offered free instant deliveries for elderly until the coronacrisis was over. While this solution enabled some risk groups to become more inclusive such as elderly being often price sensitive and not familiar with ICTs.

Empowering opportunities was discussed when time-based measures were used by e-grocery and e-pharmacy having high demand and longer waiting times offered special home delivery times for the seniors (Coop, 2020). This enabled seniors to get better access to their services.

Additional customer segments were included when quantity-based measures were used by the grocery stores to provide access to all customers for essential products by ordering from a list of 47 essential items over the phone and pay for the items when delivered (Charged retail UK, 2020). Moreover, this service was offered together with instant delivery service. This enabled more people to get additional and less advanced contact channel (phone) to get access to essential products without costing much extra, need to ask help from others or planning much ahead.

Empowering opportunities was evidenced when e-pharmacy used quantity-based measures and prioritized orders with prescription drugs or other medicines (Apoteksgruppen, 2020). This enabled equal access to medicine and reduced shortage of goods when some people started panic shopping.

Moreover, offering additional languages option could be evidenced as empowering opportunities as this gives access for people who are not as familiar with local language, but still belong to the risk group or are in quarantine. This was discussed when an application provided access to digital doctor consultations and home delivery service for medicines bought online in different language options (SINA, 2020). Although this service involves additional language option, it still requires the use of online tools.

Other example of empowering opportunities can be evidenced when grocery chain and aid organisation started collaboration in order to help isolated elderly people and risk groups to get access to goods by bringing together elderly people with volunteers in the immediate area (Coop, 2020). Moreover, contact was made by phone and special payment service in stores was offered to extend the offering. This allows more organized help from the aid organisation as now grocery store had been collaborating and made special services to support the access to their products and services.

In order to enable to reach the vulnerable customers in the most infected areas or/and special risk groups the use of various technological innovations was discussed (Transport och Logistik, 2020; MIT Technology review, 2020). This could be seen as empowering opportunities as it gives access to goods and services for the vulnerable customer segments making them value creators and not discriminated.

4.4.3 New business models or services

New business models or/and services were created to support the new ways of doing things. One example was discussed when an LSP company now offers additional services such as technical, logistical, financial support as well as health protection as discussed here: “*Support services include logistical, technical and financial support as well as health protection.*” (Supply Chain Effect, 2020).

New business models can be seen when instant e-grocery services expanded their service offering by including grocery stores or/and pharmacies into their assortment as discussed earlier (Vembla, 2020; DI, 2020; UberEats, 2020; Deliveroo, 2020). Similar option was evidenced when grocery store added new services on their e-grocery services to enable buying groceries and ready-made meals from the same application, delivered to customers instantly (The Local, 2020; DI, 2020). New business model can be seen when a new application provided access to digital doctor consultations combines home delivery service for medicines bought online in different language (SINA, 2020). New business model can be seen when a grocery store started to offer “Doorstep delivery service” (The Economic Times, 2020). Moreover, most technological innovations need to have a new business model and changes in the regulations to be able to offer new solutions for the customers, such as using robots, drones, and automation to deliver goods in the most affected areas.

5 Discussion

The purpose of this research was to expand the understanding of socially responsible urban logistics services during the covid-19 crisis and to understand the accessibility of goods and services required through innovative and socially responsible urban logistics services. This was done first by creating an analytical framework through a literature study (shown in Figure 2.2) in order to map and analyse the response that urban logistics services had to provide access to goods and services focusing on last-mile delivery during a time of emergency such as covid-19. Secondly, the research discussed the possibility of how socially responsible urban logistics services can be leveraged for achieving better inclusivity under crisis conditions. This chapter includes an evaluation of the findings in order to reach the aim and answer the second research question. It highlights and comments on the main findings and compares them with the theoretical framework.

5.1 The urban logistics system

As discussed by different authors before, having a well-functioning urban logistics system has proved to be very important in order to keep the flow of essential materials during a pandemic (S. Anderson et al., 2005; Browne et al., 2012; Dethloff et al., 2015; Grant et al., 2017; Macharis et al., 2014; Müller et al., 2019). On the other hand, the findings indicate that the pandemic extended the scope of pre-existing disadvantages in society and scaled up challenges and inequalities. People who showed symptoms and people in risk groups had to comply with isolation rules and that resulted in a lack of access to essential goods. As noted by Dablanc et al. (2017), there are many different conditions occurring in the environment that can disrupt urban logistics services and the pandemic caused a disruption with respect to both a surge in demand for urban logistics services but also the way in which these services are to be delivered. It affected the safety of consumers, employees and delivery partners and had an impact on current urban logistic service capacity as well as the consumer's role in providing delivery services for themselves. In order to get access to essential goods both citizens and companies were forced to make changes in their current ways of doing things. As the crisis evolved, companies were looking for innovative solutions that are critical to the success of logistics services and improve service efficiency. Although previously most urban logistics initiatives largely concentrated on the environmental dimension, during covid-19 the importance of focusing on the social dimension increased. Moreover, despite inclusivity being a human right, there was still a shortage of it in the urban logistics systems during the pandemic. However, some companies strived to offer service inclusion through various innovative measures, still the solutions were often voluntary or philanthropic and often service exclusion happened. To improve social sustainability and inclusion in society urban logistics services must become more inclusive. Moreover, findings show that there is a great overlap between the use of urban logistics innovations and socially responsible logistics as social responsibility has been enabled through various organisational, delivery system, informational and technological innovations.

5.2 Urban logistics innovations and service inclusion

As people were encouraged to practice social distancing, they were avoiding traditional B&M shops and instead now they ordered goods by phone or online to be delivered at a pickup place, making on-demand deliveries increase. Moreover, the on-demand economy grew and push centric LMD structure to become the most popular one as people now preferred their goods to be delivered at home or to specific addresses using on-demand and instant deliveries. New demands and regulations caused delays and shortage of some products. The challenges were the supply chain, but also the LMD, confirming different variables that may impact the LMD structural forms (Lim et al., 2018), as well as the importance of integrating global supply chains into urban logistics solutions (Allen & Browne, 2010).

One of the main characteristics that can be evidenced from the findings are the various solutions to enable social distancing and high hygiene at the pick-up place, at the delivery of goods, but also throughout the supply chain. Many solutions helped to avoid or reduce physical human to human contact such as the use of Plexiglas at the cash register, enforcing social distancing at the facilities and at workplaces, disinfecting packages and/or areas, offering free gloves and/or facemasks. Sometimes these measures involved organisational, delivery system, informational or technological innovations.

The other example was evidenced of various types of “contactless delivery” to enable delivery of goods without physical interaction. This involved delivery system innovations delivering goods behind the door and not asking for acknowledgement on the PODs. Sometimes this was used in combination with informational tools when digital tools were used to enable signing the PODs from a distance. This involved also technological innovations, when “contactless delivery” was enabled by drones, robots and automatization in most infected areas, but also at the hospitals and retirement homes. The covid-19 crisis demonstrated that new technologies, being previously only experimental or hindered by laws and regulations, were now enabling more equal access to goods and services while also helping to combat the virus from spreading. Furthermore, the use of robots to detect and kill the virus when making the delivery could be an additional service and new opportunity to combat pandemic situations.

The other novelty that was evidenced during covid-19 was the new and fast option to deliver groceries and medicine, providing now instant e-grocery and e-pharmacy. Although this service has been used by restaurants, now it included additional assortment. This made essential goods more accessible as people did not have to plan a long time ahead or wait several days to receive their orders, as there was an issue with the waiting times. This solution might be effective and efficient to enable easy and fast access to goods and services it has a risk of becoming less environmentally and economically sustainable as it is important to consider all the three sustainability dimensions. The other improvement during covid-19 was evidenced when enabling shopping groceries and ready-made meals from the same application together with instant delivery. This solution merged two services into one by improving the business model and it enabled easier and more efficient access to goods and services by extending ordering and delivery functions.

Although people were encouraged to use online shopping, the vulnerable customers could have lacked the skills to do so and therefore encountered service exclusion. Both interviewee A and B agreed that vulnerable customers were using their online services, however sometimes it was enabled by friends or family members from a distance which

means that customers themselves do not have to own or have knowledge about the tools. Oláh et al. (2018) also discusses the alternatives that virtual shopping provides for disabled customers to reduce social exclusion. Still it should be possible not to rely on help from others if one wants to be independent. Moreover, it is important to offer personalised logistics services to target groups such as the elderly or/and less advanced customer groups. Personalised logistics services could be evidenced when vulnerable customers in some areas were offered special services, such as free home delivery for their goods. Offering an omni-channel setting for the pick-up or ordering of goods, but also the additional payment method enables more risk groups with various backgrounds and options to get easier access to goods. Thus, when retailers enabling additional ordering channels for all or just for one customer segment such as ordering goods by phone or additional delivery options in rural areas or offering various customer service channels to handle the shipments could be seen as personalised logistics service as well as it enables vulnerable customer segments to get access to goods and services. Another example could be providing lists of the most essential items that can be ordered now even by phone or by merging online and offline functions or expanding ordering and delivery system options. This made it possible to reach more customers and offer choice when the need was most critical. This made access to goods and services more inclusive as customers did not have to have access or knowledge of using ICTs, but only needed access to one of the solutions. Additionally, in order to provide service inclusion, time-based, pricing measures and quantity-based measures were used. As using quantity-based measures avoided shortage of products and stopped people from buying too much at a time. While time-based measures offered alternatives for the risk groups during the crisis.

In order to enable equal access to goods and services and stop the virus from spreading different collaborations were used as there are linkages outside the supply chain and stakeholder engagement is crucial to support the way urban logistics is carried out (Holguín-Veras et al., 2018). Both horizontal and longitudinal collaborations were identified between ISI, LSC, FSI and LSP, while some solutions involved new actors. This was evidenced when volunteers, retailers, NGOs, churches, municipalities, citizens or the end customers offered new type of services and business models becoming the new actors in the traditional door to door logistics service (Boschian & Paganelli, 2016; Halldórsson & Wehner, 2020). In some cases, public authorities enabled delivery of groceries and medicine to the citizens doorsteps and sometimes retailers acting as LSP when delivering goods to the customers waiting outside the building. Often crowdshipping initiatives were used to enable equal access to goods and services for the vulnerable ones. This involved volunteers in the neighbourhood helping risk group with shopping and other tasks. Although this initiative was more voluntary under current crisis it would be something that has suggested by different authors to be enabler as the sustainable logistics solution in the future. Thus, companies should continue using it in combination with other services and to try merging it with Microhubs and DaaS. This would offer new type of delivery option and considers all three pillars of the sustainability dimensions, as it has potential to offer more inclusive, environmentally friendly, and economical solution as well as it is a good alternative during emergency situations such as pandemic. However, Microhubs need to be able to regulate the temperature for the delivery of food products and be closer to the customers for easy access. The alternative here could be the in-car deliveries and locker stations, but this study did not identify during covid-19. As in-car deliveries can be considered exclusive, enabled only by using special type of new car models, it is still offering a choice and would work for some vulnerable customer groups during the pandemic as it

offers to avoid physical interaction. Moreover, organisational setting innovations were also not identified. This can be due to the lack of information from current sources or that these were not seen as an enabler during the pandemic. Meanwhile, HCL and PI would support the various modes used for deliveries, current crisis did not evidence the use if these. Meanwhile some countries could be closer to this solution when they claim advancing smart cities and using drones, robots and automatization for the deliveries. However, it is important to consider all three sustainability dimensions and making these solutions inclusive by including vulnerable customer segments as well. Moreover, various innovative measures evidenced enabled service inclusion as well as they were protecting and keeping customers and employees safe and therefore made urban logistics services more socially responsible.

5.3 Socially responsible logistics and service inclusion

During the crisis more companies started to work with social responsibility which confirms that growing concern in social problems around the world makes the business community more focused on CSR (Uyar et al., 2020). As seen from the findings, covid-19 crisis highlighted issues that socially responsible companies must consider. The different initiatives involved the areas such as human rights, philanthropy, ethics, health and safety, diversity and community involvement supporting various social indicators used in the socially responsible logistics services. Moreover, to achieve inclusivity and reach or the UN SDG urban logistics must have a socially responsible approach. Currently socially responsible urban logistics was lacking the service inclusion and various actors were acting based on their instinct. LSPs were forced to come up with new solutions, but users needed more and created their own solutions (such as neighborhood help). Although elderly and immigrants were one of the main risk groups during this crisis, there were only few solutions enabling the inclusion of both customer segments and most of these solutions involved voluntary or philanthropic actions. To be inclusive one must include diversity. Although online services were evidenced as good alternative in current crisis and offering solution for different risk groups, it still can be out of reach when services are too expensive, users lack appropriate resources, knowledge and social network, worsening difficulties and causing casting and discrimination that may result in stressful, unproductive and damaging service encounters as discussed by Fisk et al. (2018). Socially responsible urban logistics requires innovative thinking and must provide service inclusion. This could be done by empowering opportunities and offering choice, but also creating new services and business models for the vulnerable customer segments.

While LSP struggled to serve the new demand, new actors, new services and business models were used to enable equal access to goods and services, especially for the segregated. New business models or/and services were created to support the new ways of doing things or expanding assortment. As the coronavirus crisis created growth of the on-demand economy together with on-demand delivery systems and various initiatives supporting the equal access to goods and services to enable service inclusion. All these various solutions offered during covid-19 could be seen as the response to the customer demand (Lim et al., 2018). Some even offered service inclusion when providing solutions for the vulnerable customer segments (Fisk et al., 2018). As demographics are aging, people and companies are more global they must allow use of various innovative solutions to become more inclusive and this way loose homogeneity in their service offering and easy replication. As well as it is important to offer different

solutions for different customer groups to avoid exclusion, especially for the vulnerable ones. Service design can decrease social exclusion when it accounts for diversity of humans and makes resources accessible to consumers that previously lacked access to services (Fisk et al., 2018; Maragiannis & Ashford, 2019). This could be done in collaboration and partnership with different actors as well as including socially excluded, who are valuable source for extending services. Socially responsible urban logistics services must become more inclusive and they could do this by using urban logistics innovations. Moreover, companies should combine innovative solutions with value added services and have overall holistic offering by empowering customers. This would reduce inequalities in society and make them more competitive as sustainable service offering enables to differentiate. Using innovate urban logistics services can advance service inclusion. Urban logistics can use innovations and social responsibility as a leverage to achieve service inclusion under crisis condition, but also transition to socially responsible urban logistics.

6 Conclusion

The aim of this study was to expand the understanding of socially responsible urban logistics services during the Covid-19 crisis and how to satisfy the accessibility of essential goods and services required through innovative and socially responsible urban logistics services. In order to do so, a content analysis approach was adopted and two research questions were formulated: What are the emerging urban logistics service solutions focusing on last-mile delivery in response to crises, such as covid-19?; and how can socially responsible urban logistics services be leveraged for achieving better inclusivity under crisis conditions? To be able to answer the research questions a literature study was conducted by combining different streams of theories, such as urban logistics and innovations, socially responsible logistics and service inclusion. The framework was created to be able to map the response that urban logistics services had during the emergency situation and to enable the access to essential goods and services, such as food and medicine.

During the crisis the on-demand economy grew together with several on demand last mile delivery options. The study identified different types of innovations such as organisational, delivery system, informational and technological to be used. New collaborations with sometimes new types of actors such as retailers, NGOs, churches, municipalities, citizens and the end customers offered new types of services and business models to enable equal access to goods and services. These initiatives included omni channel setting, advance on demand delivery systems for groceries and medicine products, offering instant e-groceries and e-pharmacy, drone deliveries, robots, automatization, electrification and crowdshipping.

Current logistics service systems are not prepared to work with such a high demand and to provide inclusivity to all citizens in society. This is proved by the various voluntary and aid organisations created. Evidence shows that during a pandemic it is more important for companies to work with social sustainability issues. Moreover, in order to achieve better inclusivity under crisis conditions, socially responsible urban logistics services should offer safety to their workers and customers, enhance community involvement, work with philanthropy and ethics, empower opportunities by offering choice to vulnerable customer segments in collaboration with other stakeholders. Also, socially responsible urban logistics should use innovative urban logistics services in combination with value added services by creating new business models and new services. While sustainability will advance their business and make them more competitive in the future, it will also reduce the social and service exclusion in society.

Future research could use this analytic framework to map the urban logistics system in another context, such as analysing another region in another time and/or including other types of sources and actors. Moreover, future research should try to better understand the needs of the vulnerable customer segments and how customers feel about the new solutions such as contactless delivery. Furthermore, what are the motives behind the instant e-grocery and e-pharmacy and relation to other two sustainability dimensions?

This study tried to expand the lack of empirically-based research of sustainable innovative urban logistics services in order to reduce social and service exclusion. An analytical framework was created to map the urban logistics systems. The study mapped and analysed the response that urban logistics system had to enable access to goods and services under crisis situations such as covid-19. It explained the gap in the current research, the system and a way to improve inclusivity through urban logistics innovations. LSP and urban logistics actors can use these findings and analytic

framework to improve inclusivity in urban logistics systems. Moreover, by using various innovative urban logistics services they can become inclusive and more socially responsible. This study explains the ways urban logistics services could empower vulnerable customer segments, using various urban logistics innovations to enhance social sustainability and become more inclusive as well as enabling companies to become more competitive.

7 References

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8 Appendix

8.1 Appendix 1: Interview guide, expert interviews

General questions about the company

1. What is your position in the company?
2. What does the company do? (area, size etc)
3. Does your organisation follow some sustainability guidelines?
 - Which ones? (eg. UN Sustainability goals, Global Reporting Initiatives (GRIs), Quality management standard)
 - What are the social sustainability goals that your company follows/reports?
4. What are the urban logistics service offerings/solutions (focusing on last-mile delivery)?
 - Who are the (main) target groups?
 - Do you also deliver food products and medicine?
5. Who are the actors doing deliveries?
 - Own service offering?
 - Logistics companies?
 - Crowd sourcing?
 - Consumers themselves?
 - Emerging platforms?
 - Other actors?

Changes/challenges during the corona crisis

1. What are the main things that have changed during the crisis and due to what?
 - higher government regulations (safety issues of clients and staff?),
 - issues/changes with staff (more sick)?
 - Shortage of goods?
 - Problems with shippers?
 - Higher demand?
 - Changes/delays in delivery or order-delivery times?
 - Changes in prices?
 - Driving conditions and travel speed)
2. What are the main challenges?
3. Are you expecting new problems and how do you solve them?
4. How do you solve this physical distancing problem?
5. Are there new models of delivering goods to customers?
6. What are the collaborations or new services emerged/changed?
 - Are you still delivering only from your own terminals or have you made partnerships to use other terminals?
 - are you partnering with other companies? Stakeholders (NGO-s etc)?

Before the coronavirus crises

1. What goods mobility services did you offer to **enable fair opportunities to people** who don't have access and or the ability to use "conventional" services? (ex. Risk groups, older people, people with disabilities, people with language barrier)?

2. How do you use **technology** (e.g. **ICT**-s, web-based services, apps, artificial intelligence) in your services to enable opportunity in various goods mobility service contexts (e.g. for the vulnerable, like risk groups, older people, people with disabilities, or refugee consumers)?
3. What are **the barriers for** your organization to implement fairer opportunities to everybody (see previous list)?
 - What services could be designed to eliminate these barriers? How?
 - How could urban logistics innovations help with solving existing problems regarding service inclusion?
 - Have you considered or working with value co-creation with different customer groups to create new services and reaching new customer target groups? Which ones? If not, why not?
4. Is there anything else that you want to add with respect to the current situation and maintaining equal access to goods?
5. What areas of the region (Västra Götaland) are covered with your services?

8.2 Appendix 2: Semi structured interview notes

Initial code (Level 1)	Category code (Level 2)	Literature code (Level 3)	Illustrative words from original field notes	Source
research context	e-grocery	Service portfolio	Deliver dinner packages including with recipes and food with all the ingrediencies (Deliver dinner packages with recipes) in boxes, with packages in Sweden and in Norway	A
research context	e-grocery	Service portfolio	They provide tech service. The idea is that customer buys the box online webpage or app or call to order the service home delivery.	A
research context	e-grocery	target groups	Main target groups in Sweden are the households/families with children, but also other groups.	A
research context	e-grocery	actors	LMD is by small trucks outsourced for smaller logistic companies, often local, different in different local companies delivering, like “Swedish bud firmor” (courier service)	A
research context	e-grocery	collaboration	No new collaborations. They deliver only from their own terminals. They might have some small arrangements locally, but not in the company level.	A
Social sustainability	Social responsibility	Indicators	Finishing CSR report (in 2 weeks) for 2019, where they formulated 5 sustainability target areas: food health for all (or poor) people, food waste, food production (supply chain) issues, resources, social responsibility.	A
Social sustainability	Social responsibility	Indicators	they follow UN global SDG	A
research context	e-commerce	high demand	As their services area more popular and more people order food online, thus they have had to adjust their production. Higher production growth in Norway than in Sweden. Higher production volumes, which has been a challenge for the deliveries.	A
Social sustainability	Social responsibility	Health and safety	Second challenge has been a higher demand on hygiene and cleaning routines, that they have been in forced to be able to get the customer satisfaction. Many customers are worried and anxious about their food safety. They have done number of actions (changes) in the production and in the delivery system.	A
research context	e-commerce	issues	Second challenge has been a higher demand on hygiene and cleaning routines, that they have been in forced to be able to get the customer satisfaction. Many customers are worried and anxious about their food safety. They have done number of actions (changes) in the production and in the delivery system.	A

research context	e-commerce	supply chain	Third area of challenges has been a supply chain. Suppliers have had problems of getting the volumes that they want to.	A
Social sustainability	Social responsibility	Health and safety	One risk is of course that their own personnel will be sick and this they deal with all the time.	A
Innovation	organisational	omni channel setting	Risk in supply chain and shortage of goods. They have dialogues with suppliers and try to find alternative supply chains. Also to evaluate if there are any products that they have to buy more in advance to avoid shortage of it (to be able to deliver).	A
Innovation	delivery system	pick up points	No new models, only small/minor adjustments in the routines. Like they do not go up to big apartment buildings. They try to make a delivery outside of the building and ask the customer to come outside and pick them up. To avoid personal contact during the food delivery.	A
Social sustainability	Social responsibility	Health and safety	No new models, only small/minor adjustments in the routines. Like they do not go up to big apartment buildings. They try to make a delivery outside of the building and ask the customer to come outside and pick them up. To avoid personal contact during the food delivery.	A
Social sustainability	Social responsibility	Health and safety	They do not take delivery boxes in return or products.	A
Social sustainability	Social responsibility	Health and safety	They cannot fix the problems with wrong product deliveries, not going back to collect them. They can not fix the products that must be adjusted after the delivery.	A
Social sustainability	Service inclusion	offering choice	One challenge is that to be able to have a same service for everyone. They have a limited number of different boxes to choose from. Like original box, that is for 3-5 people or vegetarian box for 3-5 people. It's not possible to switch/choose only one dish or change between the different dishes in the box to be different from others. This is one issue they are discussing, to understand how adjustable the service will be. From the sustainability perspective it's a challenge to choose between no waste strategy (where they know what and when everyone are going to order), but if everyone can change their dishes/dinner in the different boxes, then there will be more waste. And you get more transports and resources. How flexible and transparent will the service be and how high is the sustainability capability.	A

Social sustainability	Service inclusion	offering choice	She is not aware of translating the page to other languages.	A
Social sustainability	Service inclusion	offering choice	One more challenge could be that it is still quite expensive service as they have high sustainability focus in their products. If you do not have that much money it's a bit expensive service to use. It's also challenging for single household to have that big boxes.	A
research context	e-commerce	business model	No new models, only small/minor adjustments in the routines.	A
Social sustainability	Service inclusion	offering choice	Language barrier could be solved when translate the page into different languages.	A
Social sustainability	Service inclusion	offering choice	Could design the service more flexible to be able to choose between different dinners with different price levels (range). It's a challenge to make it more flexible and transparent. Now they have one price for the whole box and that's it.	A
Social sustainability	Service inclusion	offering choice	They could also think about adding more flexible services for people with allergies or religion, when they choose to avoid/switch certain articles/products what they want to eat/consume. Although they are looking into that development, but there is an issue with ecological and economical sustainability.	A
Future	innovation	e-commerce	They could probably do more with the apps and collaboration with other companies, also the different urban ways of delivering (delivery systems). In the big cities they could have bicycle deliveries (not sure if they use that already?) or sharing with other partners (stakeholders) or other households. She sees lot of opportunities within that area and she has not been involved in all those projects to know if something is going to be done in the near future. Not been discussed during the corona outbreak.	A
Future	innovation	e-commerce	It is interesting to see with these social isolation principles, how people learn new behaviours and how do they accept other ways of receiving their goods? She believes, that their service (e-commerce) is going to be part of the future. How this forced isolation is changing the behaviour in the long term, when we are going back to the normal again.	A
Social sustainability	Social responsibility	Risk evaluation	They have had continuous risk evaluation.	A

e-grocery	innovation	on demand delivery	They do not have any special services for these (vulnerable) target groups. But they know and learn, that many of them use their services. The service is the same the food box with the recipe that is delivered to the customers door and this service suites well for the ones that are in different risk groups or have low mobility issues and can not go self in stores. Even before the corona crisis they had identified this target group as the one that they can help and their service is good for them.	A
Social sustainability	Service inclusion	empowering opportunities	They do not have any special services for these (vulnerable) target groups. But they know and learn, that many of them use their services. The service is the same the food box with the recipe that is delivered to the customers door and this service suites well for the ones that are in different risk groups or have low mobility issues and can not go self in stores. Even before the corona crisis they had identified this target group as the one that they can help and their service is good for them.	A
Social sustainability	Service inclusion	offering choice	Their customer support is very well used, and they can help customers with different kind of adjustments in the buying process. If you cannot use the computer, you can just call and get (author "order") the service.	A
research context	Type of services	Service portfolio	We are leading parcel delivery provider in the Nordics.	B
research context	Service coverage	Service portfolio	We have covered 100% Västra Götaland region. In Gothenburg terminal they deliver 60% of the end receivers in Sweden.	B
research context	Service coverage	Infrastructure	We have 30-40 terminals all over the country. We have terminals in Borås, Uddevalla, Skövde.	B
Service coverage	Service portfolio	target groups	They have been focused to B2B, B2C segment online distribution.	B
Service coverage	Service portfolio	Food and medicine products	They deliver also food and medicine, but this has been only a small part of their business. Special service Bring Frigo is for these goods. Medicine has been a growing segment during the COVI-19.	B
Social sustainability	Social Responsibility	Indicators	Main goals/mission is to become CO ₂ neutral in year 2025	B
Social sustainability	Social Responsibility	guidelines	Following ISO 14001, Quality management standard	B
Social sustainability	Social Responsibility	guidelines	Leading company with sustainability in that area.	B
Social sustainability	Social Responsibility	guidelines	They have clear guidelines for ethics and everyone who will be employed have to commit to that.	B

Social sustainability	Social Responsibility	guidelines	They have online education for all new employees about their sustainability goals.	B
Social sustainability	Social Responsibility	guidelines	They measure and compare annually number of employees being sick.	B
research context	LMD	Actors	They have their own network of drivers and trucks that are committed to Bring organisation and brand.	B
Social sustainability	Social Responsibility	Health and Safety measures	It has been a challenge to prepare the production to the situation. In order to keep high hygiene, they have liquids for disinfect/sterilise everywhere at the production and personnel must wash hands often. Keep distance when possible. Administration have been asked to work from home. Only own personnel is allowed in their facilities	B
Social sustainability	Social Responsibility	Health and Safety measures	Sick personnel - At the beginning of the crisis more personnel was sick (stayed home when having any mild symptoms). Now there is very good situation with personnel at Gothenburg area and most are back to work.	B
research context	Customer demand	change	Also, the higher volumes of parcel to handle (sort and deliver). Although B2B segment has decreased 25%.	B
research context	Customer demand	change	While B2C segment (home deliveries) used to be only 10% it is now 30-50% of total deliveries. B2C segment has increased 400-500%. It has never happened before.	B
research context	Customer demand	delays	Delays - There has been some delays in delivery times, but they have solved them well.	B
Innovation	information	digital signature	Signature - Signature for the recipient has become digital to avoid social contact.	B
Innovation	delivery system	pick up points	service points - They went out from the (collaboration) partnership with company X about the service points and launched their own network of service points. Fantastic timing, as now they have bigger capacity to deliver all the new parcels for B2C segment. Now they have 1700 service points in Sweden and plan is to increase it to 3000. It has got good feedback from media as well.	B
research context	e-commerce	personnel	They have managed mostly with their old staff for making deliveries, although there has been some new employment as well. It has been stressful at the production (authors comment "handling cargo at the terminals") to manage the higher volumes and high-quality requirements from the clients and to keep up the capacity.	B

research context	LMD	product segment	There has been changes in the product segments, such as: <ul style="list-style-type: none"> • volumes for handcrafts and knitting has increased. • Fashion products decreased • IT and hardware have increased • Medicine and food have increased (mainly for other companies) 	B
Future	LMD	Customer demand	Don't know what will happen. Although it will be challenging, if volumes are to increase even more and there will be new big wave.	B
Social sustainability	Social Responsibility	Health and Safety	Everyone have to be careful, higher hygiene, avoid direct contact etc. Although they cannot make restrictions to every pickup point, these must regulate it themselves.	B
Social sustainability	Service inclusion	vulnerable	They have website in 4 different languages (one of them is English).	B
Social sustainability	Service inclusion	vulnerable	Deliveries for disabled are more complicated and if it is allowed they deliver at the door. They have indoor delivery segment and go up to stairs to deliver the goods in-door.	B
Social sustainability	Service inclusion	vulnerable	During the Covid-19 elderly have been special risk group. In the area relatives have been helping together with the new online solutions, that has helped to manage these things from the distance. It is possible to use networking to help to order goods, when not able to use ICTs self.	B
Research context	LMD	Service portfolio	They have covered 100% Västra Götaland region. In Gothenburg terminal they deliver 60% of the end receivers in Sweden.	B

8.3 Appendix 3: Coded data – Webinar

Initial code (Level 1)	Category code (Level 2)	Illustrative words from original field notes/source	Date	Source
Research context	Service portfolio	Offer services in the last mile to consumers (private persons, businesses, industries)	22-apr	Webinar
Research context	Government restrictions	Border crossing has been constant in Scandinavia. Beginning of March, the border was closed for travellers, only allowed for the ones who had a living permit or critical function in the society. Although freight transportation was always allowed to cross the borders freely. Until the middle of May this restriction will be changed some degree or maybe completely repealed.	22-apr	webinar
Research context	Government restrictions	Regards to some professions to work from home (distance) where it is possible or close the ones that has a lot of public interference (such as gyms, theatres, hairdressers, swimming pools, concerts etc). Although now, some contact-based professions start to reopen and by keeping sharp eye on their customers that are facilitating goods to rekindle comers. As well as new business associates to work with.	22-apr	webinar
Research context	Government restrictions	Schools and institutions where Sweden have been different from other Nordic countries, by keeping their kindergartens/preschools and primary schools opened.	22-apr	webinar
Research context	Government restrictions	Public assembling there are different restrictions in different countries and in Sweden it is 50 persons. Although the consensus is to try to practice social distancing in the capacity as possible.	22-apr	webinar
Research context	Impact on infrastructure	Infrastructure has got an impact, because of the restrictions and loosing capacity. Impact has been on air traffic/aircrafts many cancellations. Lot of long-haul routes, international mail being incapacitated during this time. In general, because road transport goods, being such a critical role for society, has been travelled freely in EU and not having great restrictions. Many ferry lines are being ceased or interrupted.	22-apr	webinar

Research context	Impact on infrastructure	It's important to have a conversation with your transport company and how are you facilitating goods for your logistics provider. What are the conditions during the last mile delivery, are they thinking in contingency planning? Example the ferry line route was deceased between some lines and they had to take goods by road instead. There are many good conversations to have about contingency planning here.	22-apr	webinar
Research context	Supply chain	Continuity of first mile - Although companies tend to think only in the mind frame of the last mile however first mile is such as important piece also to consider. It is because we have up on many dialogues with a new customer about the standard ways of operating. That is that they want to get the goods across the fastest way possible. Although one can ask if that is the correct way conducting yourself during the standard operating procedure. Is it just to get the goods across in fast over the network in question? They have experienced with discussion with their 3PL companies, that they are having discussions with their transport companies, that they expect delays and they only thing they want is that goods travel fast and as continuously travel across. They also don't have many events at the first mile that prevent goods from having continuous flow. Continuous flow during the covid-19 crisis has been a strength. In this point of time it is good to have a conversation with your transport company weather, they have a many events in the first mile or whether they have a steady flow? They can recommend certain different scenarios for that.	22-apr	webinar
Research context	Different delivery options in Nordics	Need to look into conditioning today and look in changing them to better serve consumer behaviour. Logistic providers in the Nordics or just in general over the world usually have a 3-fold way of sending parcels to the end receiver. Either by mail, to the service point, or by home delivery. In Scandinavia service points are usually the most used form of receiving parcel deliveries. Mailbox deliveries and home deliveries are also very attractive, since they are delivered to the home, but under certain conditions. There has to be a certain point of convenience that you can afford to the customers.	22-apr	webinar

Research context	Different delivery options in Nordics	They have seen upsurge in volumes. Their network's B2C framework is built on the foundation of three services: Home delivery, PUDDO delivery, Parcels to Mailbox delivery.	22-apr	webinar
Research context	Change in demand	There has been an increase of 500% in Home delivery. A doubling in the orders for parcels in mailbox, and 200% increase of parcels to Service points. Even though lot of customers have changed their behaviour and chosen to have a home delivery. They also had some service point closers during the covid-19, but nothing that has disrupted the services of parcels.	22-apr	webinar
Research context	Change in demand	High volumes for home deliveries has been pushed forward by two things: Extremely high volumes during the Easter peak. Easter purchases have been at an all-time high, close to Black Friday volumes.	22-apr	webinar
Research context	Change in service	They took into measures to accommodate the end consumers by changing timeframe for their evening deliveries from 5 to 9 pm to opening that timeframe to start from noon until 9 pm. To make sure that they are experiencing steady flow and avoid congestions in the network. They have also opened the deliveries on Saturdays, however not as standard. It is opened to all their customers as a contingency plan to get the goods in motion and avoid congestions.	22-apr	webinar
Research context	Change in service	Mailbox delivery has also changed the conditions for their product standards. The acceptance weight for the parcels has increased from up to 2 kg instead up to 4 kg. In able to facilitate more goods in their network.	22-apr	webinar
Research context	Extra personnel	There has been necessity to bring in extra drivers. Up to 60 to 70 % extra capacity they have had to bring in to accommodate all of the volume that has been ordered by end consumers.	22-apr	webinar

Research context	Change in demand	B2B shipments have dropped in Volume, especially shipments to stores and restaurants that have closed. They have seen many customers have ceased their shipments completely. They also have asked their customers to have a better dialogue with their stores and delivery partners to see if the shipment can in fact be delivered, because they have seen high number of failed deliveries. Even though they have asked their customers to tell them advance whether the parcel can be delivered successfully, they haven't completely got the information in time to avoid failed delivery. Therefore, their performance level to B2B delivery has demised a lot.	22-apr	webinar
Research context	New service	We have asked our customers to implement our Flex-delivery service, and where possible even deliver B2B shipments to private addresses. To be able to get goods moving an across.	22-apr	webinar
Research context	Extra fee	Failed deliveries are sent back to the customers and there is a reverse fee. Good conversation here to have is with your logistics provider, if they are keeping your parcels on hold, for how long and try to find out where your parcels are in this point of time.	22-apr	webinar
Research context	Health and safety measures	There has had a lot of concerned calls from the customers about the safety measures.	22-apr	webinar
Research context	Innovative solutions	<ul style="list-style-type: none"> • To avoid direct contact with the end user and practice safe social distancing they changed to signing for the parcel deliveries: <ul style="list-style-type: none"> o with SMS-POD for home deliveries – “sign via SMS” GO coordinates served as representation that they were at the place in question. Driver signs with a “C” and all shipments are registered with GPS coordinate. o Also very early on they met their developments at the IT side enabled the new solutions that their end receiver got to sign for their parcels on their tablet or mobile phone by login in and sign for the parcel This was possible fairly quickly. 	22-apr	webinar
Research context	Infrastructure	<ul style="list-style-type: none"> • Terminals – decentralized structure. Measures to act in different scenarios 	22-apr	webinar

Research context	Use of technology	But at this time they have relayed a lot on the measure that they have implemented digitally and offline. They have a chatbot, which is a digital way of communicating with us and to be able to by passing the longer customer service lines. To be able to answer the questions regarding the track and trace where the shipment is, questions about the invoice. Because they are getting faster answers to their questions, they are experiencing higher customers satisfaction.	22-apr	webinar
Research context	Extra personnel	Customer service side of the business is a major organ. Because of the high upsurge of volume their customer service team have had a lot of queries coming in and because of the social distancing it's been a challenge to bring in temps (author. "temporary workers"). To be able to do this one need to train them at site and have a good and close dialogue, which has not been possible. They are testing a new pilot in Norway where they are setting up screens and this way testing new personnel.	22-apr	webinar
Research context	Use of technology	Online "Customer account" is the other way, where customers quickly get answers about their shipments. It's been a create success, because of that customers have felt independent the way they are working, but also eager to use it before any training and as soon as they got their log ins.	22-apr	webinar
Research context	Change in demand	They have experience higher level of returns in the B2C segments, because of the higher volumes.	22-apr	webinar
Research context	Infrastructure	From the 31st of March they have launched a new service point location in Sweden, which is the largest they have incorporated in their network. Complete success. Higher number of service point in Sweden alone and this was planned already before the crisis.	22-apr	webinar

8.4 Appendix 4: Coded data – Innovations

Initial code (Level 1)	Category code (Level 2)	Literature code (level 3)	Illustrative words from original field notes/source	Whose initiative? (Label it)	Type of solution	Actors involved (in delivering the solution)	Source	Date	Link/File name
Innovation	delivery system	instant delivery	"Fresh groceries and pharmacy products from the local stores delivered in 60 minutes by freelancers using walking or bicycles as a delivery mode. Online service is in Swedish and in English.	foundation	Smart device (App)	IT company, grocery stores, pharmacies, customers, LSP	Vembla	24-mar	https://www.di.se/nyheter/ny-tjanst-hjalper-till-med-matinkop-under-coronakrisen-hm-miljonstottar/ ; https://www.vembla.se/
Innovation	delivery system	pick up point	For everyone's safety, we are currently avoiding physical contact at the time of delivery. We therefore place the goods outside the door, call and confirm that you receive your goods.	e-grocery	Online (web site)	e-grocery, LSP, consumer	Mathem	24-mar	https://www.mathem.se/artikel/covid-19
Innovation	delivery system	instant delivery	Contactless delivery is set by default. This enables your order to be left at your door without contact to ensure as safe of a delivery experience with us as possible. Drivers are advised to minimize contact with customers and avoid touching the handles of the delivery bag	e-grocery	online, (Peer to Peer)	e-commerce, LSP, citizens, consumers	Foodora	24-mar	https://www.foodora.se/en/contents/covid19?r=1
Innovation	delivery system	instant delivery	Riders which have been in areas with widespread transmission are kept at home. (they will receive full pay for their missed work hours)	e-grocery	online, (Peer to Peer)	e-commerce, LSP, citizens, consumers	Foodora	24-mar	https://www.foodora.se/en/contents/covid19?r=1
Innovation	delivery system	crowd-shipping	Cooperation between Coop and the non-profit organization "Äldrekontakt" (translated to eng. Elderly Contact) help isolated elderly people to buy food by bringing together elderly people with volunteers in the immediate area. Contact with the elderly takes place by phone, being much appreciated by this group, and the food box is left outside the door to reduce the risk of infection. To facilitate the purchase, the volunteers who shop for an elderly person can pay with a digital purchasing service in Coop's stores, so that they do not have to spend money themselves. The payment is then processed afterwards via invoice and is adjusted based on the payment method that the elderly person has access to.	NGO/ grocery store	collaboration, peer to peer	Grocery store, NGO, citizens, consumers	Coop	01-maj	https://www.coop.se/Globala-sidor/aldrekontakt/

Innovation	delivery system	crowd-shipping	During the time of corona connecting volunteers with people who need help – all around the world	NGO	online (web site), Smart device (app)	NGO, citizens, consumers	Helping Hands	24-mar	https://www.helping-hands.io/en/
Innovation	delivery system	crowd-shipping	Self Isolation - Help for the Vulnerable and Elderly Against Coronavirus. To chat about your concerns, offer help or ask for help with shopping if self isolating. Use this as a resource for emotional and practical support. If you are offering or requesting help please provide your postcode and what you are needing or offering.	Citizens	Social media (Peer to peer)	citizens, volunteers, consumers	Facebook	24-mar	https://www.facebook.com/groups/204363130998191/
Innovation	delivery system	instant delivery	Uber Technologies' food-delivery unit, known as Uber Eats, on April 1 announced a string of deals with retailers including French grocer Carrefour, Galp Energia gas stations in Spain, and Brazilian pharmacy chain Pague Menos. UK-based rival Deliveroo on March 23 announced a tie-up with Marks & Spencer's stores at BP gas stations.	LSP/Grocery store	smart device-based (app)	LSP, Grocery store, consumer, IT company	Breaking Views	01-apr	https://www.breakingviews.com/considered-view/meal-couriers-can-gain-by-cutting-the-grocery-line/ : https://www.ubereats.com/se
Innovation	delivery system	pick up point	We have initiated Doorstep Delivery services. Get your daily needs delivered at your doorstep. 1) Call the nearest store and place your order 2) Delivery at your doorstep. 3) Pay at home.	e-grocery, grocery stores	store-based and online	LSP, citizens, consumers	The Economic Times	26-mar	https://economictimes.indiatimes.com/industry/cons-products/fmcg/big-bazaar-expands-home-delivery-footprint-as-india-gets-stuck-in-lockdown/articleshow/74807089.cms
Innovation	delivery system	crowd-shipping	If you have been affected by the Corona virus (COVID-19), or belong to one of the risk groups, and have quarantine in the home, you can now ask for help with purchasing supplies from FIKK. Financial transactions are managed via FIKK so that both aid seekers and volunteers can feel secure. If you want to apply for help, you can do this form here or by phone 010 - 55 11 880. Would you like to help as a volunteer? Download our IRO Rescue app, register as a volunteer and check that you can help with the transportation of supplies.	NGO	phone, online, smart device (App)	NGO, LSP, citizens, consumers	FIKK	24-maj	https://fikk.se/iro-rescue/

Innovation	delivery system	pick up point	COVID-19: During this crisis, eight municipal corporations in the country stepped up in order to maintain peace and order, while also ensuring essential services like groceries and medicines. To ensure that citizens stay at home, the corporation is delivering groceries, vegetables, and medicines to people's homes. Our waste collection vehicles operate on 467 routes to cover the entire city, where every vehicle collects waste from 1,000-1,200 households on each route. We leveraged this data to convert these 467 routes into units for door-to-door delivery. We have deployed 222 loading autos and 700 handcart vegetable sellers to cover five lakh households. We have also appointed 467 nodal officers to overlook the working of the system who are managing their respective routes. The sellers have been issued essential service passes too. To end the commotion and prevent people from panic-buying, the municipal corporation of Tirupati requested supermarkets and medical shops in the city to initiate home delivery of provisions and vegetables.	Local authorities (India)	employment	LSP, grocery store, citizens, consumers	The Better India	31-mar	https://www.thebetterindia.com/222350/coronavirus-covid-19-lockdown-india-municipal-corporation-free-home-delivery-vegetables-groceries-jov30/
Innovation	delivery system	crowd-shipping	Volunteers in the Järva area have now started Järva assistance, which helps isolated neighbours with cases and disseminates community information in several languages	citizens	peer to peer	citizens, consumers	SVT news	27-mar	https://www.svt.se/nyheter/lokalt/stockholm/frivilliga-i-jarva-hjalper-isolerade-grannar
Innovation	delivery system	crowd-shipping	Offers her help - through multilingual notes around her apartment building	citizens	peer to peer	citizens, consumers	SVT news	27-mar	https://www.svt.se/nyheter/inrikes/hon-erbjuder-sin-hjalp-genom-flersprakiga-lappar
Innovation	delivery system	crowd-shipping	Facebook group "Elderly Help" (orig. "Äldrehjälpen") has joined hundreds of people across the country and offered their help to go shopping for people who will stay at home	citizens	social media, peer to peer	citizens/consumer	Facebook	17-apr	https://www.facebook.com/groups/208754836883633/
Innovation	delivery system	crowd-shipping	Facebook group to help elderly during the crisis: "Shopping Aid during Corona" (original "Handlingshjälpen Corona") where hundreds joined to help buy food for the elderly	citizens	social media, peer to peer	citizens/consumer	Facebook	17-apr	https://www.facebook.com/groups/223654578784966/
Innovation	delivery system	crowd-shipping	Facebook group called "Corona in Västra Götaland - Help with food purchases for at-risk groups!" (orig. "Corona i Västra Götaland	citizens	social media,	citizens/consumer	Facebook	17-apr	https://www.facebook.com/groups/312962066347823/

			- Hjälp med inköp av livsmedel till riskgrupper!"). To join and connect people in the region.		peer to peer				
Innovation	delivery system	crowd-shipping	"Coronahelp" (orig. "Coronahjälpen") In these tough times, we have to help our fellow human beings. Lists of people who want to help, but also people who are in need of help. You can also enter yourself or your loved ones in the lists below. This service is designed to be able to easily get help with all sorts of different kinds of cases such as purchasing, delivering food or picking up medicines to help with finding a new job.	citizens	Online (web site), peer to peer	NGO, citizens/consumers	Corona Hjälpen	24-maj	https://coronahjälpen.org/
Innovation	delivery system	crowd-shipping	list of Action Aid Groups (orig. "Handlingshjälpgupper") started within Sweden to overcome Corona crisis	citizens	social media, peer to peer	citizens/consumer	Facebook	16-mar	https://www.facebook.com/notes/handlingshj%C3%A4lpen-corona/handlingshj%C3%A4lpgupper-p%C3%A5-olika-orter/226271995189891/
Innovation	delivery system	instant delivery	ICA has added to our a regular e-store the meal app Ica Pronto, where you can order selected items and ready-made food from a local Ica store directly to your doorstep.	e-grocery or omni-channel grocery stores	Smart device (App)	omni channel grocery, LSP, customer	The local	14-apr	https://www.thelocal.se/20200414/which-grocery-delivery-company-offers-the-best-service-for-foreigners-in-sweden
Innovation	delivery system	crowd-shipping	If you belong to a risk group and need help from a volunteer, you can contact the Red Cross. Examples of services that volunteers may conceivably perform are shopping for food or buying prescription drugs. You can contact the Red Cross weekdays during business hours by phone or email. There may be many callers so please send an email if you have the opportunity and the Red Cross will hear from them as soon as they can. Contact by Email, Phone.”	Local authorities and NGO	Peer to peer	Local authorities, NGO, citizens, customers	City of Gothenburg, 2020b		https://goteborg.se/wps/portal/start/kommun-och-politik/samhallsskydd-och-beredskap/goteborgs-stads-information-om-covid-19/covid-19-vill-du-hjalpa-till/hjalp-till-som-volontar!/ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfIjo8zifS0s3D083A0C3I0cXQ0CDd2M3IwMPI1Nggz1wwkpiAJKG-AAjgb6BbmhigDQzykM/dz/d5/L2dBISEvZ0FBIS9nQSEh/

Innovation	delivery system	pick up point	State pharmacy chain Apoteket is now testing pavement pharmacies, so that people over 70 and risk groups can tap and get help with their medicines without having to go into the room. A special alarm clock has been installed this week at Apoteket AB's pharmacy in Ulricehamn, and if it works well, the solution can be found outside more stores in the state pharmacy chain.	pharmacy	store-based	pharmacy, customer	SVT news	04-apr	https://www.svt.se/nyheter/inrikes/trottoarapotek-for-alla-over-70-ar
Innovation	delivery system	crowd-shipping	The children help risk groups to buy essentials to reduce the spread of infection in society.	children	Peer to peer	citizens, consumers	SVT news	07-apr	https://www.svt.se/nyheter/inrikes/barn-hjalper-riskgrupper-att-handla-det-hela-handlar-om-att-sjukhusen-inte-ska-bli-fulla
Innovation	delivery system	crowd-shipping	We're against Corona (orig Vi mot Corona) Help each other! To help those who cannot or should not leave their homes at the moment, "We Against Corona" was started. Here you will find people in your area who need help and those who want to help.	NGO	Peer to peer	citizens, consumers	Vi mot Corona	04-apr	https://vimotcorona.se/
Innovation	delivery system	pick up point	Service points - They went out from the (collaboration) partnership with company X about the service points and launched their own network. Fantastic timing, as now they have bigger capacity to deliver all the new parcels for B2C segment. Now they have 1700 service points in Sweden and plan is to increase it to 3000. It has got good feedback from media as well.	LSP	infrastructure	LSP, E-commerce company, service points, customers	Interview ee B	07-maj	semi-structured interviews
Innovation	delivery system	pick up point	Deliver dinner packages including with recipes and food with all the ingredients (Deliver dinner packages with recipes) in boxes, with packages in Sweden and in Norway. The idea is that customer buys the box online webpage or app or call to order the service home delivery. LMD is by small trucks outsourced for smaller logistic companies, often local, different in different local companies delivering, like "Swedish bud firmor" (courier service)	e-grocery	online	E-grocery, smart device, LSP, customer	Interview ee A	17-apr	semi-structured interviews
Innovation	delivery system	pick up point	From the 31st of March they have launched a new service point location in Sweden, which is the largest they have incorporated in their	LSP	infrastructure	LSP, E-commerce company,	webinar	22-apr	appendix

			network. Complete success. Higher number of service point in Sweden alone and this was planned already before the crisis.			service points, customers			
Innovation	delivery system	crowd-shipping	If you belong to a risk group, you can get help from various aid organizations in several of the country's municipalities. For example, the Red Cross and the Swedish Church have volunteers who act as agents. Contact your municipality for more information on the approach and the aid organization that is relevant to where you live.	pharmacy	store based	Store, customer	Apoteksgruppen	24-maj	https://www.apoteksgruppen.se/recept/hamta-medicin-pa-apoteket/
Innovation	delivery system	instant delivery	Many Stockholmers have stayed at home and avoided restaurants lately. One industry that has flourished when many others have been tough is the food delivery companies in Stockholm.	Restaurants	Smart device (App)	IT company, restaurants, customers, LSP	Allt om Stockholm	06-maj	https://alltomstockholm.se/restaurangbar/hemkornin-g-exploderar-coronakrisen/
Innovation	delivery system	instant delivery	In March, almost 500 percent more new restaurants joined Uber Eats compared to January. This is the highest percentage increase in Europe, according to a press release.	Restaurants	Smart device (App)	IT company, restaurants, customers, LSP	Allt om Stockholm	06-maj	https://alltomstockholm.se/restaurangbar/hemkornin-g-exploderar-coronakrisen/
Innovation	delivery system	employment	During March, Foodora employed about 300 people. This is an indicator of the large increase in sales, according to CEO Hans Skrufors.	Restaurants	Smart device (App)	IT company, restaurants, customers, LSP	Allt om Stockholm	06-maj	https://alltomstockholm.se/restaurangbar/hemkornin-g-exploderar-coronakrisen/
Innovation	delivery system	pick up point	Have package delivered to the door without having to sign a receipt	LSP	social distancing	E-commerce, LSP, customer	Postnord	06-maj	https://www.postnord.se/vara-losningar/artiklar/hemleveranser/tips-for-leveranser-under-corona-smittan
Innovation	delivery system	pick up point	If you do not feel safe leaving home but still choose to receive delivery to one of our service points, you can ask a relative for help to easily retrieve their package at the service point by using PostNord App and BankID and forward the digital avin to the person who is to retrieve the package.	LSP	social distancing	E-commerce, LSP, customer	Postnord	06-maj	https://www.postnord.se/vara-losningar/artiklar/hemleveranser/smartahemleveranser-till-dinakunder
Innovation	delivery system	pick up point	Delivery to the door - without meeting the driver If you order a home delivery, you will receive a text message or a note in your PostNord App with a link to a website where you can choose to receive the delivery without acknowledgment and thus avoid contact with	LSP	social distancing	E-commerce, LSP, customer	Postnord	06-maj	https://www.postnord.se/vara-losningar/artiklar/hemleveranser/smartahemleveranser-till-dinakunder

			the driver. Read more about choosing how you want to receive your delivery.						
Innovation	delivery system	pick up point	Delivery of packages to rural areas. There is the possibility of ordering delivery of rural mail carriers. The recipient then does not have to go to the agent and can calmly wait for home delivery to his home.	LSP	social distancing	E-commerce, LSP, customer	Postnord	06-maj	https://www.postnord.se/v-ara-losningar/artiklar/hemleveranser/smarta-hemleveranser-till-dina-kunder
Innovation	delivery system	crowd-shipping	Through the newly launched initiative "Matjouren Uppsala" they try to reach elderly people in the neighbourhood who do not have relatives by handing out pieces of paper into older people's mailbox in order to help with the grocery shopping	citizens	Peer to peer	Citizen, customer	Aftonbladet	01-apr	https://www.aftonbladet.se/nyheter/a/kJrJGX/amer-och-josef-handlar-mat-till-isolerade-aldre-i-uppsala
Innovation	delivery system	instant delivery	Home delivery in Stockholm via Airmee. We offer home delivery for those living in Stockholm via the logistics company Airmee. They automate and optimize in real time to always deliver fast, flexible and sustainable deliveries to your home. In addition, the majority of Airmee's deliveries are fossil-free thanks to cargocycles and electric cars. You can track your delivery in real time and see exactly when your package will be delivered. In addition, you can enter details such as port code and floor as well as contact customer support via chat - all for an even smoother delivery. For an extra fee you can through Airmee choose an exact time window of 30 minutes for your delivery. The freight charge of SEK 19 includes a delivery attempt, further delivery attempts are made against an additional fee of SEK 59 per delivery attempt.	pharmacy	online (web site)	e-pharmacy, LSP, consumer	Apoteksgruppen	29-maj	https://www.apoteksgruppen.se/e-handel-info/leveransinformation/
Innovation	delivery system	on demand delivery	Get orders outside your pharmacy For those of you at risk group or for any other reason not want to visit our pharmacy physically, there is the option to call your pharmacy and ask to retrieve your order outside the pharmacy when you place an order online for pharmacy pickup. Call your pharmacy and we will find together the best solution for you!	pharmacy	online (web site)	pharmacy, consumer	Apoteksgruppen	29-maj	https://www.apoteksgruppen.se/e-handel-info/leveransinformation/

Innovation	delivery system	instant delivery	Contactless delivery options can also help cut down the need to stand at the door and wait.	e-grocery	social distancing	E-commerce, LSP, customer	Digital trends	19-maj	https://www.digitaltrends.com/home/best-food-delivery-apps/
Innovation	delivery system	pick up point	For parcels requiring a signature, our drivers can temporarily do this on behalf of the customer.	LSP	social distancing	LSP, customer	UPS	26-maj	https://www.ups.com/se/en/service-alerts.page?id=alert1
Innovation	delivery system	instant delivery	In partnership with Deliveroo which will offer on-demand delivery in as little as 30 minutes to families struggling to secure delivery slots. Morrisons will now offer 70 “essential household” items via the Deliveroo app from 130 stores across the UK meaning one-in-four households can order from the app. The service will be available from more than 130 Morrisons stores across the UK, meaning one-in-four households can order “to the door in as little as under 30 minutes”.	Grocery store	telesale/phone	LSP, Grocery store, consumer, IT company	Charged retail UK	04-mar	https://www.chargedretail.co.uk/2020/04/22/morrisons-launches-tele-sales-service-offering-next-day-delivery-to-most-vulnerable-and-elderly/
Innovation	delivery system	pick up point	Help get medicine out for you You can also ask an acquaintance, family member or someone else to get your medicine. The agent must have a mandate from you if the recipe is electronically transmitted. He or she must then also know your social security number and also be able to identify himself. You can also get help from healthcare professionals to get medicine, then a special authorization for care and care is needed.	pharmacy	store based	Store, customer	Apoteksgruppen	24-maj	https://www.apoteksgruppen.se/recept/hamta-medicin-pa-apoteket/
Innovation	delivery system	employment	There was more sick personnel at the beginning of the crisis and stayed home when having any mild symptoms. Now there is very good situation with personnel at Gothenburg area and most are back to work.	LSP	health and safety	LSP	Interview ee B	07-maj	semi-structured interviews
Innovation	delivery system	employment	They have managed mostly with their old staff for making deliveries, although there has been some new employment as well. It has been stressful at the production (authors comment "handling cargo at the terminals") to manage the higher volumes and high quality requirements from the clients and to keep up the capacity.	LSP	extra personnel	LSP	Interview ee B	07-maj	semi-structured interviews
Innovation	delivery system	employment	There has been necessity to bring in extra drivers. Up to 60 to 70 % extra capacity they have had to bring in to accommodate all of the	LSP	extra personnel	LSP	webinar	22-apr	appendix

			volume that has been ordered by end consumers.						
Innovation	delivery system	employment	For us, this mainly means that many more employees than usual are sick or caring for sick children. The employees who are on hand work for high pressure to ensure that the high absenteeism is noticed as little as possible in the deliveries of mail and parcels. PostNord as an employer also looks at opportunities to hire extra staff to a greater extent than usual.	LSP	extra personne 1	LSP	Postnord	22-apr	https://www.postnord.se/om-oss/vad-gor-postnord-med-anledning-av-covid-19

8.5 Appendix 5: Coded data – Social Sustainability

Initial code (Level 1)	Category code (Level 2)	Literature code (level 3)	Illustrative words from original field notes/source	Whose initiative?	Source	Date	Link/File name
Social sustainability	service exclusion	offering choice	92-year-old Kerstin is forced to pay SEK 370 to bring home the grocery bag, being almost double the cost that she is used to pay.	Elderly consumer	SVT news	08-april	https://www.svt.se/nyheter/lokalt/vasternorrland/kerstin-92-tvingas-betala-370-kronor-for-att-fa-hem-matkassen
Social sustainability	service inclusion	empowering opportunities	With enormous pressure on e-commerce and long waiting times for home delivery, Coop is trying to ensure that seniors 70+ get their food. Therefore, specific delivery times for that group have now been added.	e-grocery	E-handel	24-mar	https://www.ehandel.se/coop-lanserar-leveranstider-for-aldre-har-ett-viktigt-ansvar
Social sustainability	service inclusion	empowering opportunities	If you are 65+ and live in Stockholm City, you can place your order through our app, by calling 010-7500800 or by emailing your shopping list to handla@vembla.se. Free deliveries until the Corona crisis is over! Fresh groceries and pharmacy products from the local stores delivered in 60 minutes by private persons/freelancers using walking or bicycles as a delivery mode. Online service is in Swedish and in English.	foundation	Vembla	27-mar	https://www.di.se/nyheter/ny-tjanst-hjalper-till-med-matinkop-under-coronakrisen-hm-miljonstottar/ https://www.vembla.se/
Social sustainability	service inclusion	empowering opportunities	For everyone's safety, we are currently avoiding physical contact at the time of delivery. We therefore place the goods outside the door, call and confirm that you receive your goods. If you do not open the door, we will contact you on the phone to confirm that you have received your delivery.	e-grocery	Mathem	24-mar	https://www.mathem.se/artikel/covid-19
Social sustainability	service inclusion	offering choice	Different delivery options: home delivery or pick up point	e-grocery	Spice on Wheels	24-maj	https://spiceonwheels.se/
Social sustainability	service inclusion	empowering opportunities	Grocery stores open earlier for risk groups in corona times	grocery stores	SVT news	19-mar	https://www.svt.se/nyheter/lokalt/stockholm/matbutiker-oppnar-tidigare-for-pensionarer-i-coronatider
Social sustainability	service inclusion	empowering opportunities	Cooperation between Coop and the non-profit organization "Äldrekontakt" (translated to eng. Elderly Contact) help isolated elderly people to buy food by bringing together elderly people with volunteers in the immediate area. Contact with the elderly takes place by phone, being much appreciated by this group, and the food box is left outside the door to reduce the risk of infection. To facilitate the purchase, the volunteers who shop for an elderly person can pay with a digital purchasing service in Coop's stores, so that they do not have to spend money themselves. The payment is then processed afterwards via	NGO/store	Coop	19-mar	https://www.coop.se/Global-a-sidor/aldrekontakt/

			invoice and is adjusted based on the payment method that the elderly person has access to.				
Social sustainability	service inclusion	empowering opportunities	We have initiated Doorstep Delivery services: Get your daily needs delivered at your doorstep. 1) Call the nearest store and place your order 2) Delivery at your doorstep. 3) Pay at home.	online / stores grocery stores	The Economic Times	26-mar	https://economictimes.indiatimes.com/industry/cons-products/fmcg/big-bazaar-expands-home-delivery-footprint-as-india-gets-stuck-in-lockdown/articleshow/74807089.cms
Social sustainability	service inclusion	offering choice	Sina provides access to digital doctor consultations and a home delivery service for medicines bought online for everyone, regardless of language or cultural background.	e-pharmacy	SINA	24-mar	https://www.sina.se/
Social sustainability	service inclusion	new business model	Sina provides access to digital doctor consultations and a home delivery service for medicines bought online for everyone, regardless of language or cultural background.	e-pharmacy	SINA	24-mar	https://www.sina.se/
Social sustainability	service inclusion	social exclusion	There are difficulties encountered when ordering home-delivered groceries without for example a Swedish payment card or personal ID number. One out of five accepts only customers with Swedish ID, two accept payment card issued from Nordic countries. Other have no restrictions	e-grocery or omni-channel grocery stores	The local	14-apr	https://www.thelocal.se/20200414/which-grocery-delivery-company-offers-the-best-service-for-foreigners-in-sweden
Social sustainability	service inclusion	social exclusion	All five home-delivery grocery stores have only Swedish as a language option	e-grocery or omni-channel grocery stores	The local	14-apr	https://www.thelocal.se/20200414/which-grocery-delivery-company-offers-the-best-service-for-foreigners-in-sweden
Social sustainability	service inclusion	offering choice	has added to our regular e-store by quickly rolling out the meal app Ica Pronto, where you can order selected items and ready-made food from a local Ica store directly to your doorstep.	e-grocery or omni-channel grocery stores	The local	14-apr	https://www.thelocal.se/20200414/which-grocery-delivery-company-offers-the-best-service-for-foreigners-in-sweden
Social sustainability	service inclusion	empowering opportunities	have also introduced digital signing of deliveries. That means that you do not have to physically sign that you have received your order, we can leave the bag of groceries outside the customer's door. You will then receive an SMS with a link where you confirm that you have received the order.	e-grocery	The local	14-apr	https://www.thelocal.se/20200414/which-grocery-delivery-company-offers-the-best-service-for-foreigners-in-sweden
Social sustainability	service inclusion	service exclusion	"She knows that there are help groups on Facebook but points out that it is difficult to know how to handle help from people you do not know. "It is always difficult with foreign people. It's not just knocking on the door and asking, "can I help you?". It sounds good but in reality, it is quite difficult. You don't know if you can trust this person, she says."	Elderly consumer	Strömstad Tidning	19-mar	https://www.stromstadtidning.se/nyheter/s%C3%A5-kan-du-hj%C3%A4lpa-till-att-skydda-riskgrupperna-1.25649410

Social sustainability	service inclusion	offering choice	Some Iceland stores will open one hour early to allow older shoppers to buy food when it is quieter amid the coronavirus outbreak. Iceland said it was not a company policy, but it was allowing individual stores to decide how best to meet the needs of shoppers in their local areas. Iceland's Kennedy Centre store in West Belfast will let older customers shop on their own between 08:00 and 09:00 every day from Wednesday. "We just want to make sure the experience is as stress-free as possible," store manager Danny Burke said."	Grocery store	BBC UK	16-mar	https://www-bbc-co-uk.cdn.ampproject.org/c/s/www.bbc.co.uk/news/amp/business-51906744
Social sustainability	service inclusion	offering choice	If you belong to a risk group and need help from a volunteer, you can contact the Red Cross. Examples of services that volunteers may conceivably perform are shopping for food or buying prescription drugs. You can contact the Red Cross weekdays during business hours by phone or email. There may be many callers so please send an email if you have the opportunity and the Red Cross will hear from them as soon as they can. Contact by Email, Phone."	Local authorities and NGO	City of Gothenburg, 2020b		https://goteborg.se/wps/portal/start/kommun-opolitik/samhallsskydd-och-beredskap/goteborgs-stads-information-om-covid-19/covid-19-vill-du-hjalpa-till/hjalp-till-som-volontar!/ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfljo8zifS0s3D083A0C3I0cXQ0CDd2M3IwMPI1Nggz1wwkpiAJKG-AAjgb6BbmhigDQzykM/dz/d5/L2dBISEvZ0FBIS9nQSEh/
Social sustainability	service inclusion	offering choice	They have website in 4 different languages (one of them is English).	LSP	Interview ee B	07-maj	semi-structured interviews
Social sustainability	service inclusion	offering choice	Deliveries for disabled are more complicated and if it is allowed they deliver at the door. They have indoor delivery segment and go up to stairs to deliver the goods in-door.	LSP	Interview ee B	07-maj	semi-structured interviews
Social sustainability	service inclusion	offering choice	During the Covid-19 elderly have been special risk group. In the area relatives have been helping together with the new online solutions, that has helped to manage these things from the distance. It is possible to use networking to help to order goods, when not able to use ICTs self.	LSP	Interview ee B	07-maj	semi-structured interviews
Social sustainability	Service inclusion	offering choice	One challenge is that to be able to have a same service for everyone. They have a limited number of different boxes to choose from. Like original box, that is for 3-5 people or vegetarian box for 3-5 people. It's not possible to switch/choose only one dish or change between the different dishes in the box to be different from others. This is one issue they are discussing, to understand how adjustable the service will be. From the sustainability perspective it's a challenge to choose between no waste strategy (where they	e-grocery	Interview ee A	17-apr	semi-structured interviews

			know what and when everyone are going to order), but if everyone can change their dishes/dinner in the different boxes, then there will be more waste. And you get more transports and resources. How flexible and transparent will the service be and how high is the sustainability capability.				
Social sustainability	Service inclusion	offering choice	It is still quite expensive service as we have high sustainability focus in our products. It's also challenging for single household to have that big boxes	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Service inclusion	offering choice	Language barrier could be solved when translate the page into different languages.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Service inclusion	offering choice	Could design the service more flexible to be able to choose between different dinners with different price levels (range). It's a challenge to make it more flexible and transparent. Now they have one price for the whole box and that's it.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Service inclusion	offering choice	They could also think about adding more flexible services for people with allergies or religion, when they choose to avoid/switch certain articles/products what they want to eat/consume. Although they are looking into that development, but there is an issue with ecological and economical sustainability.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Service inclusion	empowering opportunities	This service suites well for the ones that are in different risk groups or have low mobility issues and can not go self in stores. Even before the corona crisis they had identified this target group as the one that they can help and their service is good for them.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Service inclusion	offering choice	Their customer support is very well used, and they can help customers with different kind of adjustments in the buying process. If you cannot use the computer, you can just call and get (author "order") the service.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	service inclusion	new business model	JD Logistics also provides support services to the company's 250,000 last-mile suppliers so that they can maintain their service in the affected provinces. Support services include logistical, technical and financial support as well as health protection. In recent weeks, the company has also carried out 2.5 million deliveries of medical protective equipment to hospitals, including face masks, gloves, and disinfectants.	LSP	Supply Chain Effect	14-feb	https://sceffect.se/autonoma-fordon-bekampar-coronaviruset/
Social sustainability	service inclusion	offering choice	Order by phone, pay and collect your goods outside the pharmacy. For those of you who want to avoid visiting our pharmacies physically at the moment, there is also the opportunity to call your nearest pharmacy group pharmacy and place an order by phone. Together, you and the pharmacy will agree on how to best resolve your case. When you pick up your order, one of our employees will meet you outside the pharmacy, where you can easily pay via swish.	pharmacy	Apoteksgruppen	24-maj	https://www.apoteksgruppen.se/recept/hamta-medicin-pa-apoteket/

			You can also call your pharmacy and ask to get your order outside the pharmacy when you place an order online for pickup at pharmacies. Call your pharmacy and we will find together the best solution for you!				
Social sustainability	service inclusion	offering choice	If you belong to a risk group, you can get help from various aid organizations in several of the country's municipalities. For example, the Red Cross and the Swedish Church have volunteers who act as agents. Contact your municipality for more information on the approach and the aid organization that is relevant to where you live.	pharmacy	Apoteksgruppen		https://www.apoteksgruppen.se/recept/hamta-medicin-pa-apoteket/
Social sustainability	service inclusion	offering choice	Delivery of packages to rural areas. There is the possibility of ordering delivery of rural mail carriers. The recipient then does not have to go to the agent and can calmly wait for home delivery to his home.	LSP	Postnord		https://www.postnord.se/vara-losningar/artiklar/hemleveranser/smarta-hemleveranser-till-dina-kunder
Social sustainability	social exclusion	vulnerable ones	The Public Health Authority also announced that there is an overrepresentation of people born in another country among the proportion who have so far fallen ill in covid-19 in Sweden.” says Anders Tegnell. This applies to countries such as Somalia, Iraq and Syria, to a lesser extent. - Then we have some countries like Finland and the former Yugoslavia, which is primarily because the population groups born in those countries belong to the groups that are over 60-70 years old, says Tegnell.		SVT news		https://www.svt.se/nyheter/irikes/folkhalsomyndigheten-allt-fler-skrivs-ut-fran-iva
Social sustainability	social exclusion	vulnerable ones	The municipality offers home service (orig. hemtjänst) help for the citizens, that need help in their everyday life. It is possible to get help with the personal care and heating food, dishes, shopping, cleaning and other household tasks. People can choose between private or public provider of the home service		City of Gothenburg		https://goteborg.se/wps/porta/start/aldre/hjalp-i-hemmet/hemtjanst/Om-hemtjanst/!ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAflj08ziQw0NAi2cDB0N3H18TAw8zS29LVzCQozcXQz1wwkpiAJKG-AAjgb6BbmhigCdN2Fk/dz/d5/L2dBISEvZ0FBIS9nQSEh/
Social sustainability	social exclusion	vulnerable ones	Concern for rapid spread of infection in vulnerable areas. A number of people who have died from covid-19 have heard in Järva in north-western Stockholm. Now there is concern that many have missed important information from the authorities. "We know that segregation affects how we live and communicate," says Ahmed Abdirahman, founder of the Political Week in Järva. Poor living, generational housing, poor public health and in	consumer	SVT news		https://www.svt.se/nyheter/irikes/oro-for-snabb-smittspridning-i-jarva

			some cases lacking Swedish knowledge have made the Järva area in Stockholm extra exposed.				
Social sustainability	social exclusion	vulnerable ones	Results of segregation according to the Healthcare Council That the spread of covid-19 is now increasing, especially in Skärholmen and in Södertälje, explains the Health Council region Anna Starbrink (L) that health is unequal, which becomes clear in how the virus strikes against different groups. - People living in socio-economically vulnerable areas are at a higher risk of contracting covid-19 so seriously that they need hospital care. It is a sad acknowledgment of the segregation and inequality we have not been overcome - and makes it painfully clear how important it is to continue working for health and freedom for everyone, she writes in a press release.	consumer	SVT news		https://www.svt.se/nyheter/lokalt/stockholm/minskad-smittspridning-i-jarva-okning-i-nya-omraden
Social sustainability	social exclusion	vulnerable ones	Statistics show that among those found infected, foreign-born are clearly over-represented.		tv4 news		https://www.tv4play.se/program/nyheter/12580756?fbclid=IwAR2hhJV8TWpWE3y8XTEr50e33wIR99eJBdVweB1My4jJDxTJJf8ut0nPYwo
Social sustainability	social responsibility	health and safety	No new models, only small/minor adjustments in the routines. Like they do not go up to big apartment buildings. They try to make a delivery outside of the building and ask the customer to come outside and pick them up. To avoid personal contact during the food delivery.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	social responsibility	inclusion elderly	With enormous pressure on e-commerce and long waiting times for home delivery, Coop is trying to ensure that seniors 70+ get their food. Therefore, specific delivery times for that group have now been added.	e-grocery	E-handel	24-mar	https://www.ehandel.se/coop-lanserar-leveranstider-for-aldre-har-ett-viktigt-ansvar
Social sustainability	social responsibility	health and safety	If you are 65+ and live in Stockholm City, you can place your order through our app, by calling or by emailing your shopping list. Free deliveries until the Corona crisis is over! Fresh groceries and pharmacy products from the local stores delivered in 60 minutes by freelancers using walking or bicycles as a delivery mode. Online service is in Swedish and in English.	foundation	DI	27-mar	https://www.di.se/nyheter/ny-tjanst-hjalper-till-med-matinkop-under-coronakrisen-hm-miljonstottar/ https://www.vembla.se/
Social sustainability	social responsibility	health and safety	For everyone's safety, we are currently avoiding physical contact at the time of delivery. We therefore place the goods outside the door, call and confirm that you receive your goods. If you do not open the door, we will contact you on the phone to confirm that you have received your delivery.	e-grocery	Mathem	24-mar	https://www.mathem.se/artikel/covid-19
Social sustainability	social responsibility	health and safety	We temporarily pause our home service deliveries to home service users. We pause the return of purchased goods.	e-grocery	Mathem	24-mar	https://www.mathem.se/artikel/covid-19

Social sustainability	social responsibility	health and safety	As of March 13, goods being delivered to care homes and homes for the elderly will be delivered to cargo bays or incoming goods areas, and not to possible designated locations that have previously been specified. This decision applies until further notice.	LSP	Postnord		https://www.postnord.se/en/about-us/how-the-coronavirus-is-affecting-our-deliveries
Social sustainability	social responsibility	health and safety	Contactless delivery is set by default. This enables your order to be left at your door without contact to ensure as safe of a delivery experience with us as possible.	e-grocery	Foodora	24-mar	https://www.foodora.se/en/contents/covid19?r=1
Social sustainability	social responsibility	health and safety	In accordance with the guidelines of the Swedish Public Health Agency, we have instructed all riders to: Not go to work when showing signs of illness, Avoid close contact with anyone who shows signs of illness, Wash your hands (for at least 30 seconds) before and after each shift, Use hand sanitizer regularly, Minimize contact with customers and avoid touching the handles of the delivery bag	e-grocery	Foodora		https://www.foodora.se/en/contents/covid19?r=1
Social sustainability	social responsibility	health and safety	Different delivery options: home delivery or pick up point	e-grocery	Spice on Wheels	24-maj	https://spiceonwheels.se/
Social sustainability	social responsibility	health and safety	We will pack your groceries in a box and leave in the delivery point. You have to collect and swish based on the invoice. All the orders will be added with additional 10 SEK for packing cost.	e-grocery	Spice on Wheels	24-maj	https://spiceonwheels.se/
Social sustainability	social responsibility	ethics	We have longer delivery times and response times on customer service than normal. We prioritize orders with prescription drugs (delivery up to 4-5 working days) as well as Apodos and DosPac. For prescription drugs, we dispatch for a maximum of 90 days.	e-pharmacy	Apoteket	24-maj	https://www.apoteket.se/ku ndservice/handla-pa-apoteket/#heading12445
Social sustainability	social responsibility	health and safety	Grocery stores open earlier for risk groups in corona times	grocery stores	SVT news	19-mar	https://www.svt.se/nyheter/okalt/stockholm/matbutiker-oppnar-tidigare-for-pensionarer-i-coronatider
Social sustainability	social responsibility	health and safety	Cooperation between Coop and the non-profit organization "Äldrekontakt" (translated to eng. Elderly Contact) help isolated elderly people to buy food by bringing together elderly people with volunteers in the immediate area. Contact with the elderly takes place by phone, being much appreciated by this group, and the food box is left outside the door to reduce the risk of infection. To facilitate the purchase, the volunteers who shop for an elderly person can pay with a digital purchasing service in Coop's stores, so that they do not have to spend money themselves. The payment is then processed afterwards via invoice and is adjusted based on the payment method that the elderly person has access to.	NGO/store	Coop		https://www.coop.se/Global a-sidor/aldrekontakt/

Social sustainability	social responsibility	health and safety (working conditions)	Riders which have been in areas with widespread transmission are kept at home. (they will receive full pay for their missed work hours)	e-grocery	Foodora	24-mar	https://www.foodora.se/en/contents/covid19?r=1
Social sustainability	social responsibility	philanthropy	Russian football club Zenit St. Petersburg kicked off a charity campaign on Friday, delivering food packages for old and handicapped fans during the coronavirus lockdown. "Morning Zenit fans! Today with Yandex Lavka we start the delivery of food parcels for Zenit fans aged 65+ and for our disabled supporters unable to leave home during the lockdown," Zenit said on its Twitter account. Yandex Lavka is a Russian online grocery delivery service.	football club in Russia	Anadolu Agency	10-apr	https://www.aa.com.tr/en/health/russian-club-delivers-food-during-covid-19-lockdown/1799960
Social sustainability	social responsibility	health and safety	1) During our closure, we conducted a deep sanitation of our facilities and have established new safety protocols for the continued health of our employees and customers during this time 2)To ensure the safety of our Patrons and Employees while we restock the shelves, we have temporarily changed our store hours.	omni-channel grocery stores in USA	Patelbros	16-apr	https://www.patelbros.com/coronavirus
Social sustainability	social responsibility	health and safety	Masks for Delivery Partners, No-Contact Delivery, No-loss Self-quarantine Programme for employes to motivate to stay at home and delivery will be done based on safe zone and availability of food in particular area.	e-grocery stores	Swiggi	16-apr	https://blog.swiggy.com/news-updates/covid-19-fighting-adversity-together
Social sustainability	social responsibility	community involvement	Tipping for Delivery Partners From being on the roads when everyone else is home safe, to being good Samaritans, our Delivery Partners are going the extra mile in this time of need. We're introducing a new tipping feature on the Swiggy App so customers can show their appreciation and support for our hunger saviours during these testing times.	e-grocery stores	Swiggi	16-apr	https://blog.swiggy.com/news-updates/covid-19-fighting-adversity-together
Social sustainability	social responsibility	health and safety	We have initiated Doorstep Delivery services in India. Get your daily needs delivered at your doorstep. 1) Call the nearest store and place your order 2) Delivery at your doorstep. 3) Pay at home.	online / stores grocery stores	The Economic Times	26-mar	https://economictimes.indiatimes.com/industry/cons-products/fmcg/big-bazaar-expands-home-delivery-footprint-as-india-gets-stuck-in-lockdown/articleshow/74807089.cms
Social sustainability	social responsibility	health and safety	groceries are delivered to customers with utmost safety & hygiene maintained at all stages. Here are the steps we're taking, based on WHO recommendations, at our warehouses, with delivery partners and on-ground staff. example Masks for Delivery Partners and sanitizers are provided and contact less delivery adopted	online / stores grocery stores	Grofers	24-maj	https://twitter.com/Grofers

Social sustainability	social responsibility	health and safety	<p>1) On top of the usual health and sanitation precautions we have always been taking to safely handle and deliver your groceries. This includes wearing gloves, masks, disinfecting all surfaces (including packaging), and working in conjunction with our suppliers and delivery partners to ensure the entire supply chain is taking all precautionary measures.</p> <p>2) As you may know, we collect and reuse packaging that ensures a sustainable operation. We disinfect and sanitize each packaging item before they are redelivered, but now we're taking an extra step: We're including large, plastic bags with every order for customers to place their bags in once they are finished unpacking, which adds another layer of preventative measures to our current processes.</p>	online / stores grocery stores	Subziwalla	20-mar	https://www.subziwalla.com/an-update-on-covid-19.html
Social sustainability	social responsibility	health and safety	The company is also keen on the hygiene of the staff at the supermarket and concerned about the safety of their customers. We are having sanitisers at the entrance and we ensure all customers enter with a mask and gloves," he said.	online / stores grocery stores	Khaleej Times	05-apr	https://www.khaleejtimes.com/coronavirus-pandemic/covid-19-in-uae-grocery-stores-working-hard-to-meet-online-delivery-orders
Social sustainability	social responsibility	health and safety	Vachani noted that all their delivery staff wear gloves and masks and ensure social distancing during delivery. "The company is also keen on the hygiene of the staff at the supermarket and concerned about the safety of their customers. We are having sanitisers at the entrance and we ensure all customers enter with a mask and gloves," he said.	online / stores grocery stores	Khaleej Times	05-apr	https://www.khaleejtimes.com/coronavirus-pandemic/covid-19-in-uae-grocery-stores-working-hard-to-meet-online-delivery-orders
Social sustainability	social responsibility	health and safety	COVID-19: Eight Municipal Corporations Delivering Veggies, Groceries To Doorsteps. (During this crisis, eight municipal corporations in the country stepped up. These corporations are setting an excellent example of maintaining peace and order, while also ensuring essential services like groceries and medicines)	Local authorities	The Better India	23-mar	https://www.thebetterindia.com/222350/coronavirus-covid-19-lockdown-india-municipal-corporation-free-home-delivery-vegetables-groceries-jov30/
Social sustainability	social responsibility	health and safety	If you belong to a risk group and need help from a volunteer, you can contact the Red Cross. Examples of services that volunteers may conceivably perform are shopping for food or buying prescription drugs. You can contact the Red Cross weekdays during business hours by phone or email. There may be many callers so please send an email if you have the opportunity and the Red Cross will hear from them as soon as they can. Contact by Email, Phone.”	Local authorities and NGO	City of Gothenburg, 2020b	22-maj	https://goteborg.se/wps/porta/start/kommun-och-politik/samhallsskydd-och-beredskap/goteborgs-stads-information-om-covid-19/covid-19-vill-du-hjalpa-till/hjalp-till-som-volontar!/ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfjjo8zifS0s3D083A0C3I0cXQ0CDd2M3IwMPI1Nggz1wwkpiAJKG-

							AAjgb6BbmhigDQzykM/dz/d5/L2dBISEvZ0FBIS9nQSEh/
Social sustainability	social responsibility	philanthropy	Contact relatives, acquaintances and neighbours who you think are at risk and ask if they need help with anything. This can, for example, be about helping to shop or buying prescription drugs. You can also contact the Red Cross that matches you with the appropriate mission. Even those who need help can contact you to the Red Cross.	Local authorities and NGO	City of Gothenburg, 2020b	22-maj	https://goteborg.se/wps/porta/start/kommun-opolitik/samhallsskydd-och-beredskap/goteborgs-stads-information-om-covid-19/covid-19-vill-du-hjalpa-till/hjalp-till-som-volontar/!ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfljo8zifS0s3D083A0C3I0cXQ0CDd2M3IwMPIINggz1wwkpiAJKG-AAjgb6BbmhigDQzykM/dz/d5/L2dBISEvZ0FBIS9nQSEh/
Social sustainability	social responsibility	health and safety	As a result of the coronavirus there is more interest to buy food (cheese, meat, bread) directly from the local producers/companies and have these delivered on the pick up point.	Consumer/local company	SVT news	22-maj	https://www.svt.se/nyheter/lokalt/jamtland/okatt-intresse-for-rekoring-i-coronatider
Social sustainability	social responsibility	health and safety	Everyone have to be careful, higher hygiene, avoid direct contact etc. Although they can not make restrictions to every pick up point, these must regulate it themselves.	LSP	Interview ee B	07-maj	semi-structured interviews
Social sustainability	Social responsibility	community involvement	they follow UN global SDG and have formulated 5 sustainability target areas: food health for all people, food waste, food production (supply chain) issues, resources, social responsibility.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Social responsibility	Health and safety	Second challenge has been a higher demand on hygiene and cleaning routines. Many customers are worried and anxious about their food safety. They have done number of actions (changes) in the production and in the delivery system.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Social responsibility	Health and safety	One risk is of course that their own personnel will be sick and this they deal with all the time.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Social responsibility	Health and safety	No new models, only small/minor adjustments in the routines. Like they do not go up to big apartment buildings. They try to make a delivery outside of the building and ask the customer to come outside and pick them up. To avoid personal contact during the food delivery.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	Social responsibility	Health and safety	They do not take delivery boxes in return or products.	e-grocery	Interview ee A	17-apr	semi-structured interviews

Social sustainability	Social responsibility	Health and safety	They cannot fix the problems with wrong product deliveries, not going back to collect them. They can not fix the products that must be adjusted after the delivery.	e-grocery	Interview ee A	17-apr	semi-structured interviews
Social sustainability	social responsibility	working conditions and human rights	Personnel who can work at home are encouraged to do so, but for the most part easily understandable reasons are not. Then it is important to follow the general advice that exists, for example, to keep a distance. In our Business Center there are instructions on how to queue to keep the right distance.	LSP	Postnord	24-maj	https://www.postnord.se/om-oss/vad-gor-postnord-med-anledning-av-covid-19
Social sustainability	social responsibility	health and safety	Grocery stores put up plexiglass to prevent coronary infection	grocery store	DN	30-mar	https://www.dn.se/ekonomi/mataffarer-satter-upp-plexiglas-for-att-forhindra-coronasmitta/
Social sustainability	social responsibility	health and safety	Willys installs Plexiglas in all stores in two weeks	grocery store	Fri Köpenskap	24-mar	https://www.fri-kopenskap.se/article/view/709540/willys_installerar_plexiglas_i_alla_butiker_pa_tva_veckor
Social sustainability	social responsibility	health and safety	Now, retail chains are acting to protect staff and customers from becoming infected with coronavirus. Several stores have set up plexiglass at the checkout. The cleaning has increased and there are sticker decals in the floor that encourage the customers to keep a distance from each other.	grocery store	SVT news	01-apr	https://www.svt.se/nyheter/lokalt/skane/handlare-satter-upp-plexiglas-for-att-skydda-personalen-fran-coronasmitta
Social sustainability	Social responsibility	community involvement	Supporting local restaurants. We've waived the Delivery Fee for the more than 100,000 independent restaurants across US and Canada on Uber Eats.	LSP, e-grocery	UberEats	24-maj	https://www.uber.com/us/en/coronavirus/
Social sustainability	Social responsibility	health and safety	Uber Eats customers have the option to choose how they'd like their orders delivered, including selecting "Leave at door" during checkout	LSP, e-grocery	UberEats	24-maj	https://www.uber.com/us/en/coronavirus/
Social sustainability	Social responsibility	health and safety	Any driver or delivery person who is diagnosed with COVID-19 or is individually asked to self-isolate by a public health authority will receive financial assistance for up to 14 days while their account is on hold. We've already helped drivers in some affected areas, there may be other region or country-specific programs to help COVID-19 affected drivers in some locations.	LSP, e-grocery	UberEats	24-maj	https://www.uber.com/us/en/coronavirus/
Social sustainability	Social responsibility	health and safety	Support if you have rental vehicle. We have worked with our global rental partners to ensure that any driver diagnosed with COVID-19 or individually quarantined can return their car with no penalty. We are also working with our US rental partners to allow no-penalty returns for any driver who wishes to return their rental car.	LSP, e-grocery	UberEats	24-maj	https://www.uber.com/us/en/coronavirus/
Social sustainability	Social responsibility	philanthropy	The corporation collaborated with Amul to deliver over 14,990 tetra packs of milk, distributed 1,64,981 free food packets to the homeless, and 1,712 food packets to senior	Municipal	The Better India	24-maj	https://www.thebetterindia.com/222350/coronavirus-covid-19-lockdown-india-

			citizens. Over 11,100 free packets of vegetables and 7,792 grocery kits were also given to those in need. For those in quarantine, 28,281 free cooked food packets and 5,387 grocery kits were also distributed.				municipal-corporation-free-home-delivery-vegetables-groceries-jov30/
Social sustainability	Social responsibility	working conditions and human rights	Our number one priority is the wellbeing of our employees and customers. We follow all official recommendations, and we are committed to respond to the call for cohesion and solidarity to prevent the spread of the disease. Our Group Business Continuity Plan offers global guidelines for our operations in 220 countries. Every day, everywhere, to stop the spread of the disease: We promote a "Safety First" approach with specific recommendations as per below. We encourage flexible work arrangements, adapted to different roles. We banned global business travel. We postponed all non-business essential events and trainings	LSP	UPS	17-apr	https://www.dhl.com/global-en/home/global-news-alerts/global-messages/coronavirus.html
Social sustainability	Social responsibility	community involvement	During this crisis, we will offer increased capacity to deliver between restaurants, grocery stores and wholesalers directly to the consumer's doorstep. We want to stand with the hospitality sector and support them in anyway we can but also take a more proactive approach to prevent food waste. Restaurants and cafes have more food waste than usual right now. With Karma, food is always half price and now you can get it delivered to your door, within Stockholm. Save good food from being thrown away	E-grocery	Karma	25-maj	https://karma.life/sv/
Social sustainability	Social responsibility	health and safety	If the person to deliver feels cold or feverish, they stay home. We use hand spirit between deliveries. Karma delivery will be placed on the floor outside your door to avoid physical contact.	E-grocery	Karma	25-maj	https://karma.life/sv/
Social sustainability	Social responsibility	community involvement	You can now add a tip to your Karma orders The hospitality sector is suffering tremendously during this pandemic. At Karma we can't imagine a world without our favourite local food businesses. We know a lot of our users feel just the same because a lot of you reached out to ask us how you can help. This is why we now allow you to add a tip to every order you make on Karma. Because it's a tip and not a donation, you can't donate to our partners who don't have an active sale and it's an item just like any other on the app so the Karma fee applies to orders with tips. But 100% of every tip goes to the food business you tipped and we are working on a solution for donations to raise money for our partners outside of our normal ordering process.	E-grocery	Karma	25-maj	https://karma.life/sv/
Social sustainability	Social responsibility	community involvement	To support the first responders of the coronavirus crisis, Uber Eats will work with local governments	LSP, e-grocery	UberEats	24-maj	https://www.uber.com/us/en/coronavirus/

			to provide at least 300,000 free meals in the United States and Canada. Authorities can request assistance by emailing social-impact-support@uber.com . - For a limited time, users can make donations to restaurants when placing an order. Restaurants receive 100% of these funds. - Uber will match every contribution up to \$3,000,000 as a donation to the National Restaurant Association Educational Foundation's Restaurant Employee Relief Fund.				
Social sustainability	Social responsibility	philanthropy	For example, in South Korea, Seoul-based Hope Bridge Korea Disaster Relief Association is a civil association aimed to help populations suffering from unexpected disasters. In response to the coronavirus crisis, the Korea Disaster Relief Association and the Korean Association of Newspapers are raising funds jointly for COVID-19 prevention and support of those affected. These donations have been used to provide masks, sanitizers, and other related preventative products and to support frontline workers and self-quarantined individuals.	Philanthropic organisations	State of the Planet	07-maj	https://blogs.ei.columbia.edu/2020/05/07/global-philanthropy-coronavirus/
Social sustainability	Social responsibility	philanthropy	Partnering with 16 local community foundations, Cariplo provides fiscal resources that can be used directly by these non-profits to create initiatives and provide relief to particularly vulnerable regions in Italy. Cariplo looks to provide resources to these organizations to help them strengthen community services for vulnerable and isolated populations.	Philanthropic organisations	State of the Planet	07-maj	https://blogs.ei.columbia.edu/2020/05/07/global-philanthropy-coronavirus/
Social sustainability	Social responsibility	philanthropy	Through a voluntary civil society movement called Rio Contra Corona, the organizations receive donations, buy food, and deliver the food to communities that live in extreme poverty. The organizations have a strategic partnership in which each non-profit manages a different logistical proponent of the initiative.	Philanthropic organisations	State of the Planet	07-maj	https://blogs.ei.columbia.edu/2020/05/07/global-philanthropy-coronavirus/
Social sustainability	social responsibility	philanthropy	Several of Sweden's leading food chains are joining forces to facilitate food purchases for people who need to isolate themselves due to the corona virus. The venture receives million grants from the H&M Foundation and is part of the Action Against Corona campaign, which the Norrskan foundation and Dagens industri started.	foundation	DI	27-mar	https://www.di.se/nyheter/ny-tjanst-hjalper-till-med-matinkop-under-coronakrisen-hm-miljonstottar/
Social sustainability	social responsibility	philanthropy	New collaboration joining initiatives around the world fighting COVID19 and it's implications.	foundation	Action Against Corona	24-maj	https://actionagainstcorona.org/initiatives/
Social sustainability	social responsibility	health and safety	We temporarily pause our return service. This means that we do not currently receive any types of returns such as	e-grocery	Mathem	24-apr	https://www.mathem.se/artikel/covid-19

			recycled packages, MatHem bags or PostNord packages. We pause the return of purchased goods.				
Social sustainability	social responsibility	health and safety	We have detailed routines throughout MatHem's operations regarding hygiene and cleaning routines. All our drivers ensure good hand hygiene, including by using hand spirit. We have also expanded our cleaning routines in delivery cars, in our warehouses and offices.	e-grocery	Mathem	24-apr	https://www.mathem.se/artikel/covid-19
Social sustainability	social responsibility	philanthropy	755 Organizations have Signed the Pledge! As leaders in philanthropy, we recognize the critical need to act with fierce urgency to support our nonprofit partners as well as the people and communities hit hardest by the impacts of COVID-19. We invite funders and other leaders in the philanthropic sector to join us in making these commitments and collectively holding ourselves accountable to them by signing this pledge of action.	Philanthropic organisations	Council of Foundations	28-maj	https://www.cof.org/news/all-action-philanthropys-commitment-during-covid-19
Social sustainability	social responsibility	philanthropy	Philanthropic Organizations are Addressing Coronavirus Around the World	Philanthropic organisations	State of the Planet	07-maj	https://blogs.ei.columbia.edu/2020/05/07/global-philanthropy-coronavirus/

8.6 Appendix 6: Coded data – Research context

Initial code (Level 1)	Category code (Level 2)	Literature code (level 3)	Illustrative words from original field notes/source	Source	Date	Link/File name
Research context	Advise	Authorities	Stay at home if you are ill or have any cold-, flu-like symptoms Practise good hygiene, Practice social distancing from all other people at least a 1.5-2 metre. Avoid large gatherings, including parties, weddings, and other activities. Work from home if you can. Avoid all non-essential travel. If you are over 70 or belong to a high-risk group, you should stay at home and reduce all social contacts.	Public Health Agency	11-apr	https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/communicable-disease-control/covid-19/
Research context	Advise	risk groups	Social Board "Relatives of risk groups should stay at home. A new report from the National Board of Health and Welfare identifies how many Swedes are at increased risk of becoming seriously ill with the corona virus and now obesity is also classified as a risk factor. In addition, it is recommended that relatives of risk groups should stay home from work, in order to avoid bringing the infection home."	SVT news	24-apr	https://www.svt.se/nyheter/inrikes/socialstyrelsen-anhoriga-till-riskgrupper
Research context	corona virus	starts	December 31, 2019: China informs the World Health Organization (WHO) of an unknown virus that has caused 41 cases of pneumonia in the multi-million city of Wuhan, Hubei Province. The first affected people must have fallen ill in early December. March 11: WHO states that the corona eruption is a pandemic. On the same day, the first Swede, a person in his upper 70s, dies in covid-19.	SVT news	11-apr	https://www.svt.se/nyheter/utrikes/tidslinje-tre-manader-sen-forsta-dodsfall
Research context	delivery system	service	UberEats offers home delivery of restaurant food by drivers using their own moped, scooter or motorcycle as a delivery mode. Online service is offered in Swedish and in English.	UberEats	11-apr	https://about.ubereats.com/?_ga=2.115642565.2114974772.1590350464-1717761952.1585812793
Research context	delivery system	pick up point	14% of Swedes say that the corona virus has affected how they want their e-commerce goods delivered. There are more people who want their goods delivered home and significantly more who want them left outside the door. At the same time, fewer people want to pick up packages from agents. Demand for home deliveries has increased slightly, while agents / drop-offs have decreased slightly	Postnord	07-apr	https://www.postnord.se/siteassets/pdf/rapporter/postnord-e-handel-i-corona-tider-20200407.pdf
Research context	delivery system	on demand delivery	But despite the fact that six out of ten e-shopping packages go to a delivery point, demand for home deliveries is increasing. In the traces of covid-19, many consumers also demand that packages be left outside the door, without acknowledgment when no one is home.	Postnord	24-maj	https://www.postnord.se/vara-losningar/artiklar/hemleveranser/smarta-hemleveranser-till-din-kunder
Research context	e-commerce	trend	Most product categories are affected by declining consumption and unchanged e-commerce shares, while some have increased consumption and increased e-commerce shares; this applies primarily to groceries and pharmacy products.	Postnord	24-maj	https://www.postnord.se/vara-losningar/e-handel/e-handelsrapporter/e-handel-i-coronatider

Research context	e-commerce	trend	E-COMMERCE RUSHING - INCREASED 32 PERCENT A MONTH: e-commerce to consumers increased by 32% from February to March and for the whole quarter, e-commerce to consumers grew by 16%. For the first time in the history of the barometer, the largest product categories became beauty, health - including pharmacy products - followed by clothing and shoes. The strongest growth during the whole quarter was pharmacy products, which increased by 37%, followed by groceries, which increased by 27%	Supply Chain Effect	14-maj	https://sceffect.se/e-handeln-rusar-okade-32-procent-pa-en-manad/
Research context	e-commerce	trend	Also, the higher volumes of parcel to handle (sort and deliver). Although B2B segment has decreased 25%.	Interviewee B	07-maj	semi-structured interviews
Research context	e-commerce	trend	While B2C segment (home deliveries) used to be only 10% it is now 30-50% of total deliveries. B2C segment has increased 400-500%. It has never happened before.	Interviewee B	07-maj	semi-structured interviews
Research context	e-commerce	trend	Medicine has been a growing segment during the COVI-19.	Interviewee B	07-maj	semi-structured interviews
Research context	e-commerce	trend	Delays - There has been some delays in delivery times, but they have solved them well.	Interviewee B	07-maj	semi-structured interviews
Research context	e-commerce	trend	There has been changes in the product segments, such as: volumes Fashion products have decreased while handcrafts and knitting, IT and hardware and medicine and food have increased (this last one mainly for other companies).”)	Interviewee B	07-maj	semi-structured interviews
Research context	e-commerce	future	Don't know what will happen. Although it will be challenging, if volumes are to increase even more and there will be new big wave.	Interviewee B	07-maj	semi-structured interviews
Research context	e-commerce	supply chain	Third area of challenges has been a supply chain. Suppliers have had problems of getting the volumes that they want to.	Interviewee A	17-apr	semi-structured interviews
Research context	e-commerce	trend	They have seen upsurge in volumes. Their network's B2C framework is built on the foundation of three services: Home delivery, Pudo delivery, Parcels to Mailbox delivery. There has been an increase of 500% in Home delivery. A doubling in the orders for parcels in mailbox, and 200% increase of parcels to Service points. Even though lot of customers have changed their behaviour and chosen to have a home delivery. They also had some service point closures during the covid-19, but nothing that has disrupted the services of parcels.	webinar	22-apr	appendix
Research context	e-commerce	trend	B2B shipments have dropped in Volume, especially shipments to stores and restaurants that have closed. They have seen many customers have ceased their shipments completely. They also have asked their customers to have a better dialogue with their stores and delivery partners to see if the shipment can in fact be delivered, because they have seen high number of failed deliveries.	webinar	22-apr	appendix
Research context	e-commerce	trend	There has had a lot of concerned calls from the customers about the safety measures.	webinar	22-apr	appendix
Research context	e-commerce	trend	They have experience higher level of returns in the B2C segments, because of the higher volumes.	webinar	22-apr	appendix

Research context	e-grocery	trend	e-grocery home deliveries have high pressure. Some goods may run out in a shorter time and are therefore missing from your delivery.	Coop	24-apr	https://www.coop.se/Globala-sidor/covid-19/
Research context	e-grocery	trend	Mathem.se home deliveries have high pressure, that creates longer delivery times. Longer delivery times, less options to choose from, temporarily paused into the fridge deliveries to home service users (hemtjänst users)	Mathem	24-apr	https://www.mathem.se/artikel/covid-19
Research context	e-grocery	trend	Home delivery requests have gone up 10 to 15 times than the usual traffic. It is difficult to cope, but we are trying our best. The delivery waiting period for items is currently five to six days."	Khaleej Times	05-apr	https://www.khaleejtimes.com/coronavirus-pandemic/covid-19-in-uae-grocery-stores-working-hard-to-meet-online-delivery-orders
Research context	e-grocery	trend	As their services area more popular and more people order food online, thus they have had to adjust their production. Higher production growth in Norway than in Sweden. Higher production volumes have been a challenge for the deliveries.	Interviewee A	17-apr	semi-structured interviews
Research context	instant deliveries	service	Foodora offers home delivery of restaurant food by drivers using their own moped, scooter or motorcycle as a delivery mode. Online service is offered in Swedish and in English.	Foodora	22-apr	https://www.foodora.se/en/city/goteborg
Research context	New regulations	border crossing	Border crossing has been constant in Scandinavia. Beginning of March, the border was closed for travellers, only allowed for the ones who had a living permit or critical function in the society. Although freight transportation was always allowed to cross the borders freely. Until the middle of May this restriction will be changed some degree or maybe completely repealed.	webinar	22-apr	appendix
Research context	product	demand	Sales of dry goods such as pasta, rice and various types of canned food increased by 60 percent.	SVT news	02-mar	https://www.svt.se/nyheter/inrikes/kraftigt-okad-forsaljning-av-torrvaror
Research context	product	demand	High sales of "food with a longer shelf life - pasta, rice, preserves and some frozen food, says Tobias Rydergren, adding that it is also unusually sold by other food products. - We see sales growth of snacks. Then you see that fresh produce sells more, meat and so on. So it's not just preserves - but you add on extra dry goods."	Ny Teknik	12-mar	https://www.nyteknik.se/digitalisering/coronaviruset-far-fler-att-handla-mat-online-gar-pa-hogvarv-6990409
Research context	regulations	border crossing	For the travel of accompanied goods vehicles between the UK and mainland Europe and Ireland the government is reminding ferry operators of the importance of enabling social distance measures during longer sea crossings in respect of sleeping accommodation, in particular. The government is reminding Eurotunnel in operating its Le Shuttle services of the importance of health and safety responsibilities and enabling social distance measures, both at the UK and French terminals, but also during crossings through the Channel Tunnel. At the UK-end of journeys, domestic freight providers are also essential services. The government emphasises the health and safety responsibilities of all organisations connected with freight transport	UK	29-maj	https://www.gov.uk/government/publications/covid-19-guidance-on-freight-transport/covid-19-advice-for-the-freight-transport-industry

			organisations running transport terminals, warehouses and distribution centres to provide access to drivers and crew to toilets, washing facilities and sufficient waiting space.			
Research context	regulations	border crossing	The European Commission’s response to the COVID-19 pandemic prioritises keeping citizens healthy. This includes keeping essential transport moving, for example to transport medical supplies and other essential goods.	EU	29-maj	https://ec.europa.eu/transport/coronavirus-response_en
Research context	Restrictions	social distancing	Public health professionals told that the spread could be slowed down by “social distancing” by people avoiding public spaces and reducing their movement. Washington Post (2019) did the math and visualized it through simulation the different scenarios. ”Why outbreaks like coronavirus spread exponentially, and how to “flatten the curve” ...“That is math, not prophecy. The spread can be slowed, public health professionals say, if people practice “social distancing” by avoiding public spaces and generally limiting their movement.”	Washington post	14-mar	https://www.washingtonpost.com/graphics/2020/world/coronavirus-simulator/?fbclid=IwAR2rhfOxltFSMcma2g8FIY-c8ZvgY61Vz9iyFfhBnksS7XPVYzvLkZETMo
Research context	Restrictions	risk groups	Risk groups, who may have more severe symptoms if they are infected with covid-19, primarily pneumonia and respiratory distress. Since the disease is new, there is no comprehensive knowledge of which groups are most at risk of becoming seriously ill. Such groups where people who are 70 year and older have High blood pressure, Cardiovascular disease, Lung disease (not asthma), Severe obesity, Diabetes, but also pregnant.	Krisinformatio n.se	22-apr	https://www.krisinformation.se/detta-kan-handa/handelser-och-storningar/20192/myndigheterna-om-det-nya-coronaviruset/riskgrupper?fbclid=IwAR1kdhGiliV1LO9dJVWCWbwOMBIPz5px7aUS3N0JF8tQuO8iVw_pGKgJ0HE
Research context	Restrictions	Goods transport	Limitation do not apply to goods movement	UPS	26-maj	https://www.ups.com/se/en/service-alerts.page?id=alert1
Research context	social exclusion	vulnerable ones	As COVID-19 deaths increased in the United States (US), a disturbing statistical pattern began to emerge—the virus had a disproportionate impact on minority communities across the country. Unfortunately, this trend of disproportionate health impacts is visible across several countries. In Sweden, Somali refugees are the hardest-hit group. In Norway, immigrants are disproportionately affected as well. In addition to the disproportionate health risks, some measures put in place to contain the virus have had the effect of alienating minority and migrant communities.	New York University	24-apr	https://cic.nyu.edu/publications/covid-19-minorities-and-social-exclusion
Research context	social exclusion	vulnerable ones	Older adults and persons with underlying medical conditions are at higher risk for severe COVID-19. Non-Hispanic black patients are overrepresented among hospitalized U.S. COVID-19 patients.	Centres for disease control and prevention	24-apr	https://www.cdc.gov/mmwr/volumes/69/wr/mm6918e1.htm?s_cid=mm6918e1_w
Research context	social exclusion	vulnerable ones	The latest overall COVID-19 mortality rate for Black Americans is 2.4 times as high as the rate for Whites and 2.2 times as high as the rate for Asians and Latinos.	American Public Media	24-apr	https://www.apmresearchlab.org/covid/deaths-by-race