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Value Creation Through Digitalization in Real Estates

A Study About Digitalization in the Swedish Real Estate Sector

Master's thesis in Design and Construction Project Management

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CHALMERS UNIVERSITY OF TECHNOLOGY
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Abstract

Digitalization and innovation of technology have increased rapidly over the past years and are currently beginning to be introduced extensively in the real estate sector. The implementation of digitalization opens up for several new value propositions, both for property owners but also for tenants. This master thesis aims to examine how digital solutions and services can contribute to value creation in the Swedish real estate sector. This concerns value creation for both tenants and real estate owners. Furthermore, the goal is to investigate the current state of digitalization in the real estate business.

This master thesis has been conducted through interviews and a survey. The interviews provided insight about the real estate owners' value creation, the survey provided insight about the corresponding value for tenants. The results from the interviews were then analyzed to find common themes, while the survey was analyzed by comparing differences between age groups, gender, and different living situations.

The research shows that digitalization allow real estates be used in new innovative ways to create value for both tenants and real estate companies. Currently, actors in the sector are trying to implement minor value creating digital solutions, but have not yet figured out how to provide an extensive beneficial environment. The main findings that connect the stated research questions and provide an answer to how digitalization can contribute to value creation in the Swedish real estate sector is the digital platform in combination with partnerships, new business models, and development of new services. This combination is believed to create value for both tenants and real estate companies and investigations is currently carried out concerning how this model can be implemented. The digital platform is also seen as the tool which can be used to facilitate both present and future desires among tenants and real estate owners, making it a key feature together with the abovementioned aspects in the value creation through digitalization.

The combination partnerships, new business models, development of new services, and platform design give birth to new types of income and generate streams of user data from housing facilities. Something which can be used as a strategic asset by real estate companies, for instance providing information regarding the tenants' demand. The platform does also provide the tenants with the full value proposition conducted by the real estate company, giving them access to several digital services and solutions. Hence, the tenants desire having the possibility and flexibility to choose whether to receive or reject certain digital solutions or services, something which also is possible by the use of a digital platform.

Keywords: Digitalization, Digital Platform, Digital Services, Digital Solutions, Real Estates, Sharing Economy, User Data, Value Creation

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Markus Andreasson and Fredrik Mattsson
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Contents

Abbreviations

API - Application Programming Interface

B2B - Business-to-Business

B2C - Business-to-Customer

HVAC - Heating, Ventilation, and Air Conditioning

IoT - Internet of Things

P2P - Peer-to-Peer

Proptech - Property Technology

REC - Real Estate Core

SES - Sharing Economy Services

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1
Introduction

1.1 Background

The innovation of technology and the digitalization trend have increased rapidly over the last years (Retiefa, Bond, Pope, Morrison-Saunders, and King, 2016; The Government Office for Science, 2017). The implementation of digitalization opens up for several new value propositions, both for property owners but also for tenants. Actors in the technology sector are starting to glance at the real estate market (Pichai, 2019). Those actors see that market shares easily can be taken from existing traditional real estate companies since the tech-companies can offer a more digitalized facility to the tenants. The tech-companies do not have to go through a transformation within existing facilities in the same way as present actors in the sector will have to do. A majority of the actors within the Swedish real estate sector had as late as 2018 no innovation strategy for the implementation of digitalization within the real estates, i.e. a strategy towards a more digital business (Börjesson, 2018b). Among the companies who had a strategy for innovation, less than half of the actors had an implementation plan regarding digital solutions and services for the tenants. Based on this, the course of action for value creation by digitalization is unclear to actors in the real estate sector.

The issue within the Swedish real estate sector is based on a combination of the rapid innovation of technology, static business models, risk of new kind of investments, respectively a gap of knowledge regarding customer demand (Baum, 2017). Furthermore, there is a gap in research and literature on how to deal with changes based on the rapid development of digitalization in the real estate sector. Few researches with focus on digital opportunities in the real estate industry has been done and hence a lack of knowledge exists. The Swedish real estate sector has been profitable over a long term perspective, especially in means of rental apartments. The facility owners have profited from the same business model over time but will suddenly have to adapt the strategy towards new demographic trends and demands to stay competitive.

The issue is relevant to consider for present actors on the Swedish real estate market since adaption to changing demography respectively current and future trends is necessary to stay competitive (Rachinger, Rauter, Müller, Vorraber, and Schirgi, 2018). Furthermore, knowledge regarding social- and environmental sustainability has emerged in the past years. Real estate companies can reach a large group of people, the tenants, to e.g. encourage a more sustainable lifestyle (Börjesson, 2018b). This encouragement can potentially be provided by digital solutions and

services and might impact the overall situation if the target group is big enough. The social- and environmental sustainability has to be reached through a common effort, to achieve a significant change.

To continue the innovation of digitalization within real estates, it is important to know what state the market is in at the present (Rachinger et al., 2018). To identify a general picture that is representative to the current state, both real estate providers' respectively tenants' point of view is important. The real estate providers' perspective will contribute to knowledge about what the sector representatives think is possible and what is prioritized, seen to further innovation. The tenants' input will contribute to knowledge about what demand the customers have. This is an aspect that has to be taken into account by real estate companies when a course of action is chosen to proceed with the innovation of digitalization within housing facilities.

1.2 Aim

The aim of this master thesis is to investigate how digital solutions and services can contribute to value creation in the Swedish real estate industry. This concern value creation for both tenants and real estate owners. Furthermore, the goal is to investigate the current state of digitalization in the real estate business.

The preferred outcome of this master thesis is to identify how the digitalization is about to contribute to innovation in the real estate sector. Furthermore, the thesis aims to answer how digitalization can contribute to cover both present and future demand among tenants as well as real estate owners.

1.3 Research Questions

The report is structured and developed from the stated main question and sub-questions below:

- How can digitalization contribute to value creation in the Swedish real estate sector?
  - What is the current state of value creation through digitalization in the Swedish real estate market?
  - How can digitalization provide value for the property owner?
  - How can digitalization provide value for the tenant/customer?

1.4 Limitations

This master thesis is limited by the research questions stated in chapter 1.3. To produce a high qualitative study within the given time, the research must be limited and therefore the following subjects might be briefly handled, but are not further investigated:

- Economic aspects
- Laws and regulations
- IT-security
- Integrity

Furthermore, the study is limited to one single case study which is carried out in Sweden.

1.5 Structure of the Report

- **Chapter 1 - Introduction:** Provides a background to the investigated subject and the aim of the thesis followed by the research questions and limitations.
- **Chapter 2 - Theory:** The field of real estate, new trends and innovation is presented through a literature review to provide a theoretical framework.
- **Chapter 3 - Methodology:** Describes the methodologies used to conduct this thesis. This includes the research approach, research design, data collection, analysis, validity and reliability, as well as research ethics.
- **Chapter 4 - Case Study:** Presents the case study and the prerequisites by which it was conducted.
- **Chapter 5 - Empirical Findings:** Highlights the results collected and obtained from the empirical studies.
- **Chapter 6 - Analysis:** Compares and analyses the empirical findings with the theoretical framework.
- **Chapter 7 - Conclusion:** Final conclusions of the research, summarizes the analysis and answers the stated research questions.
- **Chapter 8 - Suggestions for Future Research:** Present suggestions of how further research could be conducted to develop the findings in this thesis.

2
Theory

2.1 Real Estate

This report is focusing on the real estate sector whereas an introduction to the subject is in place. The term real estate is used in three ways, where the first use is to identify the tangible assets of buildings and land (Ling and Archer, 2010). The second use us to denote the rights that are associated with the ownership and use of physical assets. Third and final, the term is to be used when referring to the activities of the business related to acquiring, operating and dispositioning the physical asset. The operation of the building is also known as Facility Management (Redlein, 2008).

The real estate owner possesses facilities that are to be rented out to tenants (Ling and Archer, 2010). Even though the real estate is a tangible asset, there are several intangible rights associated with the ownership and use of it. Examples of rights are privacy, security and shelter. The bundle of rights can be limited in several ways, by e.g. land use restrictions, and they can be divided and distributed among multiple owners. Generally, the real estate owner holds the responsibility to maintain and operate the building while the tenant is responsible for paying rent.

The demand in the real estate market is driven by the combination of several factors (Ruddock, 2008). These factors are economic growth, population growth, employment growth and the interrelated growth of stock of buildings. Involvement in the real estate market is nonetheless free from risks. Several risks that are presented in the literature are recessions and vacancies, the later from a real estate owners perspective (Ruddock, 2008).

2.2 Trends

A set of large trends that are common for the whole world, also known as megatrends, have been spotted recently (Retiefa et al., 2016). Those trends might impact the general picture of the real estate sector, both in terms of what real estate owners, as well as real estate tenants, consider value creating. Some of those identified trends are as follows:

- A rapid change in demography
- A rapid urbanization
- An increasing acceleration of technology
- Changes in climate and lack of resources

The first megatrend, rapid change in demography, regards the increasing population both seen to numbers but also seen to lifetime expectancy Retiefa et al., 2016. This entails some challenges regarding several different subjects. One problem for developed countries is related to the fact that the tax systems has to supply a larger amount of retired people at a not increased level of monetary assets (Sunter, 2014). Real estate companies are affected by this since elderly people occupy the facilities during longer time periods. This entails the need for adaption in the facilities respectively adjustments in the real estate companies' business strategies and portfolios.

The second megatrend is an increasing speed in urbanization, people tend to move into cities (Retiefa et al., 2016). A possible explanation of this is the relatively large human development index in cities compared to what it is in the countryside (Habitat, 2013). The urbanization will lead to challenges regarding city planning, where innovation and new ways of city structures play an important role.

The innovation of new technologies is constantly increasing and groundbreaking solutions are getting produced every day, this acceleration in new technologies stands for the third megatrend (Retiefa et al., 2016; The Government Office for Science, 2017). The emerging technology is partly getting pushed forward by human's communication needs respectively the need for energy usage. To increase those subjects, the innovation regarding both software and hardware such as sensors and processors are getting pushed forward. This trend has come to create the concept called Internet of Things (IoT) that is described in 2.2.3.1, which enables the possibility for machines to communicate with each other without human interaction (Al-Fuqaha, Guizani, Mohammadi, Aledhari, and Ayyash, 2015). The rapid innovation of new technologies has enabled new areas of use in both communication and data analysis. Two of those new areas are the IoT respectively the Big Data and it's analysis described in 2.2.3.2. The analysis of Big Data enables statistical based knowledge and can strengthen former and new hypotheses in a more accurate manner than before (Bilal et al., 2016).

The fourth megatrend regards the emerging lack of resources respectively the global climate changes (Retiefa et al., 2016). The population of the world increases and so does the life expectancy of the human race, this entails that a larger number of individuals have to share the same amount of resources. The demand for food, energy, and water is increasing by this demographic trend and the earth's resources are getting heavily utilized (Steffen et al., 2015). This demand, together with the industrial pollution of greenhouse gases, is stressing the earth's natural resources to a high degree. According to Retiefa et al. (2016), this stress has been identified as a contributor to the global climate change and a widely-spread knowledge regarding the subject occur among the human population. This knowledge has contributed as a driver in the innovation of new resources, improvements in efficiency in many different processes, and the change of human behavior. Based on the awareness regarding the human impact on climate change, individuals are more keen to live a sustainable lifestyle. The technological innovation opens up a lot of opportunities to achieve such goal, since it can contribute to both knowledge and efficiency

improvements (Retiefa et al., 2016). This sustainable living trend has opened up for the sharing economy that is further described under section 2.2.1 below. People have explored that the co-use of material things can heighten the usage of a certain object, hence reduce the individual environmental impact (Rechene, Silva, and Campos, 2018).

A trend that has emerged the last decade is the usage of smartphones, in Sweden there is 92% of the inhabitants that owns such a device (Börjesson, 2018a). In figure 2.1 below, the emerging internet usage within smartphones for the last 12 years divided into age groups per decade is visualized.

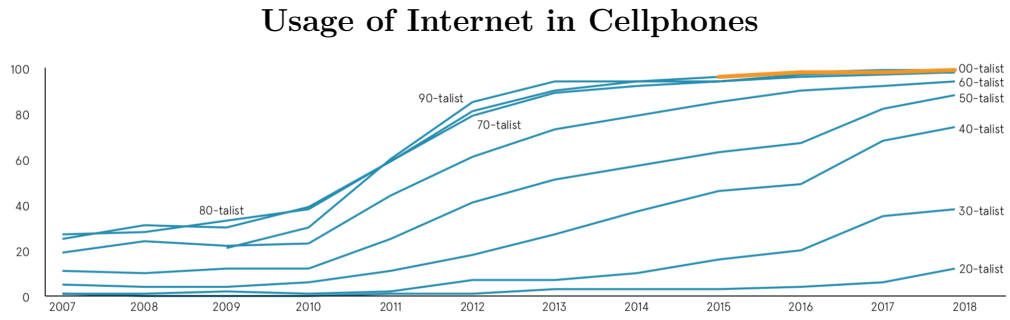


Figure 2.1: *The emerging internet usage within smartphones for the last 12 years divided on age groups per decade (Börjesson, 2018a, p. 3).*

The emerging usage of smartphones and the usage of internet within the devices open up for a lot of possibilities. Smartphones can be used as a control unit for several systems and emerging towards a central unit for the majority of new, innovative technologies (Börjesson, 2018a).

2.2.1 Sharing Economy

As mentioned in the earlier section, a rising trend is sharing economy. The objective of sharing economy is to provide an economic model that allows people to rent and borrow assets and resources owned by, or co-owned with others (Gertz, 2018). This can involve both humans as well as physical or immaterial resources.

The idea behind sharing economy is that most assets are not used to its full capacity all the time, e.g. cars (Gertz, 2018). The purpose of owning every asset yourself is weakened and therefore no longer as important. Add the economical perspective of buying e.g. a car and the incentive for sharing resources becomes obvious. At the same time, if you already own a car or an apartment that is not used to its full capacity, you can rent it out and earn extra cash.

Sharing economy creates a market place that enables the exchange of services and goods (Sundararajan, 2016). This can be conducted through digital platforms, which is going to be further explained in section 2.2.2. However, sharing economy does not necessarily have to be digitalized, even though it is often eased by digital aids. Anyhow, sharing economy opens new possibilities for everything to be used closer

to its full potential. It is also decentralized and crowd-based rather than centralized around institutions. Sharing economy is also characterized by the blurred line between personal and professional. It often entails the peer-to-peer (P2P) activities rather than business-to-customer (B2C) and business-to-business (B2B).

Sharing economy has been called a social revolution. Something that benefits the entire community and allows people to share resources through multiple platforms (Gertz, 2018). The sharing between people, business and the community can occur everywhere (Sundararajan, 2016). It can e.g. be in an apartment building, a neighborhood, an office or a digital network. The exchange of goods and service can be local, face-to-face or connected through the internet.

The most dominant areas of sharing economy are services, goods, transportation, space and money, but other areas are also present (Gertz, 2018). As a result of the growing sharing economy, the number of sharing economy service (SES) companies have increased as well (Apte and Davis, 2019). The SES companies usually use cloud-based technology, such as digital platforms, to connect and match customers with service providers. Today, the SES companies provide matchmaking services in which companies and customers can attend on either or both sides of the service transaction. SES companies can be found in all types of service settings. This includes P2P, B2C as well as B2B services. The SES companies are seen as innovative businesses and do usually have a major impact on the traditional companies with which they compete. Most often the SES companies also have a positive impact on the environment since the utilize existing resources that today are underutilized.

According to Apte and David (2019), the sharing economy has been growing rapidly for the past decade and is predicted to continue in the same manner for the foreseeable future. The sharing economy was in 2017 valued to $18.6 billion, a number that is expected to rise to $40.2 billion in 2022. It is believed that rapid growth is driven by millennials. Their familiarity with technology in combination with the value they put on experiences rather than owning goods and their willingness to share their belongings is closely related to the foundations of sharing economy.

The sharing economy is also closely related to the megatrends mentioned earlier in section 2.2. The impact of new technology has already been discussed but the other megatrends are also present in sharing economy. According to Rechene, the sharing economy has had a great impact on receiving sustainability goals (Rechene et al., 2018). Especially in large cities since sharing economy is more easily used in urban areas where people live close to each other. The rapid urbanization does hence also have an impact on sharing economy. The increased change in environmental behavior in combination with the interest in sharing, instead of owning, is answering to both the megatrend regarding lack of resources as well as the one regarding climate change and the need to prevent this.

2.2.2 Platform Economy

As a result of the emerging digitalization and the new opportunities it entails, several companies are creating online structures that enable a wide range of human activities

(Kenney and Zysman, 2016). Similarly to sharing economy, digital platforms allow not only B2C and B2B interactions, but also P2P exchange of services and rentals (McKee, 2017). The concept of platform economy is closely related to sharing economy, something which has had a great impact around the world for the past few years through companies such as Uber and AirBnB.

According to Kenney and Zysman (2016), the platform economy, or digital platform economy, encompasses the rising amount of digital activities in social interaction, business, and politics. It could be compared to the industrial revolution, but instead of organizing around the factory, today's change focuses and is organized around digital platforms. The platform economy is giving birth to new business models through the connection of customers, resources and service providers, in the same way as Spotify did with music (Börjesson, 2018b). This model could be of increasing interest and importance in the real estate business where information about the facilities such as energy consumption and unused space can be connected with e.g. service providers and SES companies to create new possibilities.

The main purpose of the digital platform is to connect service providers with clients and facilitate their transactions (McKee, 2017). The company providing the platform acts as an intermediary, charging a subscription or a commission on the transactions. The platform could be applied in several areas of rental and services with an extensive area of use, with everything from e.g. car-sharing, grocery shopping, deliveries or parking rental to laundry services.

2.2.3 New Technologies

The development of new technologies has accelerated during the last few years, new possibilities in a wide area of applications are continuously emerging (Mohn, 2018). A focus around sensors and machine communication is currently trending, a majority of the technology that is produced contains some kind of sensors and processors. Those sensors and processors enable the possibility of data streams, both between machine and human but also between machine and machine. This possibility of communication has emerged the concepts called the Internet of Things and Big Data, which are presented in the following sections.

2.2.3.1 Internet of Things

The technological trend called the Internet of Things can be traced back to the year 1999 when it was mentioned during a presentation regarding industrial enhancement concepts (Ashton, 2009). Computers, smart devices, and other electronics have earlier been dependent on actions of human beings to take action respectively provide information and data. A code or text had to be written to create data and the electronics had to be asked for specific information to give a response. The IoT implies that electronic devices are connected to each other in a network and are provided with sensors to be able to read events, change, and current state in its environment (Chaudhuri, 2019). The network enables communication between the devices without an intermediate action from a human being, since the electronics

can provide information to other parts in the network but also receive information from other devices through this technology (Ashton, 2009).

When connecting two or more devices into an IoT, several devices can take action through one single input into the network (Chaudhuri, 2019). This implies that devices are not dependent on humans to create data anymore, the sensor connected devices can provide databases with information automatically (Mohn, 2018). If all connected electronic devices constantly provide information about the IoT's specific environment, a lot of data will be collected. By analyzing this data, further topics of enhancements in that environment can be detected (Mohn, 2018).

The IoT can provide simplifying enhancements to human life in several ways, creating value in the matter of both proactive and reactive events (Ashton, 2009). One example of such enhancement is a privately owned vehicle that is connected to an IoT and set up with several sensors. The car could communicate with a smartphone and send a notification to this device when a part is starting to get worn out. By the same technology, the car can book an appointment at a workshop for service when the sensors imply that it is needed (Mohn, 2018).

The technology that creates a network of communicating devices can create value in a person's home (Mohn, 2018). By adding everyday electronics to an IoT, both time and resources can be saved. An example is to provide a refrigerator with sensors and connect it to the IoT, this could provide notifications to smartphones or similar that also is connected to the same IoT. Those notifications could provide e.g. information about what kind of food the refrigerator contains, what quantity, or if a due date is approaching. Even recipes can be provided, based on what is in the refrigerator. Another example that the IoT can be used to is light control by a smartphone. By connecting LED-lights to the IoT, the lights could be turned on, turned off, and the brightness of the light could be adjusted from a smartphone or computer. Besides the possible applications of IoT that are mentioned above, surveillance and security systems are a wide area of use when it comes to IoT (Mohn, 2018).

2.2.3.2 Big Data and it's Analysis

The term Big Data has several different definitions, but all definitions state that the term involves huge amounts of digital information (Mediratta, 2015). The most common definition is the three V's; volume, velocity, respectively variety (Mashingaidze and Backhouse, 2017; Mediratta, 2015). The first V, volume, refers to the amount of data that is getting created. The volume of Big Data is generated in such quantities that former methodologies for storing data no longer are efficient nor suitable. The second V, velocity, refers to the speed that new data gets created and that it is being analyzed without an extensive delay. The third and last V, variety, refers to all the different kinds of data, and the different structures it comes in, that is getting created every day (Kwon and Sim, 2013).

Digitalization has changed everyday activities related to e.g. health, sports, parenting, homes, etc (Marr, 2015). Sensors are implemented in the majority of new products today and this creates large amounts of data that possibly can be analyzed

if handled correctly. If the large amounts of new data that gets created every day are collected, stored, and analyzed, new possibilities for businesses and corporations emerges (Mediratta, 2015). The size of Big Data streams is so large, the analysis cannot be made through human processing. To utilize the potential of Big Data, the information has to go through phases of Data Mining (Kwon and Sim, 2013). Data Mining refers to the analysis of Big Data, where patterns and reoccurring trends are utilized from data sets. The data has to be computed through physical or virtual machines and first, after restructuring and recompiling of the Big Data, the information can be converted to knowledge and hence create direct value to the data owner.

Digital smart home solutions are based on a grid of sensors, an IoT, that is described in section 2.2.3.1 above. The sensors are integrated into network connected electrical devices such as door locks, light bulbs, humidifiers, and HVAC-systems. This network of sensors creates large amounts of data regarding e.g. energy usage, water usage, luminosity in certain areas, or the number of passages through a door (Chaudhuri, 2019; Rodríguez Fernández, Cortés García, González Alonso, and Zalama Casanova, 2016). Data mining in big sets of data like this enables a lot of possibilities for one who access information streams like these since it can create accurate pictures of the reality based on facts.

2.3 Innovation

The process of developing and bringing new ideas, solutions, services and products to the market is known as innovation (Harper, 2019a). Closely linked to innovation is technology, but also the state of society and quality of life. Understanding the importance of these factors working together, how society responds to change in technology and understand the nature of socio-technical systems, are necessary for an innovation to be successful.

2.3.1 Open Innovation

Traditionally, innovation as well as research and development were activities that took place within a company (Harper, 2019b). The employees within the company were the one developed new innovations and the companies put a lot of effort into protecting their innovation. In contrast to this, open innovation seeks to leverage knowledge internal, but also external to the company. Currently, there is a broad awareness of open innovation (Enkel, Gassmann, and Chesbrough, 2009). Chesbrough (2009) reckoned that *"not all the smart people work for us, we need to work with smart people inside and outside our company"* (p. 311). A citation that highlights the need for both internal and external collaboration within innovation projects.

Perspectives such as strategic, business, organizational, behavioral, legal and knowledge perspectives as well as economic implications are all present and discussed in

the work of open innovation (Enkel et al., 2009). Furthermore, there are three core processes which can be differentiated in open innovation:

- Outside-in process
- Inside-out process
- Coupled process

The first process, the outside-in process, aims to enrich the knowledge base within a company through integrating external parts such as suppliers, customers, and external knowledge sources (Enkel et al., 2009). By using this process, the innovativeness in a company can be increased.

Compared to the outside-in process, the inside-out process aims to earn profit by bringing different ideas to the market (Enkel et al., 2009). This can e.g. occur by transferring ideas to the outside environment. Companies that use this process focus on externalizing their innovation and knowledge with the aim of bringing their ideas to the market faster than they would be able to do by only using internal development.

The third and final process, the coupled process, refers to collaboration through cooperation, alliances, and joint-ventures (Enkel et al., 2009). I.e. co-creation with partners during which a give and take is seen as a crucial factor for success. The coupled process combines the two previous processes and companies that establish this process jointly commercialize and develop innovation.

2.3.2 User Involvement

An important part of innovation is the feedback and input of users (Bosch-Sijtsema and Bosch, 2014). Customer and user integration is seen as a paradigm of open innovation, in which the process of innovation has opened up to external knowledge. Understanding that users and the value created by, and for, them is a key part of the innovation has an impact on the skills and knowledge required for innovation (Skålén, 2018). This aspect gives birth to two kinds of knowledge which both are necessary in order to create innovative solutions; *technology knowledge* and *use knowledge*.

Technology is related to what different kinds of resources are capable of accomplishing (Skålén, 2018). E.g. how to program a computer, what type of drill might be produced by a specific material etc. It is a prerequisite to possess technology knowledge in order to integrate resources in value propositions which creates value for customers. But the possession of technology knowledge is not enough, in order to carry out innovative ideas, companies do also need use knowledge, i.e. knowledge of how customers actually use the value proposition and create value. This area does also include knowledge of possible future use. Possessing one knowledge without the other is not enough, even if a company design a technically perfect solution, it is useless if no one wants to buy it. On the other hand, customer suggestions influenced and based on use knowledge may turn out to be unrealistic or technically difficult to implement.

Commonly, companies tend to possess a lot of technical knowledge but lack the possession of use knowledge (Skålén, 2018). The combination of the two types of knowledge is what makes an innovation successful, which states the importance of co-creation of value. It is beneficial for companies to involve front-line staff in innovation projects since research shows it has a positive impact on the organization's capacity for innovation. The front-line staff spends the major part of their time co-creating value together with the customers in direct interactions. As a result of this, the companies become aware of how customers use their value proposition, how to integrate with resources as well as which problems they face in terms of creating value in use. In other words, at the same time as front-line staff possesses a certain amount of technology knowledge, they frequently become exposed by, and in the end possess, a great deal of use knowledge (Skålén, 2018).

As mentioned, the need for information, both from gathering data and from cooperation between company and user is crucial for innovative work. For integrating external knowledge from suppliers and customers, three different approaches have been developed (Bosch-Sijtsema and Bosch, 2014). The first approach has been developed toward involving users actively throughout the innovation process. Customers are seen as the ones who are initiating the starting activities for innovation, i.e. user innovation. The second approach focuses more on collaboration, gaining feedback and knowledge from users by interacting manufacturers and customers. The last approach however, focuses more on how companies can access feedback and information from users in the companies' development process. To benefit from the feedback and knowledge gained from users and customers, it is important for companies to find mechanisms to test. To explore ideas and concepts with customers in an early stage. The development of new technology gives birth to new possibilities for companies to gain input from users throughout the innovation process. As a result of this, companies do now have the possibility to work more closely with their customers through digital communication (Bosch-Sijtsema and Bosch, 2014).

2.3.3 Service Innovation and Value Creation

In the matter of service innovation, there is a need for finding new creations of value with intangible resources (Vargo, Maglio, and Akaka, 2008). Traditionally, value is seen as something embedded and added into goods or services then sold to customers, so-called goods logic (Skålén, 2018). But lately, the impact of service logic has been highlighted. Service logic sees value as something created in use by customers and generates two different approaches to value creation. Companies are from the later point of view not able to deliver complete or finished value to the customer, but are instead able to offer them a value proposition. For instance, having a laundry room in the facility is not valuable for the tenants until they decide to use it. As a result of this, the objective of a company is to facilitate customer's value creation which they do by offering the most favorable conditions possible for the customers to create value (Vargo et al., 2008), i.e. establish the value proposition. By adopting a more service-oriented approach, companies are accessing new ways of dealing with both their business and their customers (Barquet, de Oliveira, Amigo, Cunha, and Rozenfeld, 2013).

3
Methodology

This report was conducted with the combination of a qualitative and a quantitative method, i.e. a mixed method. The two different methods are conducted since different methods can provide different results (Brinkmann and Kvale, 2015). While qualitative methods refer to how something is experienced, the quantitative method aims towards answering measurements such as how much or to what extent.

In this master thesis, the survey was used as a quantitative tool while the interviews were more qualitative. The aim was that the combination of these two methods would provide the best possible outcome for this report.

3.1 Research Approach

An abductive research approach was applied to conduct this report. Bryman and Bell (2015) state that *"Abduction start with a puzzle or a surprise and then seeks to explain it"* (p. 27). Through several iterations between empirical findings and existing theory, the aim was to find the true conditions where the situation of uncertainty occur. By doing so, parts of the empirical findings were to be merged into the theory and thereby describe the reality (Atkinson, Coffey, and Delamont, 2003; Mantere and Ketokivi, 2013; Schwartz-Shea and Yanow, 2012).

The research approach of abduction entails that the researcher chooses the best fitting theory from earlier researches, and bases the empirical findings on parts of that theory (Mantere and Ketokivi, 2013). To create the foundation for this fitting, empirical data was collected. The data was used in the iterations mentioned above, it was collected through the interviews described in section 3.3.1.1, respectively through the secondary data collection described in section 3.3.2. The changeable nature of subjects under innovation processes combined with the lack of existing literature and theory regarding the chosen subject, an abductive reasoning research approach was suitable for this master thesis.

A mixed research method was used during the conduction of this master thesis, which entails data collection through both quantitative methods respectively qualitative methods (Bryman and Bell, 2015). The mixed method was chosen to strengthen the trustworthiness of the study, the method is contributing to a reduction of weaknesses that occur if a single qualitative or quantitative data collection is used. The data provided by a method like this entail both inductive and deductive data sources, which is supposed to provide a more extensive picture of the reality. The mixed

research method was chosen since the subject of this master thesis is in an innovative phase where a scarcity regarding the amount of existing literature occurs. Qualitative research had to be made to be able to ask the right questions in the quantitative analysis. Due to Bryman and Bell (2015), a mixed method is also reducing the biases that can occur in data collection. This suits the subject of this master thesis since data was being collected from different stakeholders with diverse interests.

3.2 Research Design

To form a report that suits this master thesis, a case study design was selected. According to Yin (2018), the more the research questions tends to explain some contemporary circumstance, such as "why" or "how" a social phenomenon works, the more relevant a case study design will be. Furthermore, the case study design is also advantageous the more the research questions needs an extensive description of this social phenomenon.

Most commonly, case studies are associated with one specific geographical location (Bryman and Bell, 2015). In this case an organization and its customers. Moreover, what characterize case studies, compared to other research designs, is its focus on a bounded system or situation.

Another important aspect when selecting a suitable case for the case study is to gain access to enough data (Yin, 2018). A suitable case is therefore one which matches the research questions and facilitates the data collection as much as possible. The collection of data could be through interviews, observation, document reviews, surveys or a combination of several. Additionally, according to Bryman and Bell, 2015, the selection of a suitable case should also be based on the anticipation of the opportunity to learn. This master thesis has therefore selected a case with favourable conditions for collecting data as well as good prerequisites for creating knowledge.

The development phase in the area of digitalization in which the chosen case company currently is has made it suitable for this master thesis. It was seen as advantageous to follow their work and collect knowledge from it. This case study was conducted with two methods, interviews and a survey. The objective of the case study was firstly to gain insight into what property owners see as, and believe could be value creating through digitalization. This part was conducted mainly through interviews and conversations with professional within the case company. The second objective was to conduct the survey to receive the tenant's, or customer's, point of view on what could be value creating. The case company's possession of a large customer base, with a well worked through communication tool, made it easy to send out and conduct the survey. The case company's possession of many skilled and knowledgeable persons has provided this master thesis with useful information. When information and knowledge were not found within the case company, the company's network connected the writers of this thesis with partners who could provide answers and useful information.

3.3 Data Collection

The collection of data is the key point of every research project (Bryman and Bell, 2015). In this master thesis, both primary and secondary data collection was necessary to receive a result with validity and trustworthiness.

3.3.1 Primary Data Collection

The primary data collection entails information that specifically is gathered for research, the researcher has control over the data in a more comprehensive way than it has over secondary data (Hox and Boeije, 2005). In this master thesis, qualitative primary data has been collected through the interviews described in section 3.3.1.1. Primary data has also been gathered through quantitative research, this was made through the survey that is described in section 3.3.1.2 below.

3.3.1.1 Interviews

The interviews in this report are used to gain knowledge about professionals' opinions in the subject of digitalization in real estate facilities. This was conducted with three purposes. The first one is to create a basis for the customer survey, to ensure that the survey is of good quality. The second one is to receive insight in the current state of the market of digitalization and the third and final purpose of the interviews is to gain knowledge in what real estate companies see as the benefits and value creation which digitalization can contribute to achieving.

According to Yin, 2018, interviews are seen as one of the most important sources for the collection of information in case studies. The focus was to conduct qualitative interviews which is suitable when rich and detailed answers are preferred over quick and short ones (Bryman and Bell, 2015). Furthermore, a semi-structured approach was chosen and performed. Semi-structured interviews mean that the interviewer has a list of questions with fairly specific topics that are aimed to be covered. This list is established in advance but during the interview, the interviewees are given plenty of leeway in how to reply. The questions order is not always following the predetermined way that was outlined, it is instead flexible and used whenever necessary. Instead, the interviewer can begin to ask open and explorative questions which the interviewee can interpret and speak freely about from her point of view, but not completely without presuppositions (Brinkmann and Kvale, 2015). This was seen as a beneficial approach since the investigated subject is innovative and rather unexplored.

At the same time, the interviewer can ask questions which are not included in the predetermined list based on things said by the interviewee (Bryman and Bell, 2015). If the interviewee does not have more to say about a topic or if the interviewer believes the subject is answered, she can fall back to the predetermined list of questions to guide the interview in the right direction and ensure that all desired questions are answered.

Interviews were performed both face-to-face and by telephone depending on the time and location of the interviewee. According to Bryman and Bell, 2015, telephone interviews are nowadays as representative as face-to-face interviews and often easier to supervise. Most of the interviews were, when permission was given, recorded in order to secure what was said during them. The interviews were conducted in both Swedish and English, depending on the interviewees preferred choice of language.

The interview guide that was used during the interviews can be found in Appendix A. It includes the major questions, which was further developed and adjusted during each interview depending on the interviewee's area of profession. However, the main themes that were generally discussed during all interviews were:

- Digitalization in the real estate business, present and future
- Possibilities and barriers with digitalization
- Digitalization as a value creator for real estate owners as well as their customers
- Trends in the living situation, present and future
- Digitalization in relation to sharing economy

A total of 14 interviews were conducted to contribute to the study. The selection of suitable interviewees was first based on their background and insight in the subject of digitalization of real estates. To create diversity and an advantageous basis of knowledge in several perspectives, the interviewees had different titles and professions. The professions varied from more technical interviewees to persons who focused on human behavior and change in living situations. The interviewed persons are presented in table 3.1 below. Notably is that even though most of the interviews were conducted as described above, some were shorter conversations with more specific questions that differed depending on what needed to be answered.

Table 3.1: *List of Interviewees, their position and which type of company they represent.*

Interviewee	Position	Type of Company
Interviewee A	Chief Technology Officer	Real Estate Company
Interviewee B	Chief of Property Development	Real Estate Company
Interviewee C	Sales Responsible	Proptech Company
Interviewee D	Chief of Energy and Environment	Real Estate Company
Interviewee E	Chief Executive Officer	Innovation Company
Interviewee F	Chief of Negotiation	Branch Organization
Interviewee G	Chief Digital Officer	Branch Organization
Interviewee H	Chief Executive Officer	Proptech Company
Interviewee I	Chief Executive Officer	Proptech Company
Interviewee J	Chief Executive Officer	Real Estate Company
Interviewee K	Chief Executive Officer	Real Estate Company
Interviewee L	Communicator	Real Estate Company
Interviewee M	Ambassador	Proptech Company
Interviewee N	Chief Operating Officer	Innovation Company

3.3.1.2 Surveys

The quantitative data was collected through the survey in appendix B, that was distributed to residential tenants through email. To identify what questions the survey preferably could contain, the present state of the market was identified through interviews. The interviews were performed according to the description in section 3.3.1.1. Actors from different market segments were approached and requested to participate in the study, to contribute to a general picture of the present state of today's market and society.

To create a survey that collects data with validity, it is of high importance that the questions are stated as independent as possible (Nardi, 2018). To reach this validity, the survey was reviewed several rounds before it was distributed for data collection. The reviews were performed both by supervisors and by external, independent reviewers.

To boost the number of respondents, the form should not be too extensive nor complicated for the average respondent and can advantageously be initiated with a few questions that are easily answered without any larger effort (Bryman and Bell, 2017). Based on this, the survey was limited to twelve main questions and four smaller questions. The four smaller questions were initially answered and those were to be used for sampling among the main questions. The number of responses is also correlated to the amount of text in the survey, larger amounts of words tend to produce fewer responses (Nardi, 2018). Several reviews of the survey were made to ensure that no unnecessary text was included for the respondents to see.

The validity of the quantitative data can be compromised by respondents unintentional choosing of answers in the survey (Bryman and Bell, 2015). To minimize the risk of confusion among the respondents, the answer alternatives were structured in such a consistent way as possible through the whole survey.

The survey was sent out through the case company's digital communication tool to their tenants in Gothenburg, Kungsbacka, and Mölndal. In these areas, the case company have approximately 9 000 tenants, of which around 6 200 tenants (70%) received the survey. To market the survey, it was also sent out by mail in one edition of the case company's information letter which is sent out each quarter. A total of 918 answers were received, which equals a response rate of approximately 15%. The main themes of the survey were:

- Services
- Active neighborhood
- Safety and security
- Energy optimization and sustainability
- Sharing economy
- Value creating categories
- Sharing of user data

Due to Bryman and Bell (2017) the response frequency could be increased by offering a reward to respondents who completed the survey. Therefore, the respondents were

informed that gift cards were given to a randomly selected few contributors. The response frequency could also be increased by reminding the intended respondents that the survey still was open for answers (Bryman and Bell, 2017). A second notice regarding the survey was therefore sent out to the tenants in the form of a physical folder, as a reminder to fill out the survey.

3.3.2 Secondary Data Collection

Secondary data embraces the whole spectrum of empirical forms (Smith, 2008). It can include data generated through e.g. documentary analysis or systematic reviews. I.e, data collected by someone other than the user. The use of secondary data has several benefits that were of use in this master thesis, e.g. it is time-saving and much of the background work that is need is already carried out.

The objective of using secondary data is to create a baseline of knowledge which can be further developed towards the aim of this report. In this report, data was collected from various sources such as the internet, other theses, books and documents shared by professionals met during the work of this master thesis. It was seen as both necessary and advantageous to collect data from other professionals in the subject of digitalization in real estates since it saves both time and also accesses specific data that would be hard to collect with the resources available for this master thesis (Smith, 2008). It is however important to be aware of that collected data could be outdated or collected in a specific purpose that is not suitable for this project.

3.4 Analysis

The following subsections describe how the data was analyzed and presents two different analyzing methods, one approach for the quantitative data analysis respectively one course of action for the qualitative data analysis.

3.4.1 Analyzing Qualitative Data

The qualitative data used to conduct this master thesis was collected through interviews. The data were analyzed in an explorative manner, unexplored information regarding the investigated subject was to be identified (Bryman and Bell, 2015). The interview answers were analyzed with the focus to create a framework for the quantitative data collection. The qualitative data collection that was conducted with interviewees from real estate companies were also analyzed to answer what real estate companies consider valuable. During the interviews, notes were taken regarding significant input and statements. These notes were used to create a representative basis for the collected qualitative data. This foundation was used to bring clarification in what has had been said during each interview, it brought a compilation of qualitative data. This was used during the analysis to conduct a comparison and identify patterns among the interview-gathered data. To avoid misinterpretation from the qualitative data, uncertainties were investigated through communication with the data source. Furthermore, the qualitative data analysis took it's starting

point in the themes that are listed in section 3.3.1.1. The themes cover the current state respectively the possible future of digitalization in the Swedish real estate market, respectively possibilities and barriers connected to this area.

3.4.2 Analyzing Quantitative Data

When the survey software was chosen, one of the main aspects of qualification was that the program should provide an integrated motor for analysis. By doing so, the desired functions for analysis were accessed. The desired functions were to provide the possibility to find main patterns in the quantitative data, with help of filtering of diverse groups. This ability combined with the possibility to display overall respective group filtered mean responses was to create a basis for this master thesis' quantitative data analysis.

The quantitative data were analyzed through a holistic perspective of the answers, and also from filtering of groups divided by age, gender and living situations. The most popular answers were subject for deeper analysis and the least popular answers were noted but not further investigated. The quantitative data analysis aimed to answer research question 3, that regards how digitalization can provide value for tenants in the Swedish real estate market. The quantitative data analysis took its starting point in the themes that are listed in section 3.3.1.2. The themes cover what the tenants appreciate seen to services, active neighborhood, security, respectively energy optimization and sustainability. The themes also handle the tenants' point of view in relation to sharing economy, sharing of user data, respectively other value-creating subjects.

3.5 Validity and Reliability

The concept of validity refers to whether a tool or a test is measuring what it is supposed to do, i.e. how high accuracy the measurement provides (Flick, 2014). The reliability of research entails whether a tool or test performs consistently over time if the method is performed under the same circumstances (Bryman and Bell, 2015). Validity and reliability are important criteria to establish and assess quality, to create trustworthiness of the research. Trustworthiness consists of credibility, transferability, dependability, and confirmability. Credibility addresses how believable the results from a study are and concern internal validity. Transferability regards if the result from the study can be applied to more than the original context, this parallels external validity. Dependability is close to the reliability and entails to what degree the research results can be applied later in time. The last part of trustworthiness is confirmability, this addresses the objectivity of this research. Confirmability entails whether the research results have been influenced by the authors' personal values or not (Bryman and Bell, 2015).

To create credibility, people with different professions were interviewed in the qualitative study. This was done to gain a multi-dimensional view of what was trending on the market of digital home solutions and what was to come regarding customer

demands. From this qualitative data, a form was created and sent out to tenants for quantitative data collection. By gaining input from people with different professions in the qualitative data collection, credibility was created through triangulation (Bryman and Bell, 2015). By using triangulation, i.e. multiple sources of data, the most common digital home solution trends could most likely be identified and presented in the survey for further investigation. The concept of triangulation was also used to gain credibility when answering the research questions. As stated above in this section, the market trends were first captured from qualitative interviews. Data regarding the market trends were later collected through quantitative data collection, the survey. The qualitative- and quantitative data was compared to strengthen the credibility of this thesis' findings.

To strengthen the credibility of the study further, a target regarding the reduction of biases during both the qualitative and quantitative data collection was performed. To reach the desired effects, a theory of Yin (2018) was followed: by informing the respondents that anonymity would be utilized for the gathered data, the answers were more likely to be honest. The goal was to retrieve untwisted answers from the respondents, answers that were affected less by external expectations.

According to Bryman and Bell (2015), there is some complexity when it comes to reaching transferability within qualitative research. A thick description with a high level of detail, regarding the culture and social world where the research took place, is provided in this report. This input is important to reach transferability since the results might be unique to the specific investigated environment (Bryman and Bell, 2015). To strengthen the degree of transferability and external validity in both the qualitative and quantitative study, the research procedure and context has been described as clearly as possible.

Dependability and reliability of research can be reached through auditing and peer reviews (Bryman and Bell, 2015). To strengthen the dependability of this research, the most data and information as possible was gathered, recorded, stored, and visualized in the most accessible way. This data was to be analyzed by external parties and by this, auditing was performed from several angles. The research was reviewed overtime by the examiner and the supervisor from the university. At two different occasions, peer reviews were held by other students that also were about to write a master thesis. The research was also continuously audited and reviewed by two supervisors from the company that the case study was carried out.

The research confirmability and objectivity regarding whether the research results have been highly influenced by the authors' personal values or not (Bryman and Bell, 2015). Confirmability can be reached through auditing, something that is discussed in the paragraph above. The audits that were performed during this study has contributed to strengthened confirmability in concern of the results. The study has been striving for an open minded and fact-based conduction during the whole procedure of research.

3.6 Research Ethics

Precautions have been taken when conducting this report, in order to ensure that it has been ethically correct. According to Bryman and Bell, 2015, there are four main areas of ethics that need to be taken into consideration:

- whether there is harm to participants
- whether there is lack of informed consent
- whether there is an invasion of privacy
- whether deception is involved

To ensure avoidance from these areas, the authors of this thesis have always been honest and clear with that they are students at Chalmers University of Technology who are conducting a master thesis in collaboration with the case company. To avoid an invasion of privacy, which is very important when conducting a case study, the interviewees, as well as the participants in the survey, will be anonymous throughout the report (Yin, 2018). If the interviews were recorded, they were so with the permission of the interviewees.

Furthermore, it is important that participants to this master thesis are participating voluntarily, which was the case throughout the work (Flick, 2014). The participants were always aware of the area of the subject, that it was a master thesis and that Chalmers University of Technology and the case company was involved in the process.

It is also important that explanations of the results are based on the collected data, and not on the judgment on a personal level (Flick, 2014). The authors were aware of this during the analysis and writing of the project, to ensure that the final outcome of this master thesis was objectively conducted.

4

Case Study

The company at which this case study has taken part is Swedish large-sized Real Estate firm, henceforth referred to as the case company. The case company is today one of the largest privately owned real estate companies in Sweden, owning and managing 325 buildings and approximately 2.4 million square meters, containing around 25 000 residential and 3 500 commercial objects (Stena Property, 2019b). The case company is originally based in Gothenburg, where the headquarter still is today, but is nowadays located in several Swedish cities. These cities are, except Gothenburg, Stockholm, Malmö, Uppsala, Lomma, Landskrona and Lund. The case company's main focus is rental apartments, even though they offer tenant-owned apartments and commercial office facilities as well.

This case study focuses on the case company's department in Gothenburg. Here, the case company owns and operates among 7 900 rental apartments and almost 190 000 square meters of commercial offices (Stena Property, 2019a). According to interviewee L, the case company owns and facilitates 95 buildings in central Gothenburg respectively in the city's suburbs, including Mölndal and Kungsbacka. They have approximately 9 000 tenants in the area, with a wide range of diversity in both age and ethnicity.

The case company is currently in a phase where they are exploring and developing their work in the area of digitalization, according to interviewee A. They have several projects running, where they investigate the possibilities to implement digital solutions and services in their facilities. The case company is at this point collecting information and is searching for suitable solutions for their projects, which they plan to implement in the near future.

5

Empirical Findings

5.1 Current State of Digitalization in Real Estates

The digitalization of the real estate market is currently emerging, an area that is rather unexplored and in an early development phase. According to interviewee A, E, G, I, J, and K, executives within the real estate sector are currently directing focus towards the emerging digitalization, starting to realize that this development will be a key factor for future success. The real estate market has been profitable over time, as a result of the housing situation over the past years. Thus, the real estate companies have been able to collect profit with the same business model over time, but this is about to change. New actors are about to enter the real estate market, actors that are specialized within the present and future technology. This is forcing the current actors on the real estate market to adapt their business models, an adaption that might be crucial for the companies' further existence.

The development of technology has led to challenges and opportunities that real estate companies have to face today, according to interviewee A, B, D, F, G, I, J, and K. Actors within the sector has made attempts to implement digital smart home solutions and digital services within their properties before, but the technology has been too immature to create significant value for both tenants and suppliers. The time to act in this matter is perceived to be now since the technology has reached a level of maturity which can generate value for several stakeholders and thereby further profit for real estate companies. Real estate companies are starting to develop and adapt their business models toward the above-mentioned subjects, most of the subjects involve digital solutions according to interviewee A, D, G, and H.

Currently, real estate companies are trying to implement minor digital solutions, such as smart locks. The business has not yet figured out how to deal with the bigger picture and provide an extensive beneficial environment according to interviewee A, B, C, G, H, and I. This is believed to be achieved through digital platforms, which currently is in a stage of development. The Swedish real estate companies are trying to implement such a platform as a value proposition to the tenants in their properties.

5.1.1 Platformization and Platform Design

The common view on real estate concern how property owners possess a property, which is rented out to tenants according to interviewee H. By providing apartments, operating and maintaining the facility, the property owner receives money from their tenants in the form of rent. If tenants want services or anything else at all, they obtain it separately. See figure 5.1.

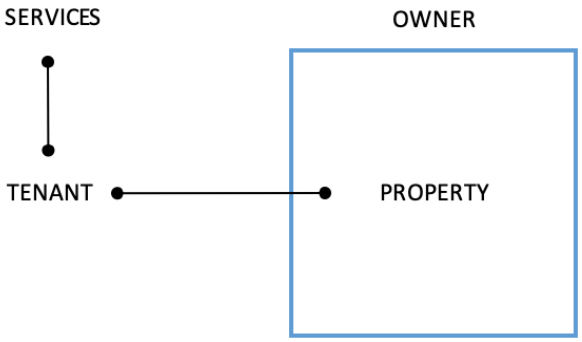


Figure 5.1: *The real estate platform model as it seems today, adopted from Last Meter® research by Base2.*

This is in fact not the case according to interviewee H. Actually, there are a lot of things and actors that are using the building in some way, see figure 5.2. Ways from which the owners are not making any value at all. This can concern e.g., services such as broadband, streaming services, package boxes, etc. Broadband suppliers have for the past years been able to install fiber cables in facilities at no/low costs which gave them access and control over the supply of digital services to the tenants. The same goes for IoT solutions, smart speakers, digital locks, package boxes, etc. Service suppliers are using the facilities, selling services to the tenants through the building without the property owner receiving anything in return. This results in several industries using the asset while the owner is actually cut out, industries with which the real estate companies are not having any relationship with.

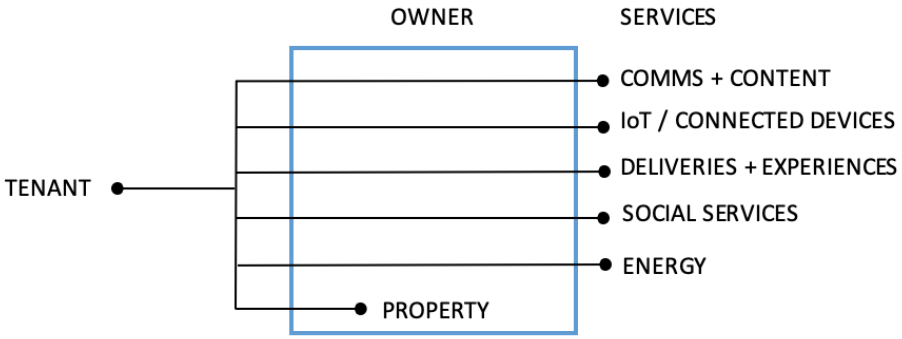


Figure 5.2: *The real estate platform model as it is today, adopted from Last Meter® research by Base2.*

As awareness in this matter increases, platformization would provide integration between the property owner and service providers according to interviewee H and I. Resulting in relationships and co-operation that would generate profit for both the property owner and the service providers. Interviewee I means that at the same time it would create a value proposition for the tenants in forms of services. This could occur e.g. in the same way as a vending machine, the providing company pays a fee to the real estate company to "rent" the space for the machine, resulting in profit for the real estate company according to interviewee H. The presence of the machine near the customer generates profit for the provider and is beneficial for the customer as well since it provides easily consumed services, in this case soda or snacks. The same logic could be applied on e.g. package boxes in a property, resulting in benefits for the real estate company, the service provider, and the customer/tenant.

The platform concept adapted for the real estate sector would, as mentioned above, integrate the property owner in the process from which they are excluded today. Interviewee A state that the platform would link tenants and service providers, with the property working as a bridge between them and the property owner. The property owner would act as a bridge-keeper, monitoring and controlling the process. As seen in figure 5.3, there are several layers of services which could be provided, such as energy, social services, deliveries, etc. More layers could be added to the platform, e.g. co-working, technical support, maintenance, and so on, as new layers occur on the market and a demand exist according to interviewee H. The platform model allows the real estate company to focus on its core business, and by integrating with service providers, they are able to offer an extensive value proposition to the tenants. Through the platform, values and data streams between the different actors, create an environment which is supposed to be beneficial for the whole network. In such a way, the usage of the real estate in new ways can create value for the users.

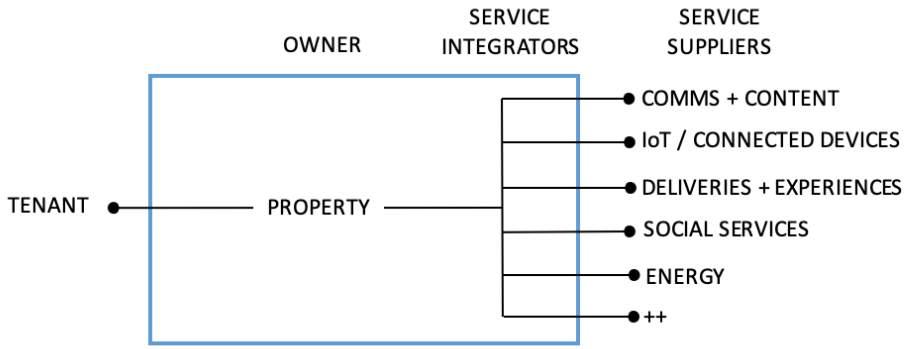


Figure 5.3: *The real estate platform model as it could be today and in the future, adopted from Last Meter® research by Base2.*

5.2 Value Creation Through Digitalization for Real Estate Companies

Real estate companies can create value in different ways. A few of those are by providing services to tenants, being updated on trends and innovation and increasing the value of their facilities. In the following sections, results from the qualitative data collection are presented.

5.2.1 Value Creation Through Provided Services

Many real estate companies are housing thousands of people who constantly purchase items, services, and experiences from third party companies according to interviewee A, H, and I. If the real estate companies can offer these purchases through themselves instead, possibilities for value creation within the real estate companies occur. By giving tenants the possibility to purchase items, services, and experiences through digital platforms provided by the real estate company, large amounts of revenue can be generated. Interviewee A, B, G, H, I, J, K, and M mention that micro-transactions might be value creating for real estate companies. If services, additional to what is included in the rent, can be activated and deactivated by the tenants and the cost for those services only are a few SEK, it can still generate profit for the real estate company because the amount of purchases is large. Interviewee A, H, and I state that the facility owners can create big value once not only the apartments are seen as an asset, but also that the access to reach the tenants can be sold to third party companies. Based on this, real estate companies shall not let other businesses profit on the supply of customers, the tenants, for free. Real estate companies have earlier paid service companies for their presence, e.g. for services like car leasing and food- respectively package delivery. According to interviewee A, H, and I, the service companies should rather pay the real estate companies for the access to the large supply of potential customers within a certain area. According to interviewee A, B, E, and J it might take time to change the nature between service takers and service providers since the real estate companies will try to make service companies pay for something they earlier have made a profit from.

A digital platform where all errands within but also around the apartment could be handled would be value creating for real estate companies, this is stated by interviewee A, B, C, D, G, I, J, K, and L. From such a platform, communication between the tenants and the facility managers could occur. Services, items, and experiences could be activated or bought from this platform, rent could be paid, and information regarding e.g. scheduled maintenance or status of rent payment could be published. This can both bring profit to real estate companies but also save a lot of time and hence create value. A challenge that interviewee A, I, and L mention regarding a digital platform like this is to get the tenants to use it. There are a lot of different digital platforms in today's society, those are applications that are specialized in certain features. If an application is created and distributed to tenants, it has to attract the intended target group to actually use the digital platform. To make this attraction, the functions shall not only be a substitute to

already existing solutions but have to exceed present platforms in some way. It is first when tenants are using a real estate company's platform that value is created for the company.

Real estate companies might have an impact on the tenant's behavior through the implementation of gamification according to interviewee A, B, I, M, and N. The concept of gamification regards that individuals gather some kind of points when doing something for the provider of the game. An example in the real estate sector can be when a tenant report that an elevator is out of order, the tenant is rewarded with points in a gamification platform because of their effort in communication with the facility manager. Those points can be traded for e.g. services, to motivate tenants to actually help the real estate company with such tasks. Value is created for the real estate company since the tenants actually are doing work for the company. The concept can help real estate companies to have an impact on their tenants' behavior and routines, e.g. points can be distributed when a tenant is recycling its waste. The facility owner can thereby reach a higher level of sustainability among its facilities. Interviewee A, B, I, J, and N state that a challenge regarding gamification is to get the tenants to participate. Without extensive participation, desired effects of the initiative will not be reached.

The rise of utility value allows the real estate companies to increase the rent for an apartment. According to interviewee A, B, D, F, G, J, and K there are disagreements within the real estate sector regarding what actually is increasing utility value and what only is a substitute solution for existing utilities when it comes to digital home solutions. The interviewees mention that facility owners might get great value for the implementation of sensors and smart home solutions within their buildings from both data collection but also from the possibility to raise the rent. A gap occurs regarding the rent adjustment, it has to be minimized before the implementation accelerates. The gap regards that many smart home devices are not seen as substitutes to what already exists and will therefore not raise the value of the utility. Interviewee A, D, F, and G mention that the uncertainty of how the implementation of digitalization in real estate facilities shall be valued will be cleared up in the near future. This is based on the rapid development of digital implementation in real estate facilities.

A value for real estate companies is created when tenants use additional services that generate profit. Interviewee B, G, and K mention the importance of offering additional services close to the tenants. Services like this shall be easily accessed to be used extensively since the human is somewhat lazy by nature. If facilitating services remotely accessible, a majority of the tenants will most likely consider the effort to reach the service larger than what the service facilitates. One example that interviewee K mentions is the usage of a car pool. If the car pool is far away, people will rather choose other options for transportation. If the car pool is right around the block, people will use it more extensively. If urban amenities and services like the given example occur, areas tend to reach a higher grade of appreciation. If the demand is high in an area, the real estate companies can profit from this and value will be created.

5.2.2 Trend Spotting and Adaption for Innovation

Interviewee A, B, E, I, J, and K raised the importance of constantly being updated on large trends, both demographic trends respectively social ones. The main argument for this is that everyone needs somewhere to live and the real estate companies can profit over time by adapting their business model towards large trends in society. The interviewees mentioned earlier in this paragraph are pointing out the following trends as extra important for the real estate sector:

- Increase of life expectancy
- Sweden consists of the highest percentage of single households in the world
- There is a growing retired population since people tend to live longer

Another trend that interviewee E mentioned is that young adults do not see ownership of items as status raising as before, which opens up for sharing economy. Real estate companies who can come up with solutions to challenges connected to large trends like these, will be able to create great value for themselves.

Interviewee A, B, D, J, and K states that real estate companies can create value by advocating subleasing of tenant's rental objects. The interviewees mean that both apartments and parking lots are subleased today and the facility owners have a hard time to prevent and control this second-hand market. By advocate subleasing, and even by providing a platform for this matter, more excessive control of this market can be reached. Interviewee A, B, and D enlighten that sensor systems could be provided at parking lots, to enable second-hand rental when the main tenant is not using the object. By doing so, a percentage of the subleasing profit can be taken by the real estate companies and more parking space can be offered. If the real estate providers try to prohibit subleasing there is a risk that the facility owner loses control of who lives in the real estates. By such a prohibition, the possibility for real estate companies to charge a subleasing fee will disappear.

Real estate companies cannot create all possible value themselves, the wave of digitalization is too extensive according to interviewee A-D respectively H-M. Digital solutions can advantageously be implemented by integrating partnerships. The real estate companies shall collaborate with expertise actors in different areas and keep the main focus on their core business. Interviewee H and J enlighten the importance that partnership integration is implemented instead of outsourcing. If digital solutions are outsourced to other businesses, the real estate companies will lose control over their facilities and tenants, hence lose possibilities to create value. Real estate companies might try to innovate their facilities through digitalization by themselves without external expertise. According to interviewee A, G, H, I, and M, a risk with in-house innovation is that the company not focuses on its core business. This can entail a loss of profit from the business models main activities but also a mediocre level of innovation since the company might lack internal expertise regarding digitalization.

5.2.3 Sustainability and Sharing Economy

Interviewee A, B, D, E, F, G, I, J, K, and M mention the concept of sharing economy as central for value creation among real estate companies. It is important that the facility owners not only see themselves as housing providers if they want to keep innovating business models. They shall rather see themselves as providers of living situations and offer the tenants value propositions aside a physical area for living. Sharing economy is strongly trending and this is partly connected to sustainability trends. The interviewees mean that value will be created for real estate companies if they offer services like car pools and tool banks to the tenants. By getting a large number of tenants into such sharing economy solutions, even a small membership fee will create direct profit for the real estate companies. According to interviewee A, B, D, J, and K, a risk with following a trend like this is that it might fade out in the near future. Hence, caution shall be taken when investments based on trends are to be done. A spotted trend is not single-handedly a good basis for an investment decision, it has to be backed up with further information regarding the market.

Real estate companies have to pay high prices for electricity when large amounts of energy are used, according to interviewee B and D. Value will be created for the real estate companies if this high energy usage can be cut since the cost for electricity will be reduced. This could be reached by embracing the usage of e.g. laundry machines during night time when the overall consumption of energy and water is relatively low. The tenants who wash during those times can be rewarded in some way, otherwise this will most likely not happen. Interviewee B, D, and E state that incentives for behavioral change do not often lie within economic aspects, especially not for those who have a relatively high income. Other aspects have to be taken into consideration to change a behavioral pattern, aspects like e.g. group belonging, personal identity, and environmental impacts.

5.2.4 Technology and Data

The implementation of sensors in real estates is a key aspect for the digitalization of apartments, according to interviewee A, C, D, G, I, J, and M. The whole idea of smart home solutions is based on a grid of sensors that can receive input from human interaction and also communicate with other hardware. The implementation of sensors in apartments will create value for real estate companies, since those not only can perform actions in real time but also collect data for analysis. The sensors are an important part of digitalization since those are a main pillar in the IT infrastructure necessary for smart home solutions. Hence, the implementation of sensors in real estate is value creating for real estate companies.

Digital locks are value creating for real estate companies, according to interviewee A, C, D, G, I, J, and M. A lot of time is consumed among the facility managers when it comes to the handling of physical keys. At most real estate companies today, the facility manager has to get in contact with the tenant to distribute door keys the day that access to an apartment shall be given. Also, digital keys cannot be lost like a physical key can. The switch of door locks based on lost keys are time-consuming

for the facility managers. If all management of keys could be converted to digital solutions, and keys could be distributed through digital communication, both time and risk would be saved for the real estate companies. Interviewee A mentions that there are still some gaps to deal with before digital locks can be distributed among real estate facilities, the digital locks are well developed for industries but needs further innovation before the concept can be completely implemented in the real estate sector. If a system like this is implemented before it is fully developed for its purpose, there is a risk that the investment not will generate profit. Implementation of unfinished hardware or software can even generate large costs for real estate companies.

If real estate companies shall implement smart home solutions in their facilities, an important aspect is that the items are future proof according to interviewee A, C, D, I, J, and K. The implemented hardware has to be open for any software that the real estate owner wants to have installed, to ensure that the solutions won't get outdated. Digital solutions are often outdated in a few years, while a real estate facilities' life span if often counted to 50 years. The changeability of the software is hence crucial to correspond to the physical building's life span. Furthermore, interviewee A, H, and I highlight the importance of correct installation of hardware. The smart home solutions will reach its full potential first when locks, sensors, digital communications and similar are fully integrated in and around the facilities.

According to interviewee A and I, the real estate companies see the owning of usage data from their facilities as value creating. The amount of information that flows through society today is so large, that the concept of Big Data has emerged. If data is gathered and analyzed in a correct way, very precise patterns can be found regarding the data source. A gap that is mentioned regarding the collection of data, is that the data comes in different data languages depending on which device it origins from. To enable data mining, digital information is tagged with its attributes and stored unstructured in what is known as a data lake, according to Interviewee A. From this data lake, the data has to be converted to a common language. Interviewee A and I mention that this might be done through an open source software that is in the making. The software is called Real Estate Core (REC) and is created to take in large amounts of data regarding real estates, translate it to one common language, and present the data through different application programming interfaces (API:s).

Interviewee A, D, G, H, I, J, and K mention that owning the information about facility usage and living habits of the tenants, brings the possibility to analyze the data for future decisions respectively to sell the data to other parties. Based on this, interviewee A, D, H, and I highlight the importance of owning the infrastructure in real estate facilities. If someone else is implementing their e.g. network infrastructure within a building, the infrastructure owner has reserved all the rights to the data that is distributed through it. A real estate company shall make sure to get value from either the infrastructure owner in form of payments or make sure to own the infrastructure themselves. The collection of user data might not only be positive, according to interviewee A, B, D, J, and K. The concept pushes the society towards surveillance and a top monitored nature.

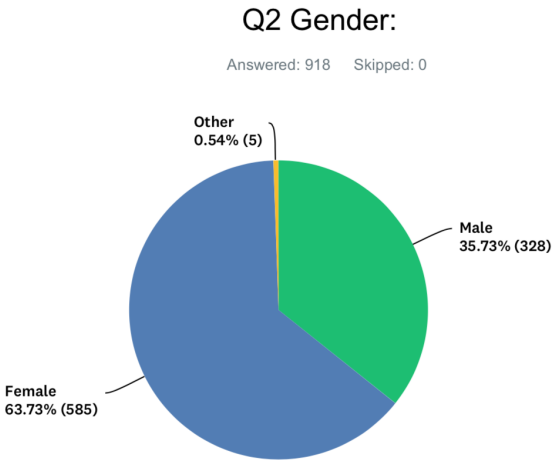
Interviewee A, D, G, H, I, and J mention that data most likely will turn into something close to a currency in a near future, purchases between companies might be made with data sets as payment. With this in mind, the interviewees mention the importance of creating a desire for the tenants to share as much data as possible. An example that comes up is that if a tenant shares a certain amount of user data, the tenant can get rewarded with free access to some chosen services. Interviewee A, B, D, and J state clearly that a discount on rent is not in question as a reward for data sharing. Interviewee A and D also mention that user data is a cornerstone for the digitalization of real estates since this is an accurate data input for further development of smart systems. A risk that interviewee A and B mention is that it might be hard to control who the user data is sold to. If the data is not handled carefully, there is a risk that the information will be used for non-intended purposes.

Software that concerns innovation of digitalization within real estate has to be created and published with open source codes to create value for the real estate companies, according to interviewee A, G, I, and M. The actors in the real estate sector have to collaborate with each other to push the innovation forward. This is not something that one single actor can develop itself, the subject is too complicated and too game-changing for that. Hence, every development in the right direction shall be distributed among actors who are interested to contribute to the innovation of digitalization within the real estate market.

5.3 Value Creation for Customers

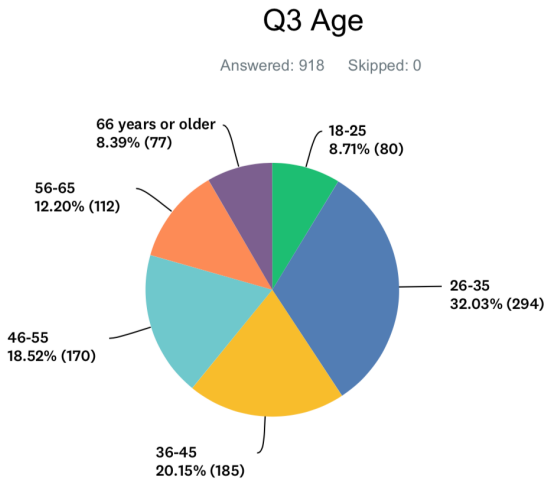
The answers provided from the survey, except for the free text answers, can be seen as a whole in Appendix C. Below follows the result regarding the customer's value creation in a more detailed manner. Firstly, data about the respondents in terms of gender, age and living situation is shown in figure 5.4, figure 5.5, and figure 5.6. The variance between the different respondent categories (age, gender and different living situations) concerning what they see as value creating is also explained in this section and can be seen in appendix D, appendix E and appendix F.

As seen figure 5.4, about 64% of the respondents were female and approximately 36% were male. The age varied from 18 years to over 66 years among the participants, were the most common age group were 26-35 years, as seen in the figure 5.5. Concerning living situation, the most common response category was single households, even though the allocated majority of the respondents live with company. This is shown in figure 5.6.



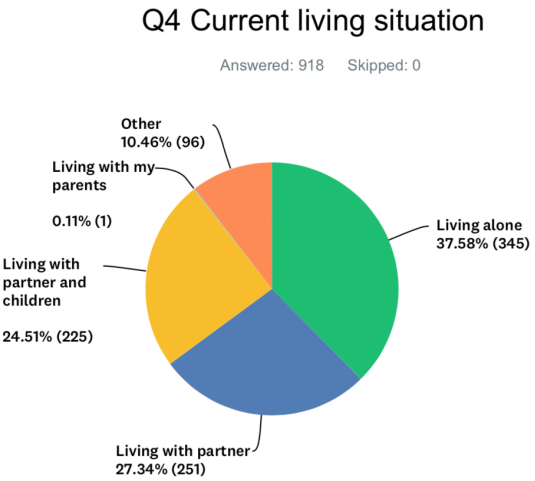
ANSWER CHOICES	RESPONSES	
Male	35.73%	328
Female	63.73%	585
Other	0.54%	5
TOTAL		918

Figure 5.4: *Gender distribution among the respondents.*



ANSWER CHOICES	RESPONSES	
18-25	8.71%	80
26-35	32.03%	294
36-45	20.15%	185
46-55	18.52%	170
56-65	12.20%	112
66 years or older	8.39%	77
TOTAL		918

Figure 5.5: *Age distribution among the respondents.*



ANSWER CHOICES	RESPONSES	
Living alone	37.58%	345
Living with partner	27.34%	251
Living with partner and children	24.51%	225
Living with my parents	0.11%	1
Other	10.46%	96
TOTAL		918

Figure 5.6: *Distribution in living situation among the respondents.*

5.3.1 Value Creating Categories

Value creation for the tenants was investigated based on several categories, which are seen in the list below as well as in figure 5.7. The categories are forth out of the interviews as well as literature and believed to represent the needs and reasons digital services and solutions could facilitate. The categories below are presented based on the answers of the tenants with the highest relevant category first, and the lowest ranked category last.

1. Safety and security
2. Expenditure reduction
3. Energy and sustainability
4. Comfort
5. Information exchange
6. Time-saving
7. Sharing
8. Active neighborhood

The categories handled in the survey are going to be further discussed later on, except from *expenditure reduction*, *comfort*, *information exchange*, and *time-saving*. This due to the fact the these will be covered in other categories. Anyhow, here follows an explanation on each of the categories.

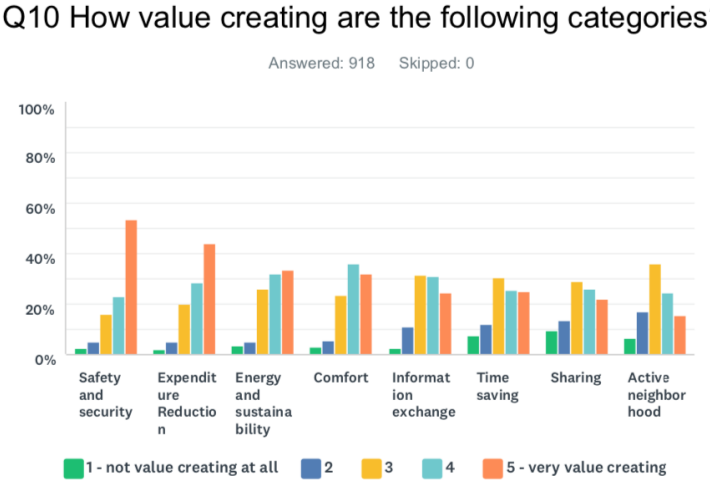
Safety and security aim to make the tenants feel safe and secure in and around their apartments. Digitalization can facilitate and raise this through solutions like e.g. digital locks, cameras, and alarms. Safety and security could also be connected to the category *active neighborhood*. Knowing who-is-who in the house is according to interviewee B making the tenants feel more secure. Apart from this, an active neighborhood could involve communications among the tenants, information about the events in the area and the possibility to offer/receive help, etc. This could be facilitated by a digital platform, which not only could facilitate the *information exchange* between different tenants but also between tenants and real owners or tenants and service providers.

The category *expenditure reduction* could be achieved in several ways, both major and minor actions can be provided through digital solutions. For example, digitalization and automation can optimize the energy use of the building and smart technology can be used to make the use of electrical devices more efficient to reduce the cost of use. Solutions like a digital platform could also generate lower costs in multiple ways, e.g. through discounts, gamification, etc. A digital platform can in many ways also facilitate *time-saving* and *comfort* by aids such as home deliveries and connecting customers and service providers in services such as house cleaning and laundry services.

Another category that is connected to the expenditure reduction is *sharing*. Trough share economy solutions such as car pools, bicycle pools or tool banks, savings can occur by co-owning or renting the needed tool/vehicle instead of owning each of them. The concept of sharing is furthermore also connected to the last category, *energy and sustainability* since sharing implies less consuming than individual buying. The category of energy and sustainability does also include digital services such as the possibility to measure and monitor the consumption of energy and other media. Smart lights and the possibility to control them is also part of this subject.

As seen in figure 5.7 below, the category that is seen as most value creating overall is *safety and security* followed by *expenditure reduction* and *energy and sustainability*. When comparing the results between younger people and elderly, it is seen that these groups value the categories differently. Both have the same top three as the overall results, but younger people value *time-saving* and *sharing* remarkably more than elderly while elderly to some extent value *safety and security* somewhat higher. Between the respondents in different living situations, it is seen that those who live with partner and children value an *active neighborhood* and *time-saving* more than both those who live alone and those who live with partner. Except for these categories, there are no major differences between the various living situations.

When comparing how the different genders value the given categories, it is seen that females value every category higher than males.



	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Safety and security	2.51% 23	5.12% 47	16.01% 147	22.98% 211	53.38% 490	918	4.20
Expenditure Reduction	2.18% 20	5.12% 47	20.15% 185	28.43% 261	44.12% 405	918	4.07
Energy and sustainability	3.27% 30	5.01% 46	26.14% 240	31.92% 293	33.66% 309	918	3.88
Comfort	2.94% 27	5.56% 51	23.75% 218	35.84% 329	31.92% 293	918	3.88
Information exchange	2.40% 22	10.78% 99	31.59% 290	30.83% 283	24.40% 224	918	3.64
Time saving	7.41% 68	11.87% 109	30.28% 278	25.60% 235	24.84% 228	918	3.49
Sharing	9.69% 89	13.51% 124	28.76% 264	26.03% 239	22.00% 202	918	3.37
Active neighborhood	6.32% 58	17.10% 157	36.17% 332	24.73% 227	15.69% 144	918	3.26

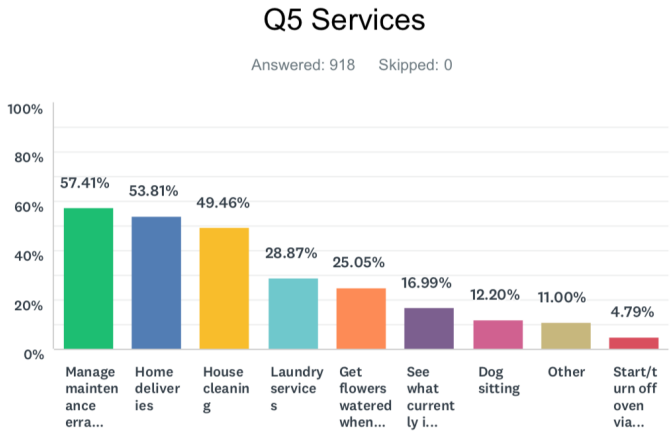
Figure 5.7: *Overall result of how value creating the different categories are seen.*

5.3.2 Value-Creating Services

The overall result of value-creating services for tenants is shown in figure 5.8. The result states that the most rated services are *the possibility to manage maintenance errands from a distance*, *home deliveries*, and *house cleaning*.

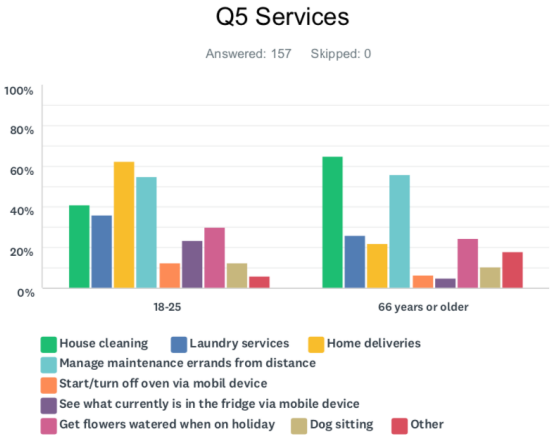
Dividing the results between age groups indicates some differences among the respondents, see figure 5.9. Younger people rank services such as *home deliveries*, *laundry services* and *the possibility to see what currently is in the fridge* higher than elderly do. On the other hand, elderly rank *house cleaning* higher than youngsters. Comparing the results between the sexes, it is shown that men value *laundry services* more than women, see figure 5.10.

Between respondents in different living situations, the results concerning value-creating services do not vary that much.



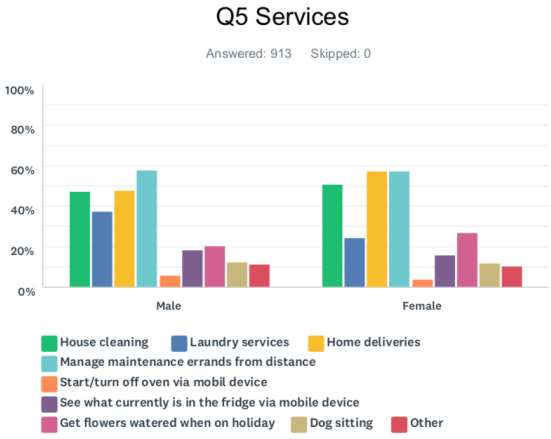
ANSWER CHOICES	RESPONSES	
Manage maintenance errands from distance	57.41%	527
Home deliveries	53.81%	494
House cleaning	49.46%	454
Laundry services	28.87%	265
Get flowers watered when on holiday	25.05%	230
See what currently is in the fridge via mobile device	16.99%	156
Dog sitting	12.20%	112
Other	11.00%	101
Start/turn off oven via mobil device	4.79%	44
Total Respondents: 918		

Figure 5.8: *Overall result of value creating services.*



	HOUSE CLEANING	LAUNDRY SERVICES	HOME DELIVERIES	MANAGE MAINTENANCE ERRANDS FROM DISTANCE	START/TURN OFF OVEN VIA MOBIL DEVICE	SEE WHAT CURRENTLY IS IN THE FRIDGE VIA MOBILE DEVICE	GET FLOWERS WATERED WHEN ON HOLIDAY	DOG SITTING	OTHER	TOTAL
18-25	41.25% 33	36.25% 29	62.50% 50	55.00% 44	12.50% 10	23.75% 19	30.00% 24	12.50% 10	6.25% 5	142.68% 224
66 years or older	64.94% 50	25.97% 20	22.08% 17	55.84% 43	6.49% 5	5.19% 4	24.68% 19	10.39% 8	18.18% 14	114.65% 180
Total Respondents	83	49	67	87	15	23	43	18	19	157

Figure 5.9: *Result of value creating services, younger people compared to elderly.*



	HOUSE CLEANING	LAUNDRY SERVICES	HOME DELIVERIES	MANAGE MAINTENANCE ERRANDS FROM DISTANCE	START/TURN OFF OVEN VIA MOBIL DEVICE	SEE WHAT CURRENTLY IS IN THE FRIDGE VIA MOBILE DEVICE	GET FLOWERS WATERED WHEN ON HOLIDAY	DOG SITTING	OTHER	TOTAL
Male	47.56% 156	37.50% 123	48.17% 158	57.93% 190	5.79% 19	18.29% 60	20.73% 68	12.50% 41	11.28% 37	93.32% 852
Female	50.94% 298	24.27% 142	57.26% 335	57.26% 335	4.10% 24	15.90% 93	27.18% 159	11.97% 70	10.60% 62	166.27% 1,518
Total Respondents	454	265	493	525	43	153	227	111	99	913

Figure 5.10: *Result of value creating services, males compared to females.*

5.3.3 Active neighborhood

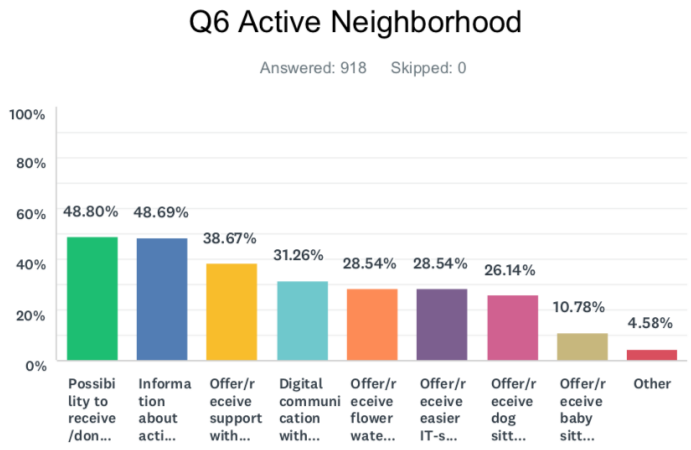
The three most chosen answer choices regarding an active neighborhood are *the possibility to receive/donate items*, *information about activities and events in the area* and *offer/receive support with easier handyman chores*. See in figure 5.11. The later choice concerning handyman cores refers to tasks such as e.g. assemble furniture from Ikea or put up a painting on the wall.

Concerning *digital communication with neighbors*, this is something that in many neighborhoods already exist through digital platforms such as Facebook groups according to interviewee B. The case company has also conducted interviews with tenants earlier, finding out that knowing "who-is-who" in the building is something desired by a lot of tenants.

Investigating the variances in answers from different age groups shows that the most valued answer choices between elderly are *information about activities and events in the area*, *offer/receive easier IT-support* and *offer/receive support with easier handyman chores*. This can be compared to younger people, where the most valued choices are *the possibility to receive/donate items*, *digital communication with neighbors*, *offer/receive dog sitting support* and *information about activities and events in the area*.

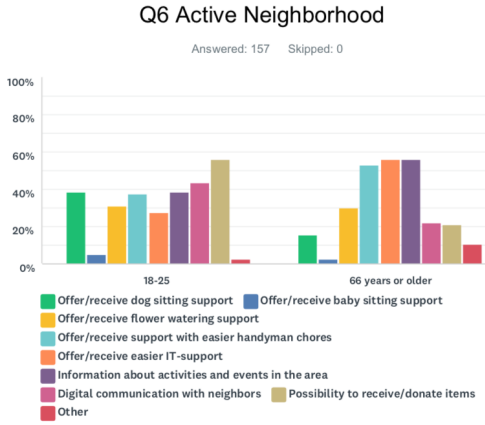
Variances are also present between males and females, see figure 5.13. The major differences are concerning *offer/receive support with easier handyman chores* and *digital communication with neighbors*.

Between different living situations, *offer/receive babysitting support* are obviously more present and valued among those who live with children. The same goes with *information about activities and events in the area* and *the possibility to receive/donate items*. On the other hand, this group of people values most of the other answer choices lower than other groups.



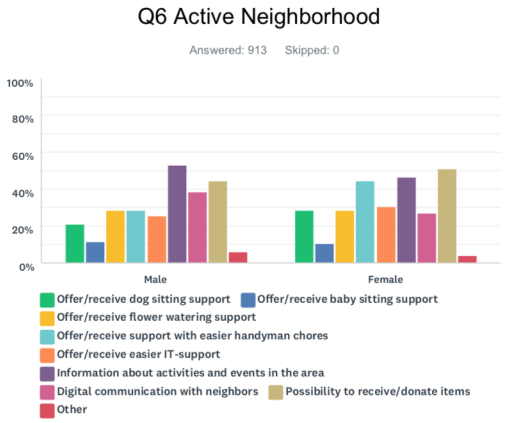
ANSWER CHOICES	RESPONSES	
Possibility to receive/donate items	48.80%	448
Information about activities and events in the area	48.69%	447
Offer/receive support with easier handyman chores	38.67%	355
Digital communication with neighbors	31.26%	287
Offer/receive flower watering support	28.54%	262
Offer/receive easier IT-support	28.54%	262
Offer/receive dog sitting support	26.14%	240
Offer/receive baby sitting support	10.78%	99
Other	4.58%	42
Total Respondents: 918		

Figure 5.11: *Overall result of how an active neighborhood can be value creating.*



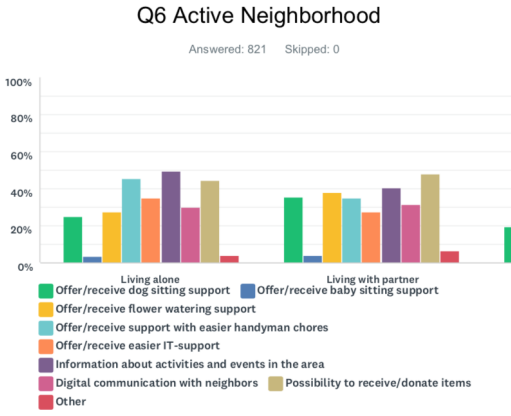
	OFFER/RECEIVE DOG SITTING SUPPORT	OFFER/RECEIVE BABY SITTING SUPPORT	OFFER/RECEIVE FLOWER WATERING SUPPORT	OFFER/RECEIVE SUPPORT WITH EASIER HANDYMAN CHORES	OFFER/RECEIVE EASIER IT-SUPPORT	INFORMATION ABOUT ACTIVITIES AND EVENTS IN THE AREA	DIGITAL COMMUNICATION WITH NEIGHBORS	POSSIBILITY TO RECEIVE/DONATE ITEMS
18-25	38.75% 31	5.00% 4	31.25% 25	37.50% 30	27.50% 22	38.75% 31	43.75% 35	56.25% 45
66 years or older	15.58% 12	2.60% 2	29.87% 23	53.25% 41	55.84% 43	55.84% 43	22.08% 17	20.78% 16
Total Respondents	43	6	48	71	65	74	52	61

Figure 5.12: *Result of how an active neighborhood can be value creating, younger people compared to elderly.*



	OFFER/RECEIVE DOG SITTING SUPPORT	OFFER/RECEIVE BABY SITTING SUPPORT	OFFER/RECEIVE FLOWER WATERING SUPPORT	OFFER/RECEIVE SUPPORT WITH EASIER HANDYMAN CHORES	OFFER/RECEIVE EASIER IT-SUPPORT	INFORMATION ABOUT ACTIVITIES AND EVENTS IN THE AREA	DIGITAL COMMUNICATION WITH NEIGHBORS	POSSIBILITY TO RECEIVE/DONATE ITEMS
Male	21.04% 69	11.28% 37	28.66% 94	28.35% 93	25.61% 84	53.05% 174	38.72% 127	44.51% 146
Female	28.38% 166	10.43% 61	28.38% 166	44.62% 261	30.26% 177	46.67% 273	27.18% 159	50.94% 298
Total Respondents	235	98	260	354	261	447	286	444

Figure 5.13: *Result of how an active neighborhood can be value creating, males compared to females.*



	OFFER/RECEIVE DOG SITTING SUPPORT	OFFER/RECEIVE BABY SITTING SUPPORT	OFFER/RECEIVE FLOWER WATERING SUPPORT	OFFER/RECEIVE SUPPORT WITH EASIER HANDYMAN CHORES	OFFER/RECEIVE EASIER IT-SUPPORT	INFORMATION ABOUT ACTIVITIES AND EVENTS IN THE AREA	DIGITAL COMMUNICATION WITH NEIGHBORS	POSSIBILITY TO RECEIVE/DONATE ITEMS
Living alone	24.93% 86	3.48% 12	27.54% 95	45.51% 157	35.07% 121	49.28% 170	29.86% 103	44.64% 154
Living with partner	35.46% 89	3.98% 10	37.85% 95	35.06% 88	27.49% 69	40.64% 102	31.47% 79	47.81% 120
Living with partner and children	19.56% 44	28.00% 63	23.56% 53	26.22% 59	19.11% 43	57.33% 129	34.22% 77	56.89% 128
Total Respondents	219	85	243	304	233	401	259	402

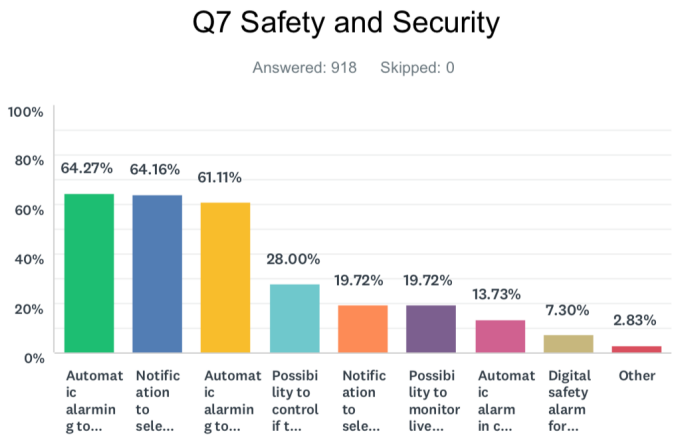
Figure 5.14: *Overall result of how an active neighborhood can be value creating, comparison between different living situations.*

5.3.4 Safety and Security

Concerning value creation through safety and security, three answer choices were clearly more preferred than the rest. They all received a rate of over 60% while the fourth most popular choice received a score under 30%, see figure 5.15. The top choices are *automatic alarming to surrounding apartments in case of fire*, *notification to selected mobile device if something undesirable happens in the apartment* and *automatic alarming to a security company in case of trespassing*.

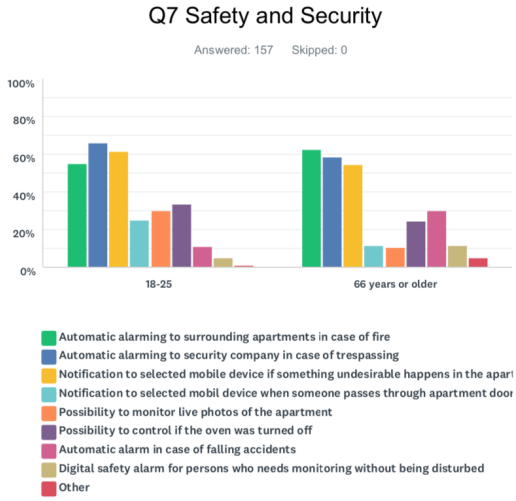
Comparing the responses from different age groups shows that both have the same top three, though in a different order. See figure 5.16. But except from the top three, the various age groups imply differences in some of the other answer choices. Whereas younger people value both *notifications to a selected mobile device when someone passes through the apartment door* and *the possibility to monitor live photos of the apartment* more than elderly, the older generation score higher in the two choices targeting elderly. These choices are *automatic alarming in case of falling accidents* were the variation compared to youngsters were considerably major and *digital safety alarm for persons who needs monitoring without being disturbed* where just a minor variance was present.

Regarding both response differences between males and females, as well as differences between different living situations, only minor variances are present in this section.



ANSWER CHOICES	RESPONSES	
Automatic alarming to surrounding apartments in case of fire	64.27%	590
Notification to selected mobile device if something undesirable happens in the apartment	64.16%	589
Automatic alarming to security company in case of trespassing	61.11%	561
Possibility to control if the oven was turned off	28.00%	257
Notification to selected mobil device when someone passes through apartment door	19.72%	181
Possibility to monitor live photos of the apartment	19.72%	181
Automatic alarm in case of falling accidents	13.73%	126
Digital safety alarm for persons who needs monitoring without being disturbed	7.30%	67
Other	2.83%	26
Total Respondents: 918		

Figure 5.15: *Overall result of safety and security value creation.*



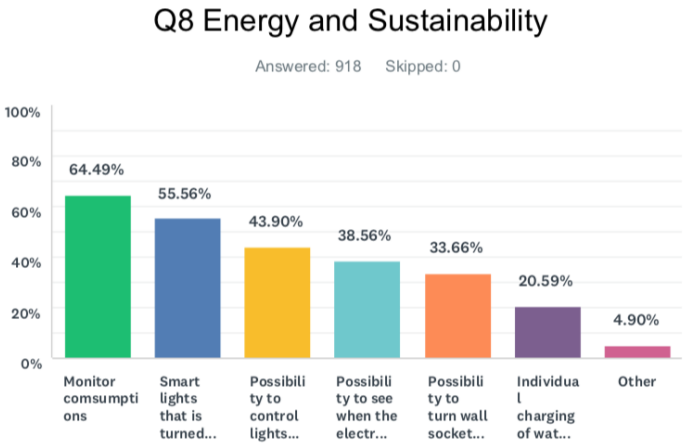
	AUTOMATIC ALARMING TO SURROUNDING APARTMENTS IN CASE OF FIRE	AUTOMATIC ALARMING TO SECURITY COMPANY IN CASE OF TRESPASSING	NOTIFICATION TO SELECTED MOBILE DEVICE IF SOMETHING UNDESIRABLE HAPPENS IN THE APARTMENT	NOTIFICATION TO SELECTED MOBIL DEVICE WHEN SOMEONE PASSES THROUGH APARTMENT DOOR	POSSIBILITY TO MONITOR LIVE PHOTOS OF THE APARTMENT	POSSIBILITY TO CONTROL IF THE OVEN WAS TURNED OFF	AUTOMATIC ALARM IN CASE OF FALLING ACCIDENTS	DIGITAL SAFETY ALARM FOR PERSONS WHO NEEDS MONITORING WITHOUT BEING DISTURBED	OTHER	TOTAL
18-25	55.00% 44	66.25% 53	61.25% 49	25.00% 20	30.00% 24	33.75% 27	11.25% 9	5.00% 4	1.25% 1	147.13% 231
66 years or older	62.34% 48	58.44% 45	54.55% 42	11.69% 9	10.39% 8	24.68% 19	29.87% 23	11.69% 9	5.19% 4	131.85% 207
Total Respondents	92	98	91	29	32	46	32	13	5	157

Figure 5.16: *Result of safety and security value creation, younger people compared to elderly.*

5.3.5 Energy and Sustainability

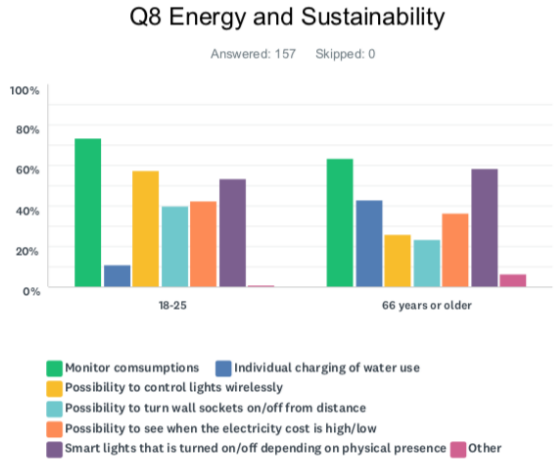
The feature *monitoring the consumption* is raised as the choice that would be most value creating regarding energy and sustainability followed by two answer choices concerning *smart lights and the ability to control them wirelessly*. See figure 5.17. The same answer choices are in top among youngsters, seen in figure 5.18. Hence, elderly are preferring *individual charging of water use* rather than *the possibility to control lights wirelessly*. Elderly are neither as keen as younger people towards the *possibility to turn wall sockets on/off from distance*.

Comparing various living situations shows that all have the same top three answer choices as the general results. The same goes for both sexes. No major differences are present among neither males/females or different living situations.



ANSWER CHOICES	RESPONSES	
Monitor comsumptions	64.49%	592
Smart lights that is turned on/off depending on physical presence	55.56%	510
Possibility to control lights wirelessly	43.90%	403
Possibility to see when the electricity cost is high/low	38.56%	354
Possibility to turn wall sockets on/off from distance	33.66%	309
Individual charging of water use	20.59%	189
Other	4.90%	45
Total Respondents: 918		

Figure 5.17: *Overall result of value creation through energy and sustainability solutions.*



	MONITOR COMSUMPTIONS	INDIVIDUAL CHARGING OF WATER USE	POSSIBILITY TO CONTROL LIGHTS WIRELESSLY	POSSIBILITY TO TURN WALL SOCKETS ON/OFF FROM DISTANCE	POSSIBILITY TO SEE WHEN THE ELECTRICITY COST IS HIGH/LOW	SMART LIGHTS THAT IS TURNED ON/OFF DEPENDING ON PHYSICAL PRESENCE	OTHER	TOTAL
18-25	73.75% 59	11.25% 9	57.50% 46	40.00% 32	42.50% 34	53.75% 43	1.25% 1	142.68% 224
66 years or older	63.64% 49	42.86% 33	25.97% 20	23.38% 18	36.36% 28	58.44% 45	6.49% 5	126.11% 198
Total Respondents	108	42	66	50	62	88	6	157

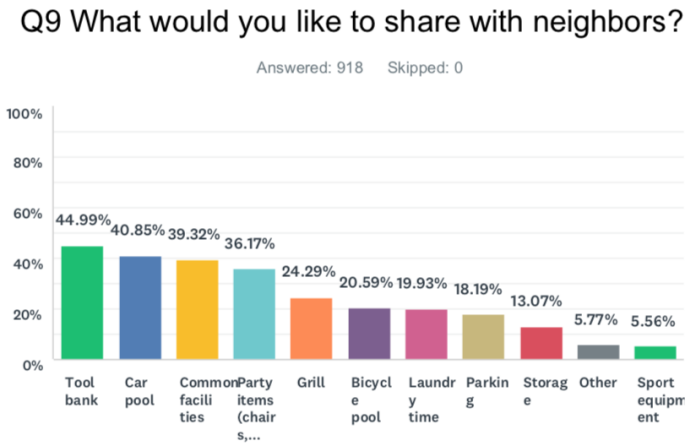
Figure 5.18: *Result of value creation through energy and sustainability solutions, younger people compared to elderly.*

5.3.6 Sharing

When asked what kind of items or services that tenants were willing to share with their neighbors, *tool bank*, *car pool*, *common facilities*, and *party items* were generally raised as the most preferred ones, see figure 5.19. Between younger people and elderly there is a rather similar desire towards the different answer choices apart from two of them. Youngsters indicate a higher demand for *bicycle pool* and sharing a *grill* compared to elderly, see figure 5.20.

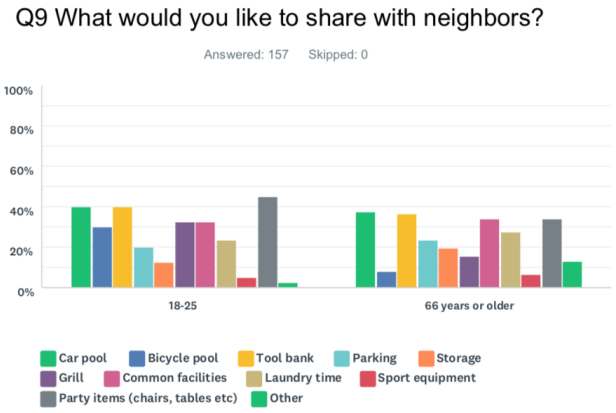
The differences between various living situations indicate a similar opinion as to the general responses except from one issue. Those who live with partner and children raise sharing *common facilities* as the most desired one, see figure 5.21.

Comparing males and females indicates no major differences concerning variances in responses.



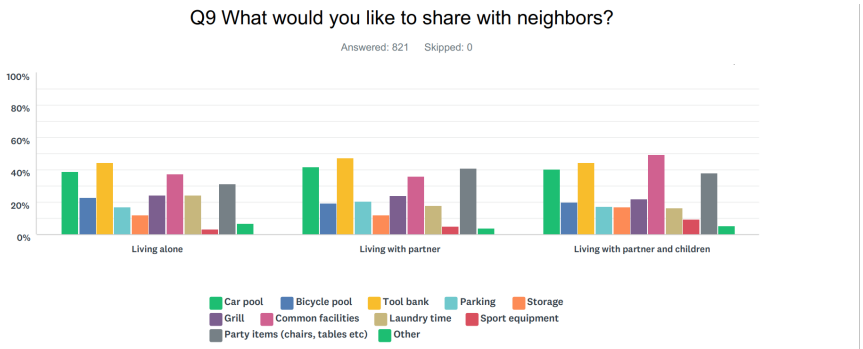
ANSWER CHOICES	RESPONSES	
Tool bank	44.99%	413
Car pool	40.85%	375
Common facilities	39.32%	361
Party items (chairs, tables etc)	36.17%	332
Grill	24.29%	223
Bicycle pool	20.59%	189
Laundry time	19.93%	183
Parking	18.19%	167
Storage	13.07%	120
Other	5.77%	53
Sport equipment	5.56%	51
Total Respondents: 918		

Figure 5.19: *Overall result of what could be shared with neighbors.*



	CAR POOL	BICYCLE POOL	TOOL BANK	PARKING	STORAGE	GRILL	COMMON FACILITIES	LAUNDRY TIME	SPORT EQUIPMENT	PARTY ITEMS (CHAIRS, TABLES ETC)	OTHER	TOTAL
18-25	40.00% 32	30.00% 24	40.00% 32	20.00% 16	12.50% 10	32.50% 26	32.50% 26	23.75% 19	5.00% 4	45.00% 36	2.50% 2	144.59% 227
66 years or older	37.66% 29	7.79% 6	36.36% 28	23.38% 18	19.48% 15	15.58% 12	33.77% 26	27.27% 21	6.49% 5	33.77% 26	12.99% 10	124.84% 196
Total Respondents	61	30	60	34	25	38	52	40	9	62	12	157

Figure 5.20: *Result of what could be shared with neighbor, younger people compared to elderly.*



	CAR POOL	BICYCLE POOL	TOOL BANK	PARKING	STORAGE	GRILL	COMMON FACILITIES	LAUNDRY TIME	SPORT EQUIPMENT	PARTY ITEMS (CHAIRS, TABLES ETC)	OTHER	TOTAL
Living alone	38.84% 134	22.90% 79	44.35% 153	17.10% 59	11.88% 41	24.35% 84	37.68% 130	24.35% 84	3.48% 12	31.30% 108	7.25% 25	110.72% 909
Living with partner	42.23% 106	19.52% 49	47.41% 119	20.72% 52	11.95% 30	23.90% 60	35.86% 90	17.93% 45	5.18% 13	41.04% 103	3.98% 10	82.46% 677
Living with partner and children	40.44% 91	20.00% 45	44.44% 100	17.33% 39	16.89% 38	21.78% 49	49.33% 111	16.44% 37	9.33% 21	37.78% 85	5.33% 12	76.49% 628
Total Respondents	331	173	372	150	109	193	331	166	46	296	47	821

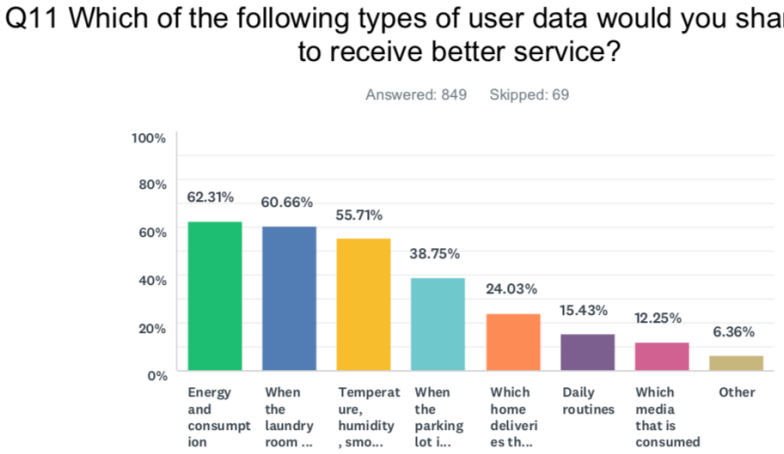
Figure 5.21: *Result of what could be shared with neighbors, comparison between different living situations.*

5.3.7 Data Sharing

An essential part of digitalization is data and the collection of data. User data can be used in many ways, e.g. in order to facilitate and improve services. However, there are laws and restrictions which regulates what type of data is allowed to collect and distribute.

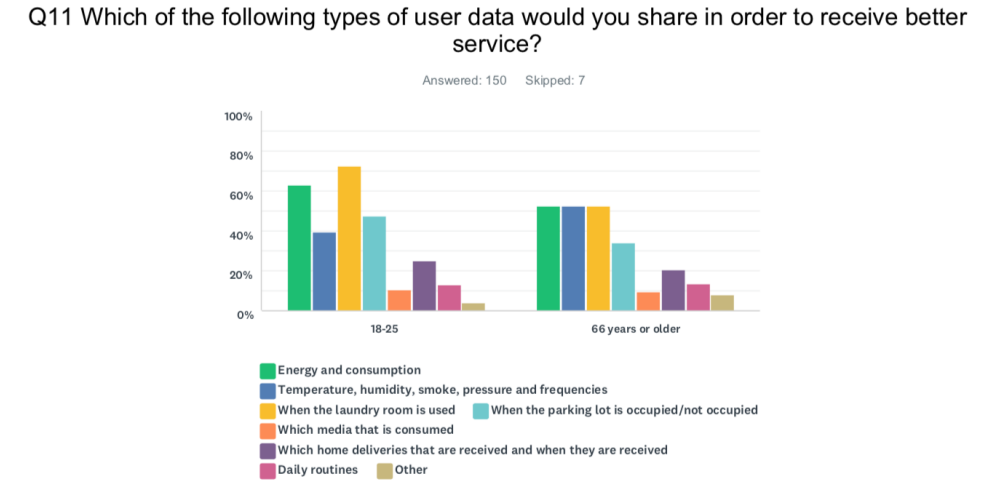
Most of the respondents were willing to share data concerning *energy and consumption*, *when the laundry room is used* and *temperature, humidity, smoke, pressure, and frequencies*. See in figure 5.22. Nearly 39% were also willing to share data regarding *when the parking lot is occupied or not* and approximately 24% were willing to share *which home deliveries that are received and when they are received*. The respondents were thus not similarly excited about sharing which *media that is consumed* or sharing data concerning their *daily routines*.

Comparing youngsters against elderly indicates that younger people are generally more willing to share user data, see figure 5.23. This goes for all types of data, except for data concerning *temperature, humidity, smoke, pressure, and frequencies* which elderly are more eager to share. Regarding differences among respondents in various living situations, there is generally a rather similar attitude towards data sharing, see figure 5.24. The exception concerns those who live on their own, who are not as eager towards sharing data about *temperature, humidity, smoke, pressure, and frequencies* nor *when the parking lot is occupied or not* as those who live with partner or partner and children.



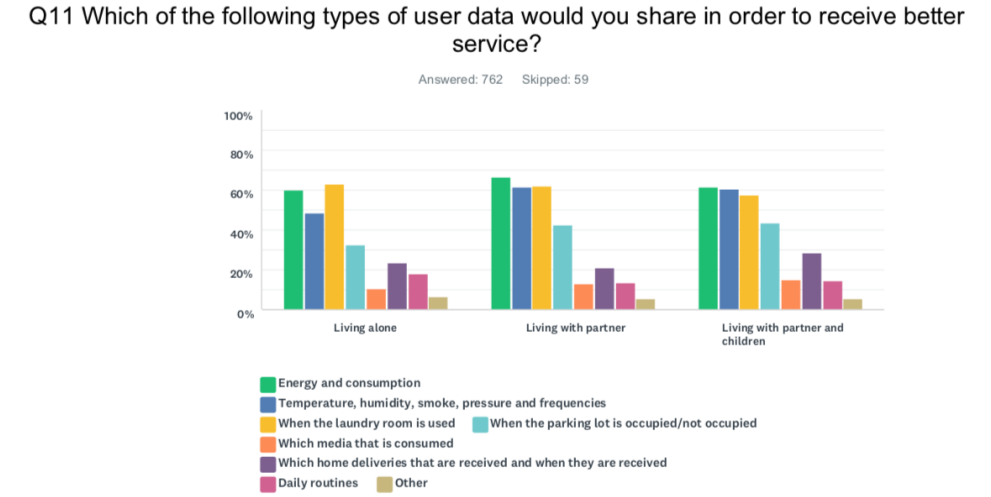
ANSWER CHOICES	RESPONSES	
Energy and consumption	62.31%	529
When the laundry room is used	60.66%	515
Temperature, humidity, smoke, pressure and frequencies	55.71%	473
When the parking lot is occupied/not occupied	38.75%	329
Which home deliveries that are received and when they are received	24.03%	204
Daily routines	15.43%	131
Which media that is consumed	12.25%	104
Other	6.36%	54
Total Respondents: 849		

Figure 5.22: *Overall result concerning which type of data tenants are willing to share.*



	ENERGY AND CONSUMPTION	TEMPERATURE, HUMIDITY, SMOKE, PRESSURE AND FREQUENCIES	WHEN THE LAUNDRY ROOM IS USED	WHEN THE PARKING LOT IS OCCUPIED/NOT OCCUPIED	WHICH MEDIA THAT IS CONSUMED	WHICH HOME DELIVERIES THAT ARE RECEIVED AND WHEN THEY ARE RECEIVED	DAILY ROUTINES	OTHER	TOTAL
18-25	63.16% 48	39.47% 30	72.37% 55	47.37% 36	10.53% 8	25.00% 19	13.16% 10	3.95% 3	139.33% 209
66 years or older	52.70% 39	52.70% 39	52.70% 39	33.78% 25	9.46% 7	20.27% 15	13.51% 10	8.11% 6	120.00% 180
Total Respondents	87	69	94	61	15	34	20	9	150

Figure 5.23: *Result concerning which type of data tenants are willing to share, young people compared to elderly.*



	ENERGY AND CONSUMPTION	TEMPERATURE, HUMIDITY, SMOKE, PRESSURE AND FREQUENCIES	WHEN THE LAUNDRY ROOM IS USED	WHEN THE PARKING LOT IS OCCUPIED/NOT OCCUPIED	WHICH MEDIA THAT IS CONSUMED	WHICH HOME DELIVERIES THAT ARE RECEIVED AND WHEN THEY ARE RECEIVED	DAILY ROUTINES	OTHER	TOTAL
Living alone	60.06% 191	48.74% 155	63.21% 201	32.70% 104	10.69% 34	23.27% 74	17.92% 57	6.60% 21	109.84% 837
Living with partner	66.53% 157	61.44% 145	61.86% 146	42.37% 100	13.14% 31	21.19% 50	13.56% 32	5.51% 13	88.45% 674
Living with partner and children	61.54% 128	60.58% 126	57.69% 120	43.27% 90	14.90% 31	28.37% 59	14.42% 30	5.29% 11	78.08% 595
Total Respondents	476	426	467	294	96	183	119	45	762

Figure 5.24: *Result concerning which type of data tenants are willing to share, comparison between different living situations.*

5.3.8 Rejecting Digital Solutions

An interesting customer request that was discovered from the survey was the possibility to decline the implementation of digital solutions. Most of the participants in this report showed a positive attitude towards digitalization, but some respondents were happy with the current situation and did not desire any digital solutions. Their reasons for not wanting any digital implementation varied, some were afraid of radiation, others believed it would be more costly than beneficial. Others were interested in some of the digital solutions but would like the possibility to reject those services they did not desire without it affecting either them or their neighbor negative. Even though most of the responses were in favor of implementing digital solutions in their homes, it is important to take those who are not into consideration. This also regards those who are not in favor of sharing user data.

5.3.9 Summary - Top Choices

The following list is a summary of the most chosen choices. They are believed to represent the most value creating and requested customer needs which digitalization can contribute to achieving. The list concerns the general outcome and not specific age groups, genders or living situations.

1. Monitor consumption (64,49%)
2. Notification to selected mobile device if something undesirable happens in the apartment (64,36%)
3. Automatic alarming to surrounding apartments in case of fire (64,27%)
4. Automatic alarming to a security company in case of trespassing (61,11%)
5. Manage maintenance errands from distance (57,41%)
6. Smart lights which are turned on/off depending on physical presence (55,56%)
7. Home deliveries (53,81%)
8. House cleaning (49,46%)
9. Possibility to receive/donate items (48,80%)
10. Information about activities and events in the area (48,69%)

6
Discussion

The innovation of technology and the digitalization trend have increased rapidly over the last years (Retiefa et al., 2016). The empirical findings point out a gap of knowledge regarding how value can be created through this development which is based on lack of information about tenants' demand and how to create value with new digital services and solutions. Few academic investigations have been made in this subject and the following discussion intends to contribute to increased knowledge about the given subject. The existing literature is discussing single digital solutions and services as value creators but does not identify how to extensively implement digitalization within real estates. In this matter, there is a gap in research and literature on how to deal with digital evolution respectively how to deal with implementation of digital solutions and services. This thesis will hopefully contribute to fill this gap of literature and research.

The findings in this master thesis are further discussed in this section with help of the research questions. The main research question is discussed through the three sub-questions that follow in the sections below. Lastly, academic respectively practical contribution are discussed.

6.1 Current State of Digitalization

The real estate sector is traditionally rather conservative and slow-changing. For a long time, companies in the real estate sector have been able to profit from rent income and economic value increase of the properties. According to the empirical findings, digitalization might provide major changes in this business. The need of innovation requires a strategy towards this change. Furthermore, real restate companies seem to be required to increase the effort concerning innovation of facility usage respectively business models, to stay competitive towards new and existing actors in the real estate sector (Harper, 2019a; Vargo et al., 2008). The empirical findings identify that the development is in an early process, actors within the business are currently investigating opportunities and barriers. At the moment, minor changes have been tested, e.g. smart locks, without finding a solution that include an extensive value creating perspective. This is something that might be a key aspect for real estate companies, to focus on digital solutions as a part of a bigger value creating entirety, rather than to implement new solutions one by one. The accelerating technological development will continue to provide the market with new services and solutions and if those are handled individually, it will be harder to implement them according to the empirical findings. The preferable objective might

instead be to create a basis that could facilitate the implementation of new digital services and solutions. This implementation can most likely be facilitated by digital platforms connected to real estates, something that actors in the sector currently are investigating.

6.1.1 Extended Value Creation Through Innovation

By comparing the quantitative data and the qualitative data, patterns regarding common interest between real estate providers and tenants are identified. The innovation regarding digital solutions and services and the implementation of it in the real estate sector gives birth to the need for new innovative business models for the actors within the real estate sector. The basics of real estate are that the real estate owner possesses facilities that are to be rented out to tenants (Ling and Archer, 2010). The income from rents is except for the property's value increase, the profit which property owner receives. The innovation and implementation of digitalization and digital platforms might result in new perspectives of value creation. The interviews imply that in a near future, the value of the real estate might not only be determined by rent income, facility condition, and location, but also by the consuming power of the tenants. If the concept Big Data analysis described by Mediratta (2015) can be used to map the tenants consuming habits and digital platforms can be used to connect service providers and customers, a whole new way of interpreting the economic value of real estate properties may occur. The definitions of real estate and facility management, as described in the real estate section, section 2.1, might even change over the years to come due the innovation currently emerging in the business.

6.1.2 Challenges in the Current State

The current state in the real estate sector points toward a lack of knowledge in how to handle the emerging implementation of digitalization. The empirical findings imply that actors within the business such as real estate companies, service providers and tenants have difficulties grasping the full extent of the implementation of digitalization. There is an uncertainty regarding what is to come and even though many are in favor of the innovation, there is also a resistance to change. The innovation in the real estate sector may have large consequences for the current way of acting in the business. Present knowledge and skills might not be as valuable in the future as they are today. Instead, new kinds of preferences and ways of working might be needed which requires preparation on how to handle the concept of digitalization within the real estate sector.

Tech-companies are currently entering the real estate market and as the interviews imply, there is obviously room for improvement in the business. The tech-companies' entry on the market puts pressure on traditional real estate companies, forcing them towards innovation of the traditional business. Digitalization is seen as very important according to the empirical findings, and the companies who are not joining the development risk to fall behind their competitors. Since the tech-companies possess knowledge concerning digital services to an extent that real estate companies

do not, it may be important for the real estate companies to integrate external partners in their development. Real estate owners possess knowledge about the real estate and facility management which the tech-companies do not, at least not to the same extent. By integrating their tenants, either by personal communication or mining of user data, the real estate company gains access to not only technology knowledge, but also use knowledge (Rodríguez Fernández et al., 2016; Skålén, 2018). By combining this and knowingly work with open innovation as Harper (2019b) mentions, the real estate companies could establish relationships and knowledge that might make them competitive to fast-evolving tech-companies. Furthermore, the competitive stand on the market might be strengthened for traditional real estate companies by integrating other actors in the business, actors as specialists from other sectors such as app developers and gamification companies.

6.2 Value Creation for the Property Owner

The above-mentioned platform concept that is under investigation might be a key feature concerning value creation for real estate companies. The facility owners might benefit by not only seeing themselves as housing providers but providers of living situations. By using a digital platform and implementing innovative solutions and services in real estates, the facilities might be used in new ways to create value.

6.2.1 Extended Value Creation Through Innovation

Services and solutions that are controlled and provided by the facility owners could be value creating for real estate companies, according to the empirical findings. By this, new kinds of value proposition from the real estate owners to tenants could occur. From a real estate company's point of view, the business model for reaching increased profit might thereby not only include implementation of services and solutions to increase the utility value rent. It might rather entail establishing a platform economy, Kenney and Zysman (2016), that could facilitate micro-transactions, subscriptions, and single time rental fees. A large number of micro-transactions could generate great profit according to the empirical findings and might work as a complement to increase the utility value for every performed improvement. The platform economy also implies that the platform owner, in this case the real estate company, get value by charging third party companies a commission on transactions that occur from the tenants (McKee, 2017).

Real estate companies see services and solutions that simplify facility management activities as value creating, according to the empirical findings. A lot of time is consumed at informative communication and physical meetings with the tenants. If this could be done through a digital solution, a lot of time could be spared and hence create direct value for real estate companies. An innovation regarding this subject could focus on the creation of the digital platform that is mentioned by McKee (2017) in the platform economy section, section 2.2.2, which might be integrated

with the concept. In figure 5.8, there is a high demand from the tenants regarding the possibility to handle maintenance errands from a distance. This might fit a broad variety of errands, e.g. questions regarding paid or unpaid rent, upcoming events, or information about planned maintenance. The empirical findings suggest that both tenants and real estate companies are interested in such a solution. The real estate companies might further identify what specific errands the tenants want to handle in a digital platform, possibly by innovation with user involvement that Bosch-Sijtsema and Bosch (2014) mention. A digital platform like this could also provide the possibility for the real estate provider to e.g. offer digital door locks, something that the empirical findings point out as value creating for real estate companies. If the implementation of digital door locks is to be executed, the keys can also be completely digital. In this way, fewer door locks would have to be changed since a digital key not can be lost. Less time is thereby needed from facility managers, hence value is created for the real estate provider. But the value of implementing a digital lock does not only lie in the lock itself, since the digital lock in combination with the digital platform can be used to create several additional services.

6.2.2 Strategy for Innovation of Value Creation

The real estate company would most likely benefit from integrating external parties in the innovation work. This concerns actors within the real estate sector as well as specialists from other industries. As Chesbrough (2009) stated, *"not all the smart people work for us, we need to work with smart people inside and outside our company"*. By integrating external parties, the real estate company might also identify new value propositions that can be offered to the tenants, while they still keep focus on the company's core business. A real estate company could choose a strategy of focusing on other aspects than its core business. This might thus have a negative impact on the company since they might lack deep and updated knowledge, i.e. technical and use knowledge, which seem to be necessary to stay competitive in business model innovation through digitalization (Skålén, 2018). The development and implementation of digitalization shall preferably therefore consist of openness and co-operation, possibly by using open innovation in combination with user involvement (Bosch-Sijtsema and Bosch, 2014; Enkel et al., 2009). By using the open innovation that Enkel et al. (2009) mention, real estate companies may leverage knowledge both internal and external (Enkel et al., 2009), accessing the best possible condition for developing successfully.

Value is created for real estate companies when profit can be made over time. The empirical findings show that facility owners might benefit from active trend spotting. Adapting business models towards current and future megatrends, such as those mentioned by Retiefa et al. (2016), the real estate providers may create long term value. Trends like sharing economy, rapid urbanization, increasing acceleration of technology, respectively changes in climate and lack of resources might be considerable aspects for real estate companies when taking strategic decisions towards an up-to-date business model and strategy. Being updated on such trends may increase the companies' power of attraction among tenants, raise demand and hence create

value over time. Thus, using current trends as a basis for investments might be a risk for real estate companies, according to the empirical findings. Trends can change quite rapidly, hence caution shall be taken when trends are involved in investment decisions.

6.2.3 Sharing Economy as Value Creator

A real estate company might profit from providing sharing pools and sharing banks to its tenants. The interest for a shared tool bank is high among the tenants, this is based on the answers in figure 5.19. Even if a tenant does not use the tool bank extensively, the availability for tools itself might be seen as a value. This can be seen as a service innovation that creates value from intangible resources (Vargo et al., 2008). By providing value propositions with high demand can lead to high occupancy on the investment, hence profit over time. A challenge is that the users might be less careful with borrowed items than private ones, the real estate providers have to consider damages and rapidly worn out items if an e.g. tool bank is provided as a shared value proposition among the tenants. Based on this a partnership integration could be advantageous, to move the responsibility for a function to someone else. The concept of sharing economy, described by Sundararajan (2016), could be facilitated by a platform design (Kenney and Zysman, 2016). The partnership integration that is identified in the empirical findings could be used in a situation like this. If a real estate company want to provide an e.g. tool bank to its tenants, a tool rental company could open up such a bank in the real estate area for a fee and a certain degree of a maintenance agreement. The real estate company will only have to provide an available space for the tool rental company, then value will be created for the real estate company in form of additional profit collected from the tool rental company.

6.2.4 User Data as a Strategic Asset

Real estate companies shall not only see their facilities as housing but also as value creating in other aspects according to the empirical findings. The facilities might be seen as a provider of user information and use knowledge (Skålén, 2018). By implementing IoT in real estates and collect the data that is produced in this network, value can be created for real estate owners since data might be seen as a strategic asset. By using the Big Data analysis on the collected data, fairly accurate intelligence about the people and facility that use the IoT may be accessed. As Mediratta (2015) states, the collection and analysis of user data provides possibilities for innovation and further development of business models. This intelligence might be used as a basis for strategic decisions within the real estate company. Furthermore, if data can be collected and sorted, data sets might be sold to external parties and thereby it may create value for real estate owners. The empirical findings show that data even might work as a currency in a near future, thereby it is of significant importance to own, collect, and sort the large amount of information that gets produced in real estate facilities. By owning the information created in real estate facilities, the use knowledge can be read out from the information. This might save

both cost and time for real estate companies since the customers does not have to be physically involved in the identification process. The tenants' usage of IoT-grids will most likely provide enough digital input to the real estate companies, so the facility owner can extract useful intelligence without arranging meetings with tenants. Hence the possibility for innovation by user involvement, that is mentioned by Bosch-Sijtsema and Bosch (2014), can be automatically provided for the real estate companies.

Many different opportunities for value propositions exist and the real estate companies will have to focus on a selection of those. The facility owners may get guidance in this selection, by keeping the focus on what the customers are interested in. Feedback and input from users are important parts of innovation, especially when the development is to be done through user involvement (Bosch-Sijtsema and Bosch, 2014). When choosing a course of action in the innovation of a business model, knowledge about the market and the demand is crucial for the investment decision. By involving customers in the innovation process the market can partly be mapped, hence this activity may be of high importance for investments. The users of the provided value propositions might contribute with useful input for future investment decisions and thereby create value for the service provider, the real estate company.

6.2.5 Challenges for the Property Owner

A barrier concerning the value creation for the property owner is to make the investment in digital infrastructure and solutions economically justifiable. It might be hard to implement digital infrastructure and solutions in existing facilities due to both the economic perspective as well as resistance to change among the tenants. Suggestively, it might be easier to implement digitalization in new facilities since the tenants then will have the option whether they want to live in a digitalized apartment or not. It is also, according to the empirical findings, more time and cost efficient to install a digital infrastructure and solutions in a construction phase compared to in an existing facility.

The empirical findings imply that there is a lot of potential in data mining for real estate providers (Kwon and Sim, 2013). However, the subject should be handled with caution. As seen in figure 5.22, the tenants are not used to the idea of officially sharing all of their user data, at least not consciously. The transition from some tenant's unwillingness of data sharing to those tenant's will to share data might take time. The transition is possible though according to the empirical findings, as long as the data sharing tenants are offered something in return. This aspect may be of significance in business model innovation. As the interview findings entail, rewards through a discount on rent is not in question. Compensation through discounts on services provided by the real estate companies can be used as reward instead. The unwillingness towards sharing data is also present in the matter of giving the tenants the possibility to decline the sharing of user data. Thus, there will be a dilemma if not enough tenants share their user data, providing the real estate company with unfair and misleading perceptions. However, many of the tenants do not seem to think of that a lot of their data already is collected through e.g. smart speakers

and smartphones. The attitude towards data sharing might change in the future according to the empirical findings, which is also indicated by the results in the data sharing section, section 5.3.7. Younger people are generally more keen towards data sharing compared to elderly, something also shown in figure 5.23. The results in section 5.3.7 also indicate that many tenants are willing to share their user data.

Another challenge for real estate companies is to prevent implemented technology from getting outdated too quickly. A problem that has been present in earlier implementation of technology in real estates since the technology were attached to a certain product developer. From the interviews it becomes clear that digital services and technology usually have a shorter lifetime compared to the real estate property, hence it is important to use technology with changeable software to prevent the technology from becoming outdated too soon.

6.3 Value Creation for the Tenant/Customer

To connect the value creation for the tenants to the mentioned platform concept, there are several ways this creates value. The tenants can access a large amount of the real estate owners value propositions through the digital platform, accessing possibilities for e.g. services, communication, and remote controlling. All services are not in need of the digital platform but can preferably be facilitated through this concept.

6.3.1 Customer Desires Facilitated Through Digitalization

As seen in the section about value creating categories, section 5.3.1, the most desired categories are safety and security, expenditure reduction, together with energy and sustainability. This indicates the major driving forces of the tenant. They value to feel safe and secure in and around their apartments, something which can be provided through several digital services such as surveillance cameras and automatic alarms. Furthermore, tenants desire features which reduce their expenditures and which are as environmentally friendly as possible. This could occur through several digital solutions, where e.g. optimizing the energy use of the property targets both. Reduction of expenditure could also occur through e.g. sharing economy solutions (Gertz, 2018).

6.3.2 Sharing Economy as Value Creator

The increasing trend concerning the willingness among people to share items and services is increasing Apte and Davis, 2019. This trend is further confirmed by the findings in the section concerning sharing, section 5.3.6, indicating that the tenants are interested in several sharing services. As mentioned earlier, the interest among tenants is high concerning access to different sharing pools or sharing banks, but also access to common facilities and items for festivities are requested.

The rising trend of sharing is also present concerning the change in attitude between younger and elderly respondents. As discovered in the section about value creating categories, section 5.3.1, younger people show a remarkably higher interest in sharing solutions. This indicates a change concerning status in owning, which Gertz (2018), also implies. A pattern in the empirical data points toward that access to a large supply of services and products, with a smaller cost instead of owning every asset yourself, is seen as advantageous. A major facilitator to the sharing trend is as mentioned digital platforms which connect those who intend to embrace the sharing concept, both B2C and P2P. The development of digital platforms facilitate the sharing and it could be applied in several ways (McKee, 2017). This might be useful for the tenant if this concept is implemented in real estate properties, where a customer desire exists.

6.3.3 Value Creation Through User Data and Digitalization

Among the customer requests which are perceived to be most value creating, several value propositions might be achieved through solutions provided from IoT-services and Big data analysis, e.g. monitoring consumption of energy and water, and analyzing the habits and patterns of resource usage. IoT solutions can create value for tenants in the matter of both proactive and reactive events (Ashton, 2009). Services such as notifications to smart devices if something undesirable happens in the apartment, automatic alarming, home deliveries, and the possibility to manage maintenance errands from distance are also provided with the assistance of IoT-solutions in combination with a digital platform. The services might not necessarily be digital themselves but are easily accessed and distributed through the facilitation of digital assistance and digital services.

The tenants can profit in several ways by sharing their user data. Since the real estate company is in need of use knowledge, as described by Skålén, 2018, they would most likely be willing to compensate the tenants for distributing it. The compensation could occur in multiple ways, such as a more personalized user experience. The data can be used to analyze e.g. customer behavior, providing customized features for each of the tenants. Except for a more adapted service supply, the tenants could also receive personalized discounts and other advantages from service providers. Discounts and advantages that are targeting the desired value creating categories such as expenditure reduction, time-saving or comfort. The discounts can suggestively come from service providers connected to the same digital platform as the tenants. The property owner might be more willing to compensate tenants who share their user data by giving them discounts on products, services or other features, rather than lowering the rent.

Furthermore, through data mining and analyses of user data, real estate companies and third-party companies can optimize services and assets which are not used to its full capacity today. From this, it is possible for tenants to receive new services or get an increased supply of already existing services. For instance, a parking lot which is not fully occupied could be rented out by the main renter to other tenants,

while the asset not is used. Almost 40% of the tenants are willing to share data about this matter. This would hopefully result in an income/expenditure reduction for the main tenant of the parking lot and also available parking space for other tenants. Collecting data about existing products and services to achieve this can be done through e.g. IoT-sensors (Mohn, 2018). This might prevent that services and products remain unused. The innovation regarding data will require a change in the tenants' behavior, but will in return provide them with new dimensions of value propositions.

6.3.4 Challenges Among Tenants/Customers

Some of the tenants indicated that the possibility to choose whether to use digital solutions or not would be of high value, as mentioned in section 5.3.8. This respondents' opinion might change over time, if they decline certain digital solutions today does not entail that their opinion can be different in the future. Hence it is important for tenants that real estate companies offer a flexibility for the customers when introducing digital services and solution in real estates.

6.4 Academic and Practical Contribution

Concerning academic literature in the area of research, there is an identified gap. This report gives insight in new developments in the Swedish real estate industry and shows from an open innovation perspective future opportunities in terms of partnerships between different types of companies, e.g tech- and real estate companies. Furthermore, input from the tenants for new value creation is also contributing to the academic literature.

The identified gap regarding how to extensively implement digitalization within real estates might be narrowed down by the presented concept of platform design in combination with partnerships, new business models, and development of new services. This combination seem to create value for both real estate providers in the Swedish real estate market, as well as for the tenants living in the facilities. Furthermore, the digital platform concept narrows the gap regarding how to deal with digital evolution respectively how to deal with implementation of digital solutions and services in the Swedish real estate sector. By adopt this findings, the actors in and around the real estate market might get connected and a more clear direction for further innovation is proposed.

7
Conclusion

The overall aim of this master thesis was to investigate how digital solutions and services can contribute to value creation in the Swedish real estate industry. This aim has been reached through theoretical studies and empirical findings. The theory presents current trends that are present within the investigated area of research and innovation which is necessary for further development of digitalization within the real estate sector. The empirical findings show the current state of digitalization in the business and indicates what could be value creating for the real estate companies, while the survey provides the thesis with information concerning the customer's value creation.

Current state of value creation through digitalization
The way digitalization creates value in the Swedish real estate market is currently changing and it evolves rapidly. Real estate companies are currently investigating which way to go, in this subject of great variety in possible route choices. The value creation through digitalization in this industry has merely begun, a lot of potential exist but real estate companies are currently at the starting point of this opportunity. The real estate sector is trying to implement minor value creating digital solutions, such as smart locks, but have not yet figured out how to deal with the bigger picture and provide an extensive beneficial environment. Digital platforms where interactions can occur are emerging as a solution to this. Furthermore, the transition based in digitalization will change traditional business models. The real estate facilities are not only to be seen as objects for housing, but also as objects for open innovation and collaboration. This innovation is to occur between actors within and around the real estate sector and reshape the general picture of how real estate facilities are defined.

Value creation for the property owner
Digitalization opens up for a variety of possibilities for property owners. One of the most value creating aspects is the opportunity to open up a digital platform for interaction between real estate companies, service providers and tenants. This digital platform can create value through in several ways, for instance by saving time and resources. For example, real estate providers can handle service errands through this solution and tenants can partly find answers to questions that earlier had to be answered by the facility managers. A digital platform also provides the possibility for the real estate companies to sell additional services and solutions to the tenants in a flexible way. Through a digital platform, the tenants can activate or deactivate the additional services on demand. This will provide real estate companies with new types of income, such as micro transactions, and hence create value. Real estate companies can also sell access to the digital platform to third-party companies. The

third-party companies can then offer a service or a solution to the tenants, while real estate companies receive a commission from the third parties for giving access to a customer group.

Digitalization can provide value for property owners by streams of user data from housing facilities. If the user data is collected and analyzed, information regarding the tenants' demand can be extracted. By this, value is created for facility owners in such a way that the real estate providers know what to offer to tenants. The data can be distributed for a commission to other actors as information regarding demand and market trends, hence create monetary value for the real estate companies. Furthermore, the collection of user data can be used for optimization in a facility. Consumption of energy, water, and similar can be measured and actions towards sustainability can thereby be taken. Based on the future value of user data, real estate companies shall make sure to own the data flows through their facilities. It will create value in this rapidly emerging market where data is believed to be a strategic asset, possibly seen as a currency in the near future.

Value creation for the tenant/customer
People who live in tenancies see digital solutions that simplify and facilitate the everyday life as value creating. Safety and security, expenditure reduction, respectively energy and sustainability are identified as the most important and hence value creating categories among tenants. All these can advantageously be facilitated through digital platforms. Furthermore, tenants see digital monitoring and remote controlling of apartments as value creating. The monitoring and remote controlling regards the above-mentioned categories, but also facilitates the possibility to receive service- or package deliveries without being physically present in the apartment.

A majority of tenants are interested in sharing several categories of user data, to receive value through e.g. benefits such as personal discounts and a more personalized user experience in and around the apartment. Furthermore, tenants see certain sharing economy categories as value creating. A solution for sharing economy can with advantage be provided and facilitated through a digital platform.

Lastly, the study shows that all tenants are not interested in every implementation of digitalization in and around their homes. Hence the option to refrain from implementation of certain digital solutions and services can advantageously exist and will be appreciated by a certain group of tenants.

Value creation through digitalization in the Swedish real estate sector
The main findings that connect the stated research questions and provide an answer to how digitalization can contribute to value creation in the Swedish real estate sector is the digital platform in combination with partnerships, new business models, and development of new services. This combination is believed to create value for both tenants and real estate companies and investigations is currently carried out concerning how this model can be implemented. The digital platform is also seen as the tool which can be used to facilitate both present and future desires among tenants and real estate owners, making it a key feature together with the above-mentioned aspects in the value creation through digitalization.

8

Suggestions for Future Research

The research conducted in this report has focused on how digitalization can contribute to value creation in the Swedish real estate sector. Both how digitalization can provide value for property owners and tenants and what the current state of value creation looks like on the Swedish real estate market. This research did not focus on economic aspects, laws and regulations, IT-security, nor personal integrity. Hence, it would be interesting to investigate those areas to find out how the digitalization in the real estate sector affects, and are affected by, them.

Furthermore, future research could investigate the digital infrastructure necessary to implementing digitalization in the real estate sector. This could include both hardware and software solutions. In connection to this it would be interesting to conduct research on which of the digital solutions and services that would be possible to realize seen from a technical and economic perspective.

It would also be relevant to investigate new and present business models, which would be suitable for the innovative work concerning digitalization in the Swedish real estate sector.

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A

Appendix - Interview Template

Inledande:

- Berätta om din roll och ditt företag?

Digitalisering:

- Hur är din syn på digitalisering inom fastighetsbranschen?
- Vart tycker du digitaliseringen står idag och var tror du vi kan se om några år?
- Vilka smarta hem lösningar tror du är av intresse?
  - För hyresgäster?
  - För fastighetsägare?
- Hur tror du de olika aktörerna (privatpersoner, företag, samhället) står sig kring att betala för intresset?
- Vilka behov tror du kan täckas med hjälp av digitalisering?
  - Privata behov
  - Företagsbehov
  - Samhällsbehov
- Hur kan digitaliseringen skapa värde för olika parter inom kategorier som trygghet, tidsbesparing, kommunikation, hållbarhet, etc.
- Hur tror du att digitalisering kommer kunna skapa värde för hyresgäster, fastighetsägare respektive samhället i framtiden?

Trender och samhällsnytta:

- Vilka skillnader ser du i hur vi bor och lever idag jämfört med för några år sedan?
- Vilka boendetrender tror du vi kommer att få se i framtiden?
- Hur tror du digitalisering kan förändra och skapa nya affärsmodeller?
- Hur tror du digitalisering och delningsekonomi kan samverka?

Underlag till enkät:

- Kund ska frågas vad de värdesätter kring digitala tjänster, vad tror du vi bör fråga dem? Tänker exempelvis på vilka digitala tjänster som kan vara intressanta? Övrigt att fråga?

B

Appendix - Survey

Stena Fastigheter

Vad värdesätter du? Vi behöver dina åsikter!

* 1. Jag bor i:

- Askim
- Centrum
- Hisingen
- Högsbo
- Kallebäck
- Kortedala
- Lunden
- Mölndal
- Tynnered
- Tölö

* 2. Kön

- Man
- Kvinna
- Annat

* 3. Ålder

- 18-25
- 26-35
- 36-45
- 46-55
- 56-65
- 66 år eller äldre

* 4. Boendestatus

- Jag bor ensam
- Jag bor med min partner
- Jag bor med partner och barn
- Jag bor hos mina föräldrar
- Annan

I följande fråga 5-9 kommer ett antal områden presenteras inom vilka digitala tjänster kan användas. För varje område ombeds du som svarar välja de tre (3) tjänster/lösningar som du anser är mest värdeskapande för din vardag. Notera att max tre (3) svarsalternativ är möjligt att välja under varje fråga.

* 5. Servicetjänster: välj de tre (3) tjänster/lösningar som du värdesätter högst.

- [ ] Hemstädning
- [ ] Tvättjänster (Smutstvätt hämtas i hemmet och lämnas sedan tillbaka tvättade, strukna och vikta)
- [ ] Hemleveranser (utan att behöva vara hemma)
- [ ] Hantera serviceärenden (utan att behöva vara hemma)
- [ ] Starta ugn/spis via mobilen
- [ ] Se vad som finns i kylskåpet i mobilen
- [ ] Få blommorna vattnade när du är på semester
- [ ] Hundvakt
- [ ] Annat

* 6. Aktivt grannskap: välj de tre (3) tjänster/lösningar som du värdesätter högst.

Detta område syftar till att öka den sociala gemenskapen och tillhörigheten. Detta kan ske genom att digitala tjänster möjliggör kommunikation mellan de boende i området, ökar vetskapen om vem som bor i trappuppgången eller håller dig uppdaterad om evenemang och aktiviteter som är på gång i och kring ditt bostadsområde.

- [ ] Erbjuda/få hjälp med hundpassning (eller annat husdjur)
- [ ] Erbjuda/få hjälp med barnvakt
- [ ] Erbjuda/få hjälp med blomvattning vid resor
- [ ] Erbjuda/få hjälp med enklare hantverkssysslor (t.ex. hänga upp tavla)
- [ ] Erbjuda/få hjälp med enklare IT-problem (t.ex. kanalsökning TV, starta om router)
- [ ] Information om aktiviteter och evenemang i området
- [ ] Möjlighet att digitalt kunna kommunicera med grannar
- [ ] Möjlighet att skänka/få skänkta saker av grannar
- [ ] Annat

* **7. Säkerhet och trygghet: välj de tre (3) tjänster/lösningar som du värdesätter högst.**

Detta område syftar till vad som skulle höja säkerhets- och trygghetsfaktorn i och kring din bostad. Med hjälp av digitala lösningar är det möjligt att t.ex. påskynda larmprocessen eller visa livebilder om vem som kommer hem till bostaden. Larm kan även kommunicera med närliggande lägenheter och varna grannar vid t.ex. en eldsvåda.

- [ ] Vid brand går larmet automatiskt i närliggande lägenheter om åtgärd inte vidtas
- [ ] Vid inbrott meddelas väktarbolag automatiskt
- [ ] Om något oönskat försiggår i lägenheten skickas en notis till vald smartphone (Brand, inbrott, vattenläcka, öppen kyl/frys)
- [ ] Vid passage genom lägenhetsdörren skickas notis till vald smartphone
- [ ] Möjlighet att visa livebilder från lägenheten på distans (t.ex. via smartphone)
- [ ] Möjlighet att kontrollera att ugn och spis är avstängda (t.ex. via smartphone)
- [ ] Automatiskt larm vid allvarliga fall i hemmet (t.ex. för äldreomsorg)
- [ ] Digitala trygghetssystem för personer som behöver tillsyn utan att bli störda (t.ex kameror, sensorer för äldreomsorgen)
- [ ] Annat

* **8. Energibesparing och hållbarhet: välj de tre (3) tjänster/lösningar som du värdesätter högst.**

Detta område syftar till att skapa medvetenhet och möjliggöra en mer hållbar livsstil. Digitala tjänster kan användas till att mäta förbrukad el, vatten värme och släcka lampor om ingen befinner sig i ett rum.

- [ ] Se förbrukning (av t.ex. vatten/el/värme)
- [ ] Individuell debitering av vattenanvändning
- [ ] Möjlighet att styra lampor (ex via smartphone)
- [ ] Möjlighet att sätta på och stänga av vägguttag (ex via smartphone)
- [ ] Möjlighet att se när elpriset är dyrt/billigt för att kunna styra sin användning (t.ex. tvätta på natten)
- [ ] Smarta lampor som tänds/släcks vid fysisk närvaro/frånvaro i rummet
- [ ] Annat

* **9. Vad hade du helst delat med dina grannar? Välj de tre (3) alternativ som du värdesätter högst.**

Detta område syftar till att erbjuda tjänster och saker som delas med andra. Samutnyttjande möjliggör tillgång till exempelvis bil, cykel, verktyg till en lägre kostnad än om respektive sak skulle ägas individuellt. På samma sätt kan kostnaden för din parkeringsplats minska om du kan tänka dig låna ut den de tider som du inte använder den.

- [ ] Bilpool
- [ ] Cykelpool
- [ ] Verktygspool
- [ ] Parkering
- [ ] Förrådsytor
- [ ] Grill
- [ ] Lokaler
- [ ] Tvättider
- [ ] Sportutrustning (t.ex skidor, skridskor)
- [ ] Saker som behövs vid fest/kalas (t.ex. bord, stolar)
- [ ] Annat

* **10. Hur värdeskapande är de olika områdena som kan nås med hjälp av digitala tjänster för dig?**

Rangordna respektive område (1-5) beroende på hur de hade kunnat bidra till att skapa mervärde för din vardag. 1 innebär lite värde och 5 innebär högt värde.

	1 - Inte alls värdeskapande	2	3	4	5 - Väldigt värdeskapande
Säkerhet och trygghet	○	○	○	○	○
Energi och hållbarhet	○	○	○	○	○
Aktivt grannskap	○	○	○	○	○
Gemensam användning (bilpool, parkering, verktyg mm)	○	○	○	○	○
Tidsbesparning	○	○	○	○	○
Informationsutbyte	○	○	○	○	○
Bekvämlighet	○	○	○	○	○
Kostnadsbesparing	○	○	○	○	○

11. Kan du tänka dig att dela med dig av din användardata för att få förbättrad service i och kring din bostad? 0-6 val möjliga. Jag kan tänka mig att dela med mig av data rörande:

Idag finns det regleringar för hur data får hämtas, hanteras och distribueras genom lagar och förordningar som bland annat GDPR. För ytterligare tillgång av privatpersoners data krävs tillåtelse. Användning och hantering av data kan skapa mervärde för både hyresgäst och hyresvärd i form av minskade kostnader genom exempelvis optimering av energi, parkeringar och tvättstugor. På samma sätt kan mätning av rutiner och vanor göra hemmet mer personligt genom digitala tjänster som är anpassade för respektive person. En viktig sak att påpeka i denna fråga är att **informationen ska inte användas som övervakning**, utan som ett verktyg för att förbättra, förenkla och skapa trygghet.

- ☐ Energi- & förbrukning
- ☐ Temperatur, fukt, rök, tryck och frekvenser i bostaden
- ☐ När tvättstugan används
- ☐ När parkeringsplatsen används/är tom
- ☐ Vilken media som konsumeras och när den konsumeras (t.ex. TV, musik)
- ☐ Vilka hemleveranser som konsumeras och när de konsumeras (t.ex. paketleverans, matleverans)
- ☐ Dagliga rutiner (för att identifiera avvikelser, t.ex. i vård- och omsorgssyfte)
- ☐ Annat

12. Är det någonting gällande digitala tjänster som kan skapa värde för dig som vi inte efterfrågat i denna enkät?

Vi lottar ut biobiljetter bland deltagarna i enkäten. För att deltaga i utlottningen, vänligen skriv in din email nedan. Att vara med i utlottningen är valfritt, lämna nedanstående ruta tom om du ej vill vara med.

13. Email-adress:

* 14. Godkänn Stena Fastigheters villkor kring datahantering, läs villkoren här.

Jag godkänner villkoren

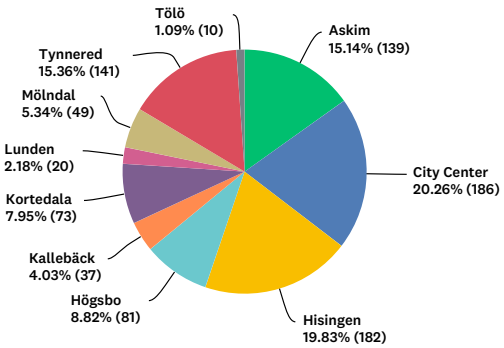
C

Appendix - Survey Answers

What is value creating for you?

Q1 I live in:

Answered: 918 Skipped: 0



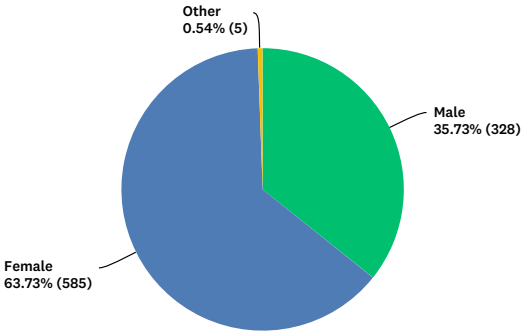
ANSWER CHOICES	RESPONSES	
Askim	15.14%	139
City Center	20.26%	186
Hisingen	19.83%	182
Högsbo	8.82%	81
Kallebäck	4.03%	37
Kortedala	7.95%	73
Lunden	2.18%	20
Mölndal	5.34%	49
Tynnered	15.36%	141
Tölö	1.09%	10
TOTAL		918

1 / 11

What is value creating for you?

Q2 Gender:

Answered: 918 Skipped: 0

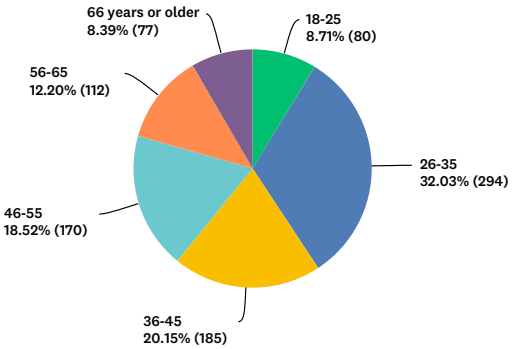


ANSWER CHOICES	RESPONSES	
Male	35.73%	328
Female	63.73%	585
Other	0.54%	5
TOTAL		918

What is value creating for you?

Q3 Age

Answered: 918 Skipped: 0



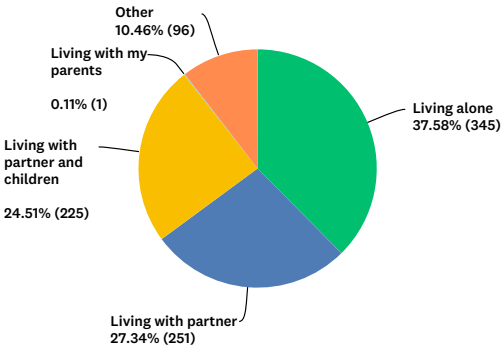
ANSWER CHOICES	RESPONSES	
18-25	8.71%	80
26-35	32.03%	294
36-45	20.15%	185
46-55	18.52%	170
56-65	12.20%	112
66 years or older	8.39%	77
TOTAL		918

3 / 11

What is value creating for you?

Q4 Current living situation

Answered: 918 Skipped: 0

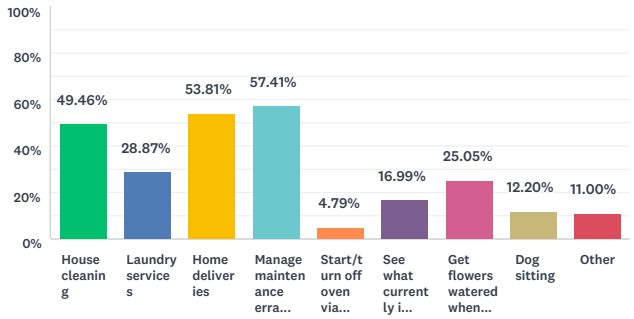


ANSWER CHOICES	RESPONSES	
Living alone	37.58%	345
Living with partner	27.34%	251
Living with partner and children	24.51%	225
Living with my parents	0.11%	1
Other	10.46%	96
TOTAL		918

What is value creating for you?

Q5 Services

Answered: 918 Skipped: 0



ANSWER CHOICES	RESPONSES	
House cleaning	49.46%	454
Laundry services	28.87%	265
Home deliveries	53.81%	494
Manage maintenance errands from distance	57.41%	527
Start/turn off oven via mobil device	4.79%	44
See what currently is in the fridge via mobile device	16.99%	156
Get flowers watered when on holiday	25.05%	230
Dog sitting	12.20%	112
Other	11.00%	101
Total Respondents: 918		

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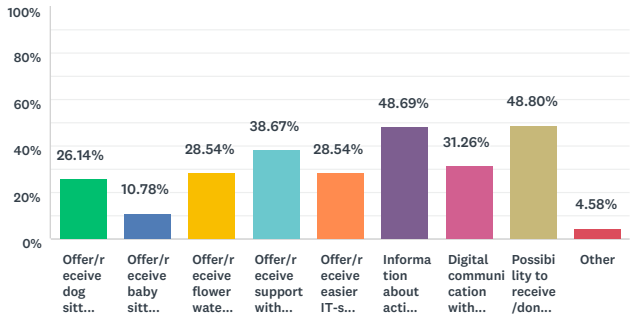
What is value creating for you?

Q6 Active Neighborhood

Answered: 918 Skipped: 0



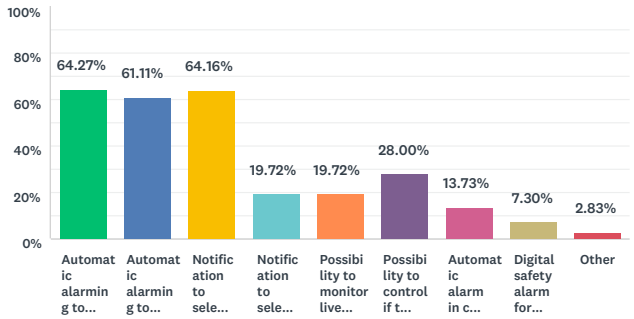
ANSWER CHOICES	RESPONSES	
Offer/receive dog sitting support	26.14%	240
Offer/receive baby sitting support	10.78%	99
Offer/receive flower watering support	28.54%	262
Offer/receive support with easier handyman chores	38.67%	355
Offer/receive easier IT-support	28.54%	262
Information about activities and events in the area	48.69%	447
Digital communication with neighbors	31.26%	287
Possibility to receive/donate items	48.80%	448
Other	4.58%	42
Total Respondents: 918		

6 / 11

What is value creating for you?

Q7 Safety and Security

Answered: 918 Skipped: 0



ANSWER CHOICES	RESPONSES	
Automatic alarming to surrounding apartments in case of fire	64.27%	590
Automatic alarming to security company in case of trespassing	61.11%	561
Notification to selected mobile device if something undesirable happens in the apartment	64.16%	589
Notification to selected mobil device when someone passes through apartment door	19.72%	181
Possibility to monitor live photos of the apartment	19.72%	181
Possibility to control if the oven was turned off	28.00%	257
Automatic alarm in case of falling accidents	13.73%	126
Digital safety alarm for persons who needs monitoring without being disturbed	7.30%	67
Other	2.83%	26
Total Respondents: 918		

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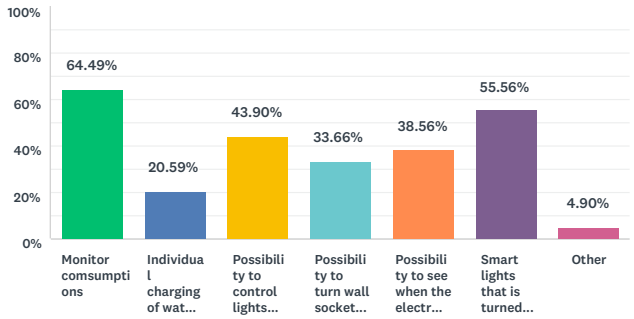
What is value creating for you?

Q8 Energy and Sustainability

Answered: 918 Skipped: 0



ANSWER CHOICES	RESPONSES	
Monitor comsumptions	64.49%	592
Individual charging of water use	20.59%	189
Possibility to control lights wirelessly	43.90%	403
Possibility to turn wall sockets on/off from distance	33.66%	309
Possibility to see when the electricity cost is high/low	38.56%	354
Smart lights that is turned on/off depending on physical presence	55.56%	510
Other	4.90%	45
Total Respondents: 918		

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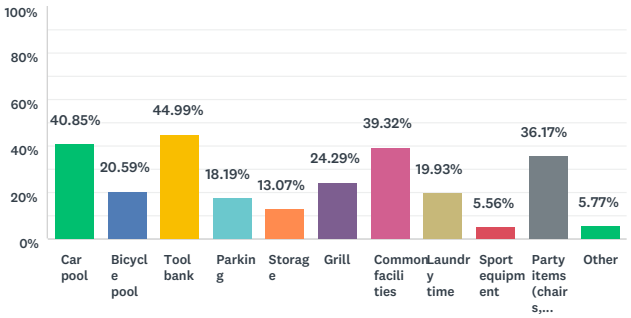
What is value creating for you?

Q9 What would you like to share with neighbors?

Answered: 918 Skipped: 0



ANSWER CHOICES	RESPONSES	
Car pool	40.85%	375
Bicycle pool	20.59%	189
Tool bank	44.99%	413
Parking	18.19%	167
Storage	13.07%	120
Grill	24.29%	223
Common facilities	39.32%	361
Laundry time	19.93%	183
Sport equipment	5.56%	51
Party items (chairs, tables etc)	36.17%	332
Other	5.77%	53
Total Respondents: 918		

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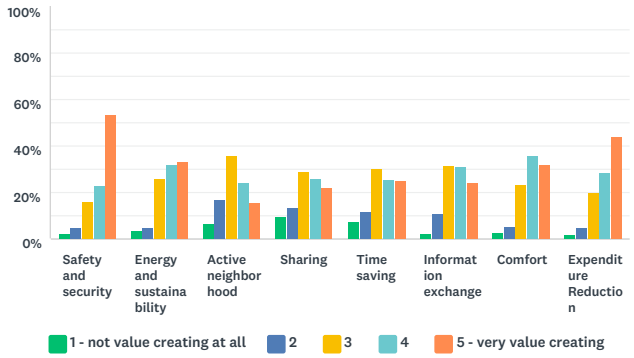
What is value creating for you?

Q10 How value creating are the following categories?

Answered: 918 Skipped: 0



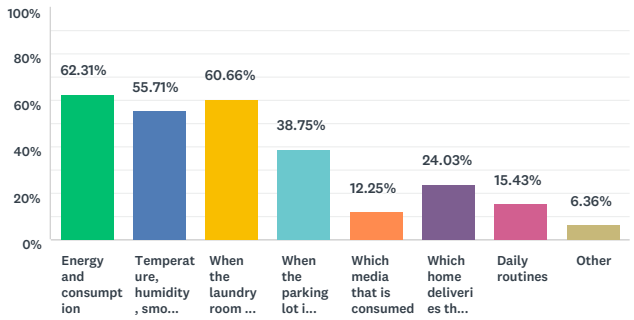
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Safety and security	2.51% 23	5.12% 47	16.01% 147	22.98% 211	53.38% 490	918	4.20
Energy and sustainability	3.27% 30	5.01% 46	26.14% 240	31.92% 293	33.66% 309	918	3.88
Active neighborhood	6.32% 58	17.10% 157	36.17% 332	24.73% 227	15.69% 144	918	3.26
Sharing	9.69% 89	13.51% 124	28.76% 264	26.03% 239	22.00% 202	918	3.37
Time saving	7.41% 68	11.87% 109	30.28% 278	25.60% 235	24.84% 228	918	3.49
Information exchange	2.40% 22	10.78% 99	31.59% 290	30.83% 283	24.40% 224	918	3.64
Comfort	2.94% 27	5.56% 51	23.75% 218	35.84% 329	31.92% 293	918	3.88
Expenditure Reduction	2.18% 20	5.12% 47	20.15% 185	28.43% 261	44.12% 405	918	4.07

10 / 11

What is value creating for you?

Q11 Which of the following types of user data would you share in order to receive better service?

Answered: 849 Skipped: 69



ANSWER CHOICES	RESPONSES	
Energy and consumption	62.31%	529
Temperature, humidity, smoke, pressure and frequencies	55.71%	473
When the laundry room is used	60.66%	515
When the parking lot is occupied/not occupied	38.75%	329
Which media that is consumed	12.25%	104
Which home deliveries that are received and when they are received	24.03%	204
Daily routines	15.43%	131
Other	6.36%	54
Total Respondents: 849		

11 / 11

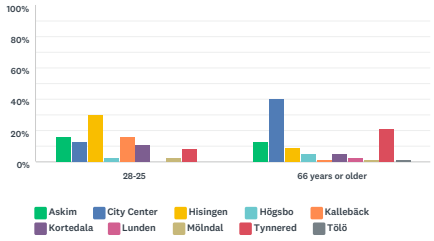
D

Appendix - Survey Answers, Age differences

What is value creating for you?

Q1 I live in:

Answered: 157 Skipped: 0



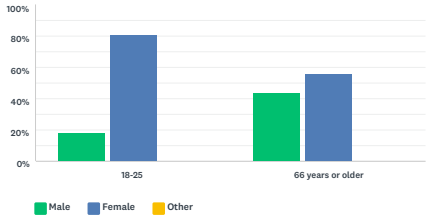
	ASKIM	CITY CENTER	HISINGEN	HÖGSBO	KALLEBÄCK	KORTEDALA	LUNDEN	MÖLNDAL	TYNNERED	TÖLÖ	TOTAL
28-25	16.25% 13	12.50% 10	30.00% 24	2.50% 2	16.25% 13	11.25% 9	0.00% 0	2.50% 2	8.75% 7	0.00% 0	50.96% 80
66 years or older	12.99% 10	40.26% 31	9.09% 7	5.19% 4	1.30% 1	5.19% 4	2.60% 2	1.30% 1	20.78% 16	1.30% 1	49.04% 77
Total Respondents	23	41	31	6	14	13	2	3	23	1	157

1 / 13

What is value creating for you?

Q2 Gender:

Answered: 157 Skipped: 0

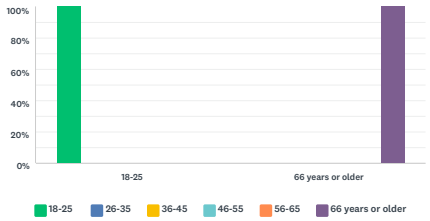


	MALE	FEMALE	OTHER	TOTAL
18-25	18.75% 15	81.25% 65	0.00% 0	50.96% 80
66 years or older	44.16% 34	55.84% 43	0.00% 0	49.04% 77
Total Respondents	49	108	0	157

What is value creating for you?

Q3 Age

Answered: 157 Skipped: 0

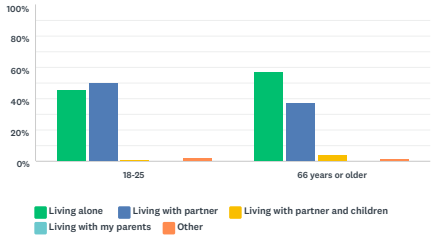


	18-25	26-35	36-45	46-55	56-65	66 YEARS OR OLDER	TOTAL
18-25	100.00% 80	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	50.96% 80
66 years or older	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 77	49.04% 77
Total Respondents	80	0	0	0	0	77	157

What is value creating for you?

Q4 Current living situation

Answered: 157 Skipped: 0

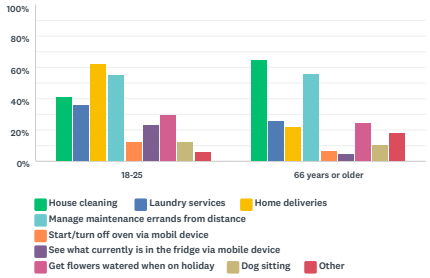


	LIVING ALONE	LIVING WITH PARTNER	LIVING WITH PARTNER AND CHILDREN	LIVING WITH MY PARENTS	OTHER	TOTAL
18-25	46.25% 37	50.00% 40	1.25% 1	0.00% 0	2.50% 2	50.96% 80
66 years or older	57.14% 44	37.66% 29	3.90% 3	0.00% 0	1.30% 1	49.04% 77
Total Respondents	81	69	4	0	3	157

What is value creating for you?

Q5 Services

Answered: 157 Skipped: 0

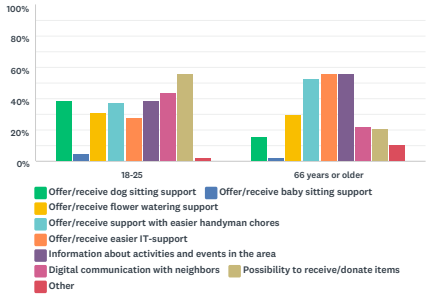


	HOUSE CLEANING	LAUNDRY SERVICES	HOME DELIVERIES	MANAGE MAINTENANCE ERRANDS FROM DISTANCE	START/TURN OFF OVEN VIA MOBIL DEVICE	SEE WHAT CURRENTLY IS IN THE FRIDGE VIA MOBILE DEVICE	GET FLOWERS WATERED WHEN ON HOLIDAY	DOG SITTING	OTHER	TOTAL
18-25	41.25% 33	36.25% 29	62.50% 50	55.00% 44	12.50% 10	23.75% 19	30.00% 24	12.50% 10	6.25% 5	142.68% 224
66 years or older	64.94% 50	25.97% 20	22.08% 17	55.84% 43	6.49% 5	5.19% 4	24.68% 19	10.39% 8	18.18% 14	114.65% 180
Total Respondents	83	49	67	87	15	23	43	18	19	157

What is value creating for you?

Q6 Active Neighborhood

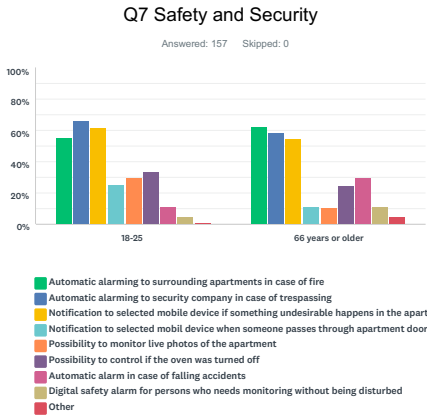
Answered: 157 Skipped: 0



	OFFER/RECEIVE DOG SITTING SUPPORT	OFFER/RECEIVE BABY SITTING SUPPORT	OFFER/RECEIVE FLOWER WATERING SUPPORT	OFFER/RECEIVE SUPPORT WITH EASIER HANDYMAN CHORES	OFFER/RECEIVE EASIER IT-SUPPORT	INFORMATION ABOUT ACTIVITIES AND EVENTS IN THE AREA	DIGITAL COMMUNICATION WITH NEIGHBORS	POSSIBILITY TO RECEIVE/DONATE ITEMS
18-25	38.75% 31	5.00% 4	31.25% 25	37.50% 30	27.50% 22	38.75% 31	43.75% 35	56.25% 45
66 years or older	15.58% 12	2.60% 2	29.87% 23	53.25% 41	55.84% 43	55.84% 43	22.08% 17	20.78% 16
Total Respondents	43	6	48	71	65	74	52	61

6 / 13

What is value creating for you?

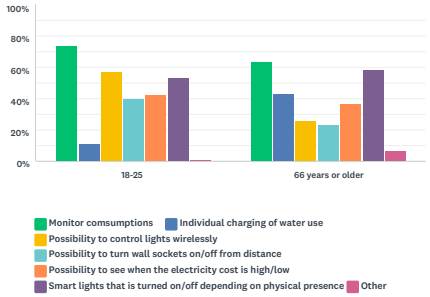


	AUTOMATIC ALARMING TO SURROUNDING APARTMENTS IN CASE OF FIRE	AUTOMATIC ALARMING TO SECURITY COMPANY IN CASE OF TRESPASSING	NOTIFICATION TO SELECTED MOBILE DEVICE IF SOMETHING UNDESIRABLE HAPPENS IN THE APARTMENT	NOTIFICATION TO SELECTED MOBIL DEVICE WHEN SOMEONE PASSES THROUGH APARTMENT DOOR	POSSIBILITY TO MONITOR LIVE PHOTOS OF THE APARTMENT	POSSIBILITY TO CONTROL IF THE OVEN WAS TURNED OFF	AUTOMATIC ALARM IN CASE OF FALLING ACCIDENTS	DIGITAL SAFETY ALARM FOR PERSONS WHO NEEDS MONITORING WITHOUT BEING DISTURBED	OTHER	TOTAL
18-25	55.00% 44	66.25% 53	61.25% 49	25.00% 20	30.00% 24	33.75% 27	11.25% 9	5.00% 4	1.25% 1	147.13% 231
66 years or older	62.34% 48	58.44% 45	54.55% 42	11.69% 9	10.39% 8	24.68% 19	29.87% 23	11.69% 9	5.19% 4	131.85% 207
Total Respondents	92	98	91	29	32	46	32	13	5	157

What is value creating for you?

Q8 Energy and Sustainability

Answered: 157 Skipped: 0



	MONITOR COMSUMPTIONS	INDIVIDUAL CHARGING OF WATER USE	POSSIBILITY TO CONTROL LIGHTS WIRELESSLY	POSSIBILITY TO TURN WALL SOCKETS ON/OFF FROM DISTANCE	POSSIBILITY TO SEE WHEN THE ELECTRICITY COST IS HIGH/LOW	SMART LIGHTS THAT IS TURNED ON/OFF DEPENDING ON PHYSICAL PRESENCE	OTHER	TOTAL
18-25	73.75% 59	11.25% 9	57.50% 46	40.00% 32	42.50% 34	53.75% 43	1.25% 1	142.68% 224
66 years or older	63.64% 49	42.86% 33	25.97% 20	23.38% 18	36.36% 28	58.44% 45	6.49% 5	126.11% 198
Total Respondents	108	42	66	50	62	88	6	157

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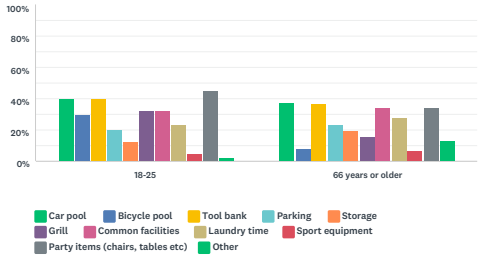
What is value creating for you?

Q9 What would you like to share with neighbors?

Answered: 157 Skipped: 0

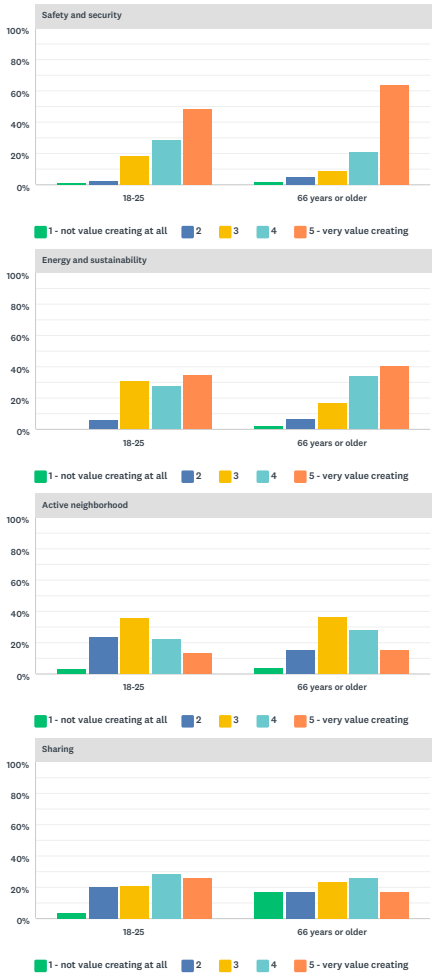


	CAR POOL	BICYCLE POOL	TOOL BANK	PARKING	STORAGE	GRILL	COMMON FACILITIES	LAUNDRY TIME	SPORT EQUIPMENT	PARTY ITEMS (CHAIRS, TABLES ETC)	OTHER	TOTAL
18-25	40.00% 32	30.00% 24	40.00% 32	20.00% 16	12.50% 10	32.50% 26	32.50% 26	23.75% 19	5.00% 4	45.00% 36	2.50% 2	144.59% 227
66 years or older	37.66% 29	7.79% 6	36.36% 28	23.38% 18	19.48% 15	15.58% 12	33.77% 26	27.27% 21	6.49% 5	33.77% 26	12.99% 10	124.84% 196
Total Respondents	61	30	60	34	25	38	52	40	9	62	12	157

What is value creating for you?

Q10 How value creating are the following categories?

Answered: 157 Skipped: 0



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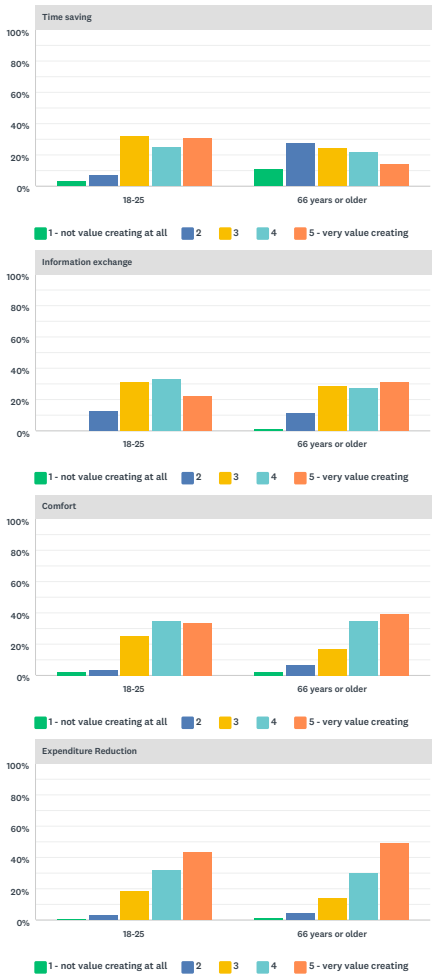
What is value creating for you?



Safety and security	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	1.25% 1	2.50% 2	18.75% 15	28.75% 23	48.75% 39	50.96% 80	4.21
66 years or older	1.30% 1	5.19% 4	9.09% 7	20.78% 16	63.64% 49	49.04% 77	4.40

Energy and sustainability	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	0.00% 0	6.25% 5	31.25% 25	27.50% 22	35.00% 28	50.96% 80	3.91
66 years or older	2.60% 2	6.49% 5	16.88% 13	33.77% 26	40.26% 31	49.04% 77	4.03

Active neighborhood	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	3.75% 3	23.75% 19	36.25% 29	22.50% 18	13.75% 11	50.96% 80	3.19
66 years or older	3.90% 3	15.58% 12	36.36% 28	28.57% 22	15.58% 12	49.04% 77	3.36

What is value creating for you?

Sharing							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	3.75% 3	20.00% 16	21.25% 17	28.75% 23	26.25% 21	50.96% 80	3.54
66 years or older	16.88% 13	16.88% 13	23.38% 18	25.97% 20	16.88% 13	49.04% 77	3.09

Time saving							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	3.75% 3	7.50% 6	32.50% 26	25.00% 20	31.25% 25	50.96% 80	3.73
66 years or older	11.69% 9	27.27% 21	24.68% 19	22.08% 17	14.29% 11	49.04% 77	3.00

Information exchange							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	0.00% 0	12.50% 10	31.25% 25	33.75% 27	22.50% 18	50.96% 80	3.66
66 years or older	1.30% 1	11.69% 9	28.57% 22	27.27% 21	31.17% 24	49.04% 77	3.75

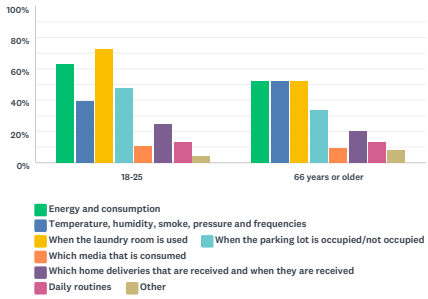
Comfort							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	2.50% 2	3.75% 3	25.00% 20	35.00% 28	33.75% 27	50.96% 80	3.94
66 years or older	2.60% 2	6.49% 5	16.88% 13	35.06% 27	38.96% 30	49.04% 77	4.01

Expenditure Reduction							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
18-25	1.25% 1	3.75% 3	18.75% 15	32.50% 26	43.75% 35	50.96% 80	4.14
66 years or older	1.30% 1	5.19% 4	14.29% 11	29.87% 23	49.35% 38	49.04% 77	4.21

What is value creating for you?

Q11 Which of the following types of user data would you share in order to receive better service?

Answered: 150 Skipped: 7



	ENERGY AND CONSUMPTION	TEMPERATURE, HUMIDITY, SMOKE, PRESSURE AND FREQUENCIES	WHEN THE LAUNDRY ROOM IS USED	WHEN THE PARKING LOT IS OCCUPIED/NOT OCCUPIED	WHICH MEDIA THAT IS CONSUMED	WHICH HOME DELIVERIES THAT ARE RECEIVED AND WHEN THEY ARE RECEIVED	DAILY ROUTINES	OTHER	TOTAL
18-25	63.16% 48	39.47% 30	72.37% 55	47.37% 36	10.53% 8	25.00% 19	13.16% 10	3.95% 3	139.33% 209
66 years or older	52.70% 39	52.70% 39	52.70% 39	33.78% 25	9.46% 7	20.27% 15	13.51% 10	8.11% 6	120.00% 180
Total Respondents	87	69	94	61	15	34	20	9	150

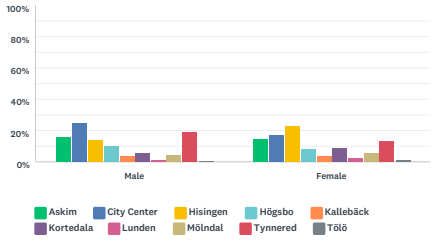
E

Appendix - Survey Answers, Gender differences

What is value creating for you?

Q1 I live in:

Answered: 913 Skipped: 0

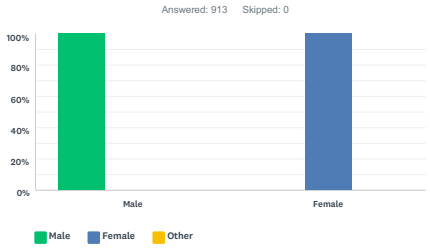


	ASKIM	CITY CENTER	HISINGEN	HÖGSBO	KALLEBÄCK	KORTEDALA	LUNDEN	MÖLNDAL	TYNNERED	TÖLÖ	TOTAL
Male	16.16% 53	25.00% 82	14.02% 46	9.76% 32	3.96% 13	6.10% 20	1.22% 4	4.27% 14	18.90% 62	0.61% 2	35.93% 328
Female	14.70% 86	17.61% 103	23.25% 136	8.03% 47	4.10% 24	8.89% 52	2.74% 16	5.81% 34	13.50% 79	1.37% 8	64.07% 585
Total Respondents	139	185	182	79	37	72	20	48	141	10	913

What is value creating for you?

Q2 Gender:

Answered: 913 Skipped: 0



	MALE	FEMALE	OTHER	TOTAL
Male	100.00% 328	0.00% 0	0.00% 0	35.93% 328
Female	0.00% 0	100.00% 585	0.00% 0	64.07% 585
Total Respondents	328	585	0	913

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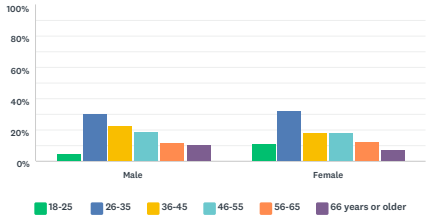
What is value creating for you?

Q3 Age

Answered: 913 Skipped: 0



	18-25	26-35	36-45	46-55	56-65	66 YEARS OR OLDER	TOTAL
Male	4.57% 15	30.49% 100	23.17% 76	19.21% 63	12.20% 40	10.37% 34	35.93% 328
Female	11.11% 65	32.48% 190	18.63% 109	18.12% 106	12.31% 72	7.35% 43	64.07% 585
Total Respondents	80	290	185	169	112	77	913

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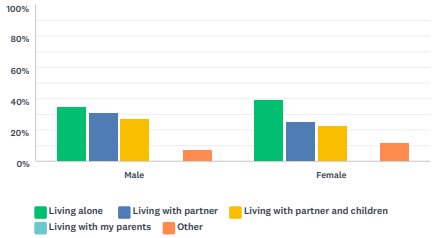
What is value creating for you?

Q4 Current living situation

Answered: 913 Skipped: 0

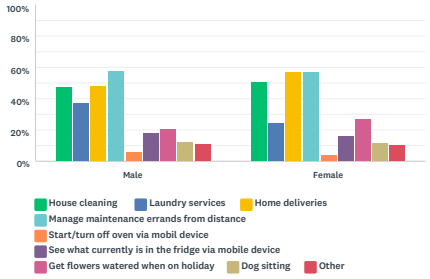


	LIVING ALONE	LIVING WITH PARTNER	LIVING WITH PARTNER AND CHILDREN	LIVING WITH MY PARENTS	OTHER	TOTAL
Male	34.76% 114	30.79% 101	27.13% 89	0.00% 0	7.32% 24	35.93% 328
Female	38.97% 228	25.64% 150	23.08% 135	0.17% 1	12.14% 71	64.07% 585
Total Respondents	342	251	224	1	95	913

What is value creating for you?

Q5 Services

Answered: 913 Skipped: 0



	HOUSE CLEANING	LAUNDRY SERVICES	HOME DELIVERIES	MANAGE MAINTENANCE ERRANDS FROM DISTANCE	START/TURN OFF OVEN VIA MOBIL DEVICE	SEE WHAT CURRENTLY IS IN THE FRIDGE VIA MOBILE DEVICE	GET FLOWERS WATERED WHEN ON HOLIDAY	DOG SITTING	OTHER	TOTAL
Male	47.56% 156	37.50% 123	48.17% 158	57.93% 190	5.79% 19	18.29% 60	20.73% 68	12.50% 41	11.28% 37	93.32% 852
Female	50.94% 298	24.27% 142	57.26% 335	57.26% 335	4.10% 24	15.90% 93	27.18% 159	11.97% 70	10.60% 62	166.27% 1,518
Total Respondents	454	265	493	525	43	153	227	111	99	913

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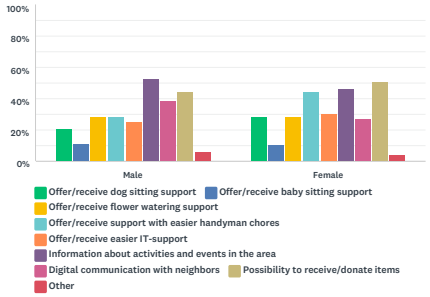
What is value creating for you?

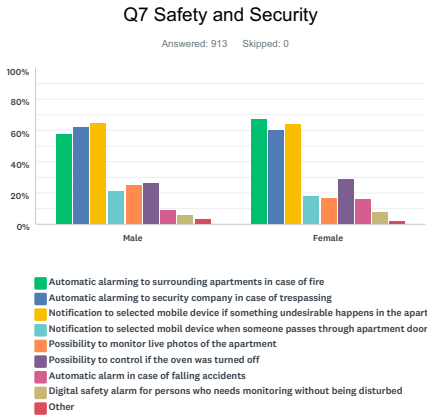
Q6 Active Neighborhood

Answered: 913 Skipped: 0



	OFFER/RECEIVE DOG SITTING SUPPORT	OFFER/RECEIVE BABY SITTING SUPPORT	OFFER/RECEIVE FLOWER WATERING SUPPORT	OFFER/RECEIVE SUPPORT WITH EASIER HANDYMAN CHORES	OFFER/RECEIVE EASIER IT-SUPPORT	INFORMATION ABOUT ACTIVITIES AND EVENTS IN THE AREA	DIGITAL COMMUNICATION WITH NEIGHBORS	POSSIBILITY TO RECEIVE/DONATE ITEMS
Male	21.04% 69	11.28% 37	28.66% 94	28.35% 93	25.61% 84	53.05% 174	38.72% 127	44.51% 146
Female	28.38% 166	10.43% 61	28.38% 166	44.62% 261	30.26% 177	46.67% 273	27.18% 159	50.94% 298
Total Respondents	235	98	260	354	261	447	286	444

What is value creating for you?

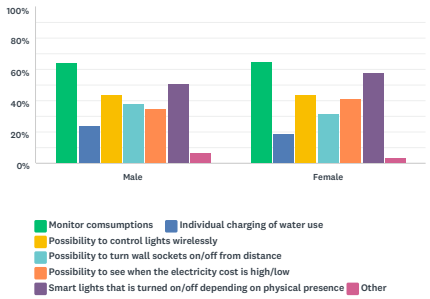


	AUTOMATIC ALARMING TO SURROUNDING APARTMENTS IN CASE OF FIRE	AUTOMATIC ALARMING TO SECURITY COMPANY IN CASE OF TRESPASSING	NOTIFICATION TO SELECTED MOBILE DEVICE IF SOMETHING UNDESIRABLE HAPPENS IN THE APARTMENT	NOTIFICATION TO SELECTED MOBIL DEVICE WHEN SOMEONE PASSES THROUGH APARTMENT DOOR	POSSIBILITY TO MONITOR LIVE PHOTOS OF THE APARTMENT	POSSIBILITY TO CONTROL IF THE OVEN WAS TURNED OFF	AUTOMATIC ALARM IN CASE OF FALLING ACCIDENTS	DIGITAL SAFETY ALARM FOR PERSONS WHO NEEDS MONITORING WITHOUT BEING DISTURBED	OTHER	TOTAL
Male	58.23% 191	62.50% 205	64.94% 213	21.34% 70	25.00% 82	26.52% 87	9.15% 30	5.79% 19	3.35% 11	99.45% 908
Female	67.35% 394	60.51% 354	63.93% 374	18.63% 109	16.75% 98	28.89% 169	16.07% 94	8.21% 48	2.56% 15	181.27% 1,655
Total Respondents	585	559	587	179	180	256	124	67	26	913

What is value creating for you?

Q8 Energy and Sustainability

Answered: 913 Skipped: 0

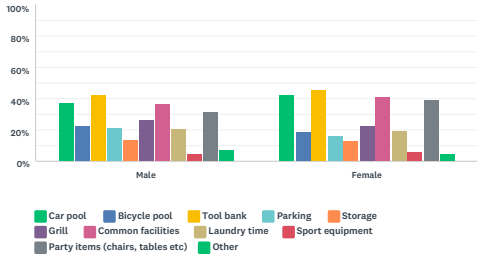


	MONITOR COMSUMPTIONS	INDIVIDUAL CHARGING OF WATER USE	POSSIBILITY TO CONTROL LIGHTS WIRELESSLY	POSSIBILITY TO TURN WALL SOCKETS ON/OFF FROM DISTANCE	POSSIBILITY TO SEE WHEN THE ELECTRICITY COST IS HIGH/LOW	SMART LIGHTS THAT IS TURNED ON/OFF DEPENDING ON PHYSICAL PRESENCE	OTHER	TOTAL
Male	64.02% 210	23.78% 78	44.21% 145	37.80% 124	34.76% 114	51.22% 168	6.71% 22	94.30% 861
Female	64.96% 380	18.97% 111	43.59% 255	31.28% 183	40.85% 239	57.78% 338	3.59% 21	167.25% 1,527
Total Respondents	590	189	400	307	353	506	43	913

What is value creating for you?

Q9 What would you like to share with neighbors?

Answered: 913 Skipped: 0



	CAR POOL	BICYCLE POOL	TOOL BANK	PARKING	STORAGE	GRILL	COMMON FACILITIES	LAUNDRY TIME	SPORT EQUIPMENT	PARTY ITEMS (CHAIRS, TABLES ETC)	OTHER	TOTAL
Male	37.50% 123	22.56% 74	42.68% 140	21.65% 71	13.41% 44	26.52% 87	36.59% 120	20.73% 68	5.18% 17	31.40% 103	7.62% 25	95.51% 872
Female	42.39% 248	19.15% 112	46.15% 270	16.41% 96	12.82% 75	23.08% 135	41.03% 240	19.49% 114	5.81% 34	38.97% 228	4.79% 28	173.06% 1,580
Total Respondents	371	186	410	167	119	222	360	182	51	331	53	913

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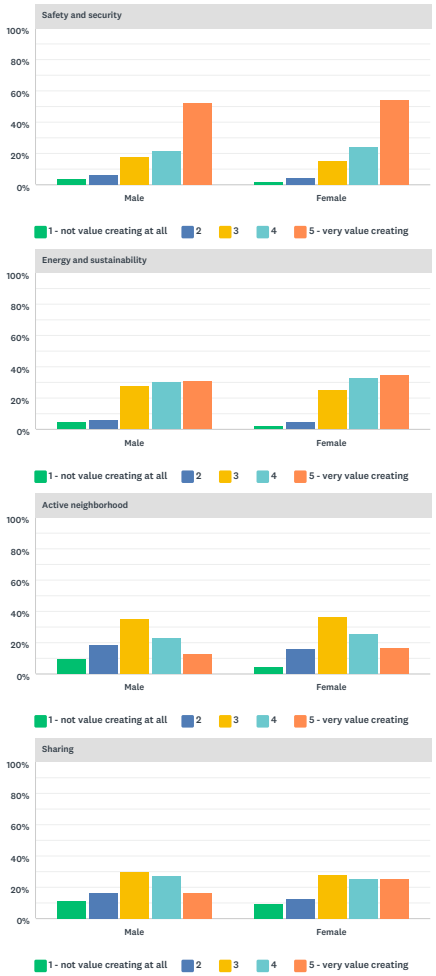
What is value creating for you?

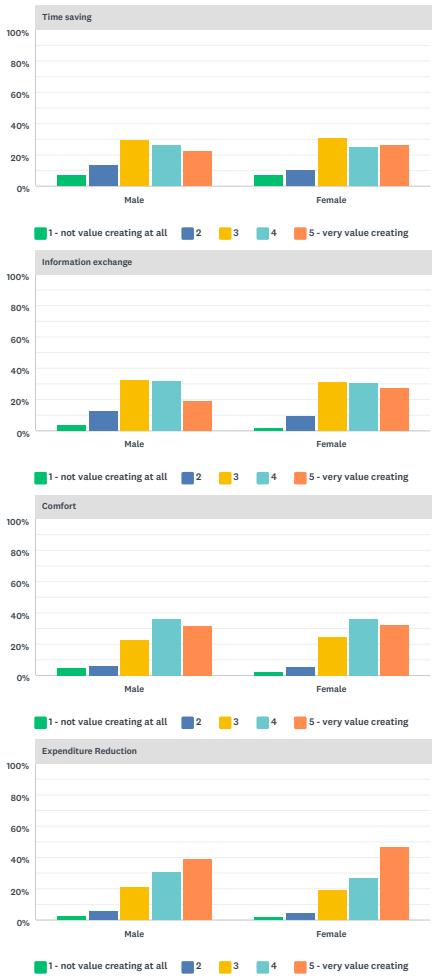
Q10 How value creating are the following categories?

Answered: 913 Skipped: 0



10 / 13

What is value creating for you?



Safety and security

	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Male	3.35% 11	5.79% 19	17.68% 58	21.34% 70	51.83% 170	35.93% 328	4.13
Female	2.05% 12	4.27% 25	15.21% 89	23.93% 140	54.53% 319	64.07% 585	4.25

Energy and sustainability

	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Male	4.57% 15	6.10% 20	28.05% 92	30.49% 100	30.79% 101	35.93% 328	3.77
Female	2.56% 15	4.44% 26	25.13% 147	32.82% 192	35.04% 205	64.07% 585	3.93

Active neighborhood

	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Male	9.45% 31	19.21% 63	35.37% 116	22.87% 75	13.11% 43	35.93% 328	3.11
Female	4.44% 26	15.90% 93	36.58% 214	25.98% 152	17.09% 100	64.07% 585	3.35

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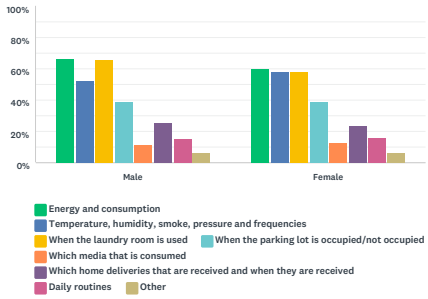
What is value creating for you?

	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Sharing							
Male	10.98% 36	15.85% 52	30.18% 99	26.83% 88	16.16% 53	35.93% 328	3.21
Female	9.06% 53	12.31% 72	28.03% 164	25.64% 150	24.96% 146	64.07% 585	3.45
Time saving							
Male	7.62% 25	14.02% 46	29.27% 96	26.52% 87	22.56% 74	35.93% 328	3.42
Female	7.35% 43	10.26% 60	30.94% 181	25.13% 147	26.32% 154	64.07% 585	3.53
Information exchange							
Male	3.35% 11	12.80% 42	32.62% 107	32.01% 105	19.21% 63	35.93% 328	3.51
Female	1.88% 11	9.57% 56	30.77% 180	30.43% 178	27.35% 160	64.07% 585	3.72
Comfort							
Male	4.27% 14	5.79% 19	22.56% 74	35.98% 118	31.40% 103	35.93% 328	3.84
Female	2.22% 13	5.30% 31	24.27% 142	35.90% 210	32.31% 189	64.07% 585	3.91
Expenditure Reduction							
Male	2.44% 8	6.10% 20	21.34% 70	30.79% 101	39.33% 129	35.93% 328	3.98
Female	2.05% 12	4.44% 26	19.66% 115	27.01% 158	46.84% 274	64.07% 585	4.12

What is value creating for you?

Q11 Which of the following types of user data would you share in order to receive better service?

Answered: 844 Skipped: 69



	ENERGY AND CONSUMPTION	TEMPERATURE, HUMIDITY, SMOKE, PRESSURE AND FREQUENCIES	WHEN THE LAUNDRY ROOM IS USED	WHEN THE PARKING LOT IS OCCUPIED/NOT OCCUPIED	WHICH MEDIA THAT IS CONSUMED	WHICH HOME DELIVERIES THAT ARE RECEIVED AND WHEN THEY ARE RECEIVED	DAILY ROUTINES	OTHER	TOTAL
Male	66.12% 203	52.44% 161	65.47% 201	38.44% 118	11.40% 35	25.41% 78	14.98% 46	6.19% 19	102.01% 861
Female	60.15% 323	58.10% 312	57.91% 311	38.92% 209	12.66% 68	23.28% 125	15.83% 85	6.52% 35	173.93% 1,468
Total Respondents	526	473	512	327	103	203	131	54	844

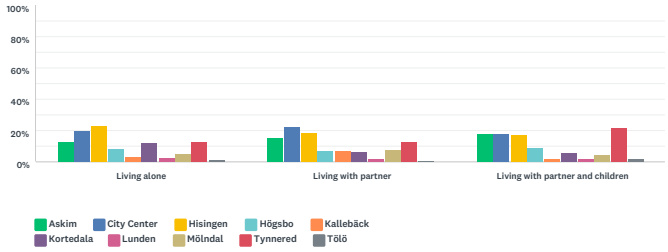
F

Appendix - Survey Answers, differences in Living Situation

What is value creating for you?

Q1 I live in:

Answered: 821 Skipped: 0

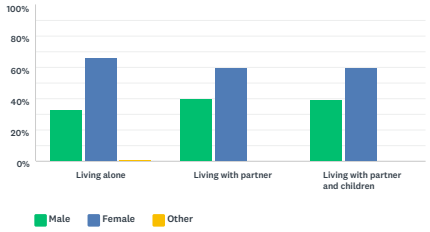


	ASKIM	CITY CENTER	HISINGEN	HÖGSBO	KALLEBÄCK	KORTEDALA	LUNDEN	MÖLNDAL	TYNNERED	TÖLÖ	TOTAL
Living alone	12.46% 43	19.42% 67	22.90% 79	8.41% 29	3.48% 12	11.88% 41	2.32% 8	4.93% 17	12.75% 44	1.45% 5	42.02% 345
Living with partner	15.54% 39	22.71% 57	18.73% 47	7.17% 18	6.77% 17	6.37% 16	1.99% 5	7.57% 19	12.75% 32	0.40% 1	30.57% 251
Living with partner and children	18.22% 41	18.22% 41	16.89% 38	8.89% 20	2.22% 5	5.78% 13	2.22% 5	4.44% 10	21.33% 48	1.78% 4	27.41% 225
Total Respondents	123	165	164	67	34	70	18	46	124	10	821

What is value creating for you?

Q2 Gender:

Answered: 821 Skipped: 0



	MALE	FEMALE	OTHER	TOTAL
Living alone	33.04% 114	66.09% 228	0.87% 3	42.02% 345
Living with partner	40.24% 101	59.76% 150	0.00% 0	30.57% 251
Living with partner and children	39.56% 89	60.00% 135	0.44% 1	27.41% 225
Total Respondents	304	513	4	821

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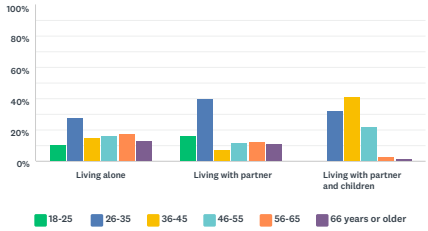
What is value creating for you?

Q3 Age

Answered: 821 Skipped: 0



	18-25	26-35	36-45	46-55	56-65	66 YEARS OR OLDER	TOTAL
Living alone	10.72% 37	27.83% 96	14.78% 51	16.23% 56	17.68% 61	12.75% 44	42.02% 345
Living with partner	15.94% 40	40.24% 101	7.57% 19	11.95% 30	12.75% 32	11.55% 29	30.57% 251
Living with partner and children	0.44% 1	32.44% 73	40.89% 92	21.78% 49	3.11% 7	1.33% 3	27.41% 225
Total Respondents	78	270	162	135	100	76	821

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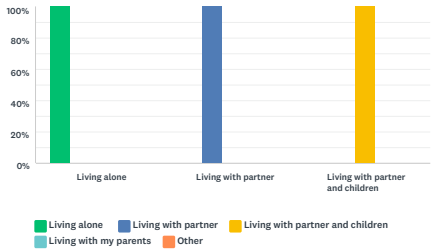
What is value creating for you?

Q4 Current living situation

Answered: 821 Skipped: 0



	LIVING ALONE	LIVING WITH PARTNER	LIVING WITH PARTNER AND CHILDREN	LIVING WITH MY PARENTS	OTHER	TOTAL
Living alone	100.00% 345	0.00% 0	0.00% 0	0.00% 0	0.00% 0	42.02% 345
Living with partner	0.00% 0	100.00% 251	0.00% 0	0.00% 0	0.00% 0	30.57% 251
Living with partner and children	0.00% 0	0.00% 0	100.00% 225	0.00% 0	0.00% 0	27.41% 225
Total Respondents	345	251	225	0	0	821

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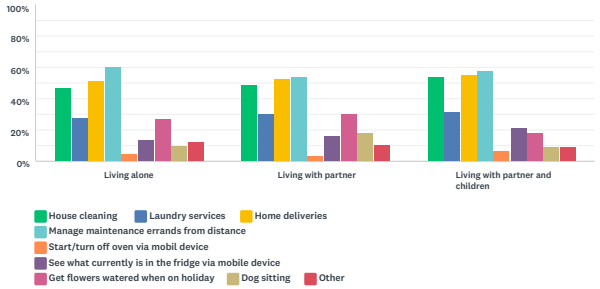
What is value creating for you?

Q5 Services

Answered: 821 Skipped: 0



	HOUSE CLEANING	LAUNDRY SERVICES	HOME DELIVERIES	MANAGE MAINTENANCE ERRANDS FROM DISTANCE	START/TURN OFF OVEN VIA MOBIL DEVICE	SEE WHAT CURRENTLY IS IN THE FRIDGE VIA MOBILE DEVICE	GET FLOWERS WATERED WHEN ON HOLIDAY	DOG SITTING	OTHER	TOTAL
Living alone	47.25% 163	27.83% 96	51.59% 178	60.58% 209	4.93% 17	13.62% 47	26.96% 93	9.86% 34	12.46% 43	107.19% 880
Living with partner	49.00% 123	30.28% 76	52.59% 132	53.78% 135	3.59% 9	16.73% 42	30.68% 77	17.93% 45	10.36% 26	81.00% 665
Living with partner and children	54.22% 122	31.56% 71	55.56% 125	57.78% 130	7.11% 16	21.33% 48	18.22% 41	9.33% 21	8.89% 20	72.35% 594
Total Respondents	408	243	435	474	42	137	211	100	89	821

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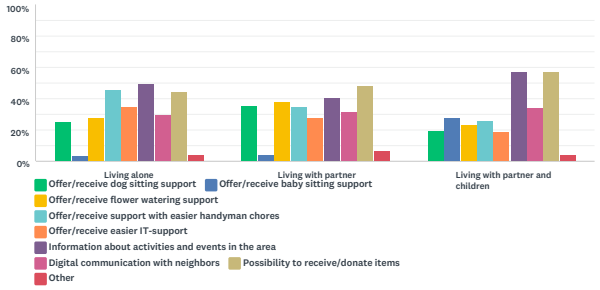
What is value creating for you?

Q6 Active Neighborhood

Answered: 821 Skipped: 0



	OFFER/RECEIVE DOG SITTING SUPPORT	OFFER/RECEIVE BABY SITTING SUPPORT	OFFER/RECEIVE FLOWER WATERING SUPPORT	OFFER/RECEIVE SUPPORT WITH EASIER HANDYMAN CHORES	OFFER/RECEIVE EASIER IT-SUPPORT	INFORMATION ABOUT ACTIVITIES AND EVENTS IN THE AREA	DIGITAL COMMUNICATION WITH NEIGHBORS	POSSIBILITY TO RECEIVE/DONATE ITEMS
Living alone	24.93% 86	3.48% 12	27.54% 95	45.51% 157	35.07% 121	49.28% 170	29.86% 103	44.64% 154
Living with partner	35.46% 89	3.98% 10	37.85% 95	35.06% 88	27.49% 69	40.64% 102	31.47% 79	47.81% 120
Living with partner and children	19.56% 44	28.00% 63	23.56% 53	26.22% 59	19.11% 43	57.33% 129	34.22% 77	56.89% 128
Total Respondents	219	85	243	304	233	401	259	402

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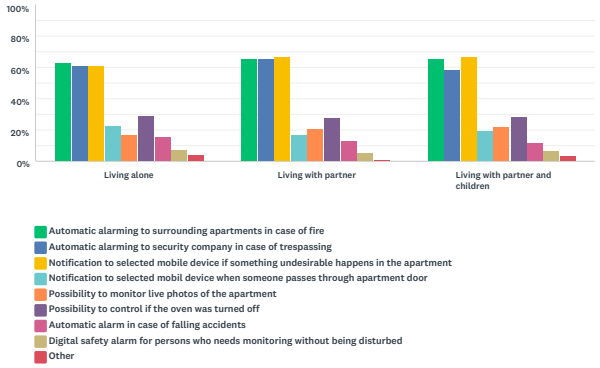
What is value creating for you?

Q7 Safety and Security

Answered: 821 Skipped: 0



	AUTOMATIC ALARMING TO SURROUNDING APARTMENTS IN CASE OF FIRE	AUTOMATIC ALARMING TO SECURITY COMPANY IN CASE OF TRESPASSING	NOTIFICATION TO SELECTED MOBILE DEVICE IF SOMETHING UNDESIRABLE HAPPENS IN THE APARTMENT	NOTIFICATION TO SELECTED MOBIL DEVICE WHEN SOMEONE PASSES THROUGH APARTMENT DOOR	POSSIBILITY TO MONITOR LIVE PHOTOS OF THE APARTMENT	POSSIBILITY TO CONTROL IF THE OVEN WAS TURNED OFF	AUTOMATIC ALARM IN CASE OF FALLING ACCIDENTS	DIGITAL SAFETY ALARM FOR PERSONS WHO NEEDS MONITORING WITHOUT BEING DISTURBED	OTHER	TOTAL
Living alone	62.90% 217	60.87% 210	60.87% 210	22.61% 78	16.81% 58	28.99% 100	15.65% 54	7.54% 26	3.77% 13	117.66% 966
Living with partner	65.74% 165	65.74% 165	66.93% 168	17.13% 43	20.72% 52	27.49% 69	13.15% 33	5.58% 14	1.20% 3	86.72% 712
Living with partner and children	65.33% 147	58.67% 132	67.11% 151	19.56% 44	21.78% 49	28.44% 64	12.00% 27	7.11% 16	3.56% 8	77.71% 638
Total Respondents	529	507	529	165	159	233	114	56	24	821

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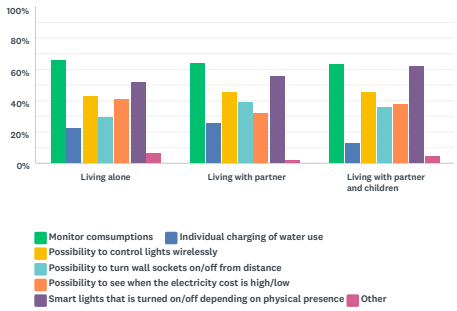
What is value creating for you?

Q8 Energy and Sustainability

Answered: 821 Skipped: 0



	MONITOR COMSUMPTIONS	INDIVIDUAL CHARGING OF WATER USE	POSSIBILITY TO CONTROL LIGHTS WIRELESSLY	POSSIBILITY TO TURN WALL SOCKETS ON/OFF FROM DISTANCE	POSSIBILITY TO SEE WHEN THE ELECTRICITY COST IS HIGH/LOW	SMART LIGHTS THAT IS TURNED ON/OFF DEPENDING ON PHYSICAL PRESENCE	OTHER	TOTAL
Living alone	65.80% 227	22.32% 77	42.90% 148	29.57% 102	41.45% 143	51.88% 179	6.67% 23	109.50% 899
Living with partner	64.54% 162	25.90% 65	45.42% 114	39.04% 98	32.67% 82	56.18% 141	2.39% 6	81.36% 668
Living with partner and children	63.56% 143	12.89% 29	45.78% 103	36.00% 81	38.22% 86	62.22% 140	4.44% 10	72.11% 592
Total Respondents	532	171	365	281	311	460	39	821

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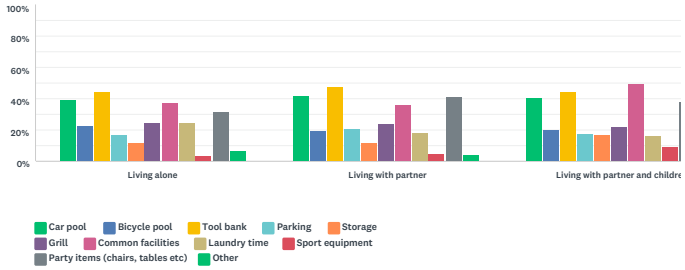
What is value creating for you?

Q9 What would you like to share with neighbors?

Answered: 821 Skipped: 0



	CAR POOL	BICYCLE POOL	TOOL BANK	PARKING	STORAGE	GRILL	COMMON FACILITIES	LAUNDRY TIME	SPORT EQUIPMENT	PARTY ITEMS (CHAIRS, TABLES ETC)	OTHER	TOTAL
Living alone	38.84% 134	22.90% 79	44.35% 153	17.10% 59	11.88% 41	24.35% 84	37.68% 130	24.35% 84	3.48% 12	31.30% 108	7.25% 25	110.72% 909
Living with partner	42.23% 106	19.52% 49	47.41% 119	20.72% 52	11.95% 30	23.90% 60	35.86% 90	17.93% 45	5.18% 13	41.04% 103	3.98% 10	82.46% 677
Living with partner and children	40.44% 91	20.00% 45	44.44% 100	17.33% 39	16.89% 38	21.78% 49	49.33% 111	16.44% 37	9.33% 21	37.78% 85	5.33% 12	76.49% 628
Total Respondents	331	173	372	150	109	193	331	166	46	296	47	821

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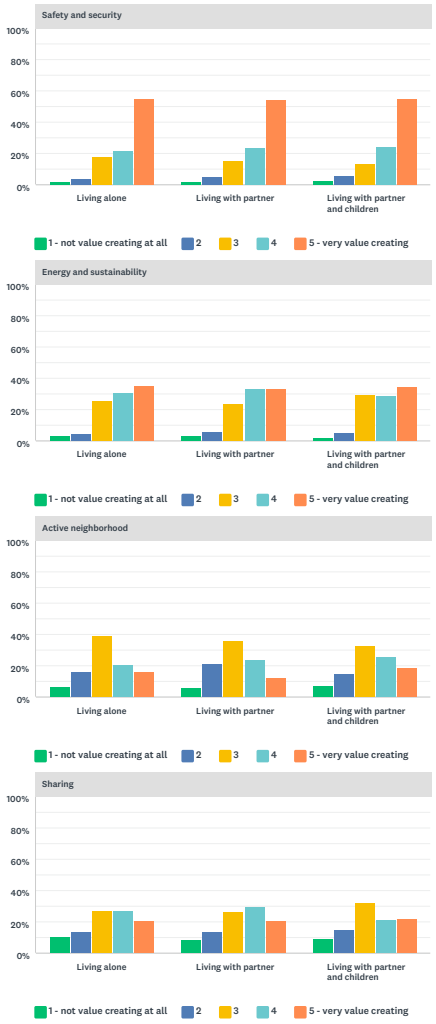
What is value creating for you?

Q10 How value creating are the following categories?

Answered: 821 Skipped: 0



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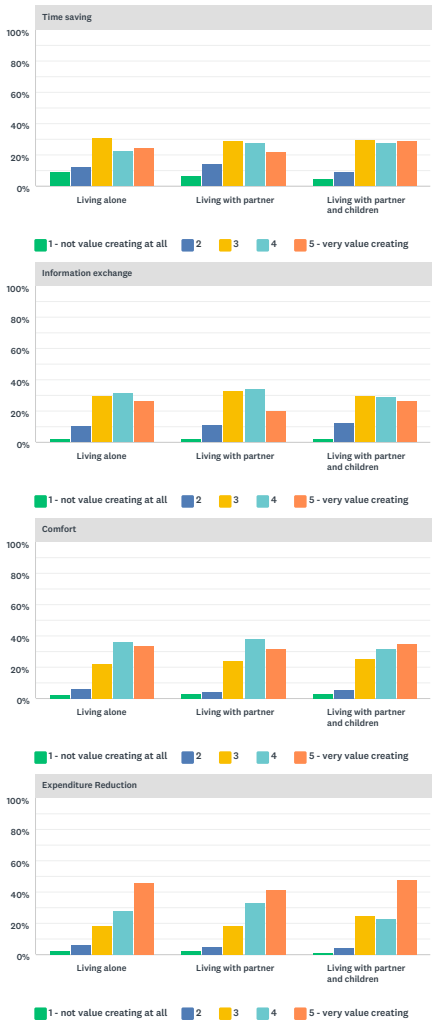
What is value creating for you?



Safety and security

	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	1.45% 5	4.06% 14	17.97% 62	21.74% 75	54.78% 189	42.02% 345	4.24
Living with partner	1.99% 5	5.18% 13	15.14% 38	23.51% 59	54.18% 136	30.57% 251	4.23
Living with partner and children	2.67% 6	5.33% 12	12.89% 29	24.00% 54	55.11% 124	27.41% 225	4.24

Energy and sustainability

	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	3.48% 12	4.64% 16	25.51% 88	30.72% 106	35.65% 123	42.02% 345	3.90
Living with partner	3.59% 9	5.58% 14	23.90% 60	33.47% 84	33.47% 84	30.57% 251	3.88

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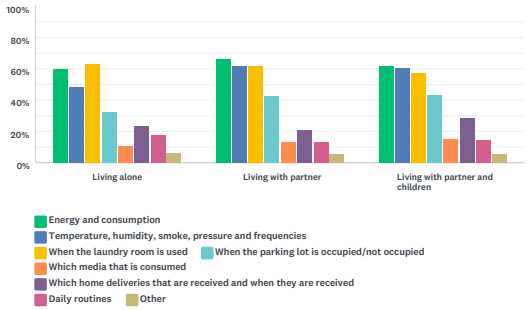
What is value creating for you?

Living with partner and children	2.22% 5	4.89% 11	29.33% 66	28.89% 65	34.67% 78	27.41% 225	3.89
Active neighborhood							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	6.38% 22	16.52% 57	39.42% 136	21.16% 73	16.52% 57	42.02% 345	3.25
Living with partner	5.98% 15	21.51% 54	35.86% 90	23.90% 60	12.75% 32	30.57% 251	3.16
Living with partner and children	7.11% 16	15.11% 34	32.89% 74	26.22% 59	18.67% 42	27.41% 225	3.34
Sharing							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	10.43% 36	14.20% 49	26.96% 93	27.25% 94	21.16% 73	42.02% 345	3.34
Living with partner	8.37% 21	13.94% 35	26.69% 67	29.88% 75	21.12% 53	30.57% 251	3.41
Living with partner and children	9.33% 21	15.11% 34	32.00% 72	21.33% 48	22.22% 50	27.41% 225	3.32
Time saving							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	8.99% 31	12.46% 43	31.01% 107	23.19% 80	24.35% 84	42.02% 345	3.41
Living with partner	6.77% 17	14.74% 37	29.08% 73	27.49% 69	21.91% 55	30.57% 251	3.43
Living with partner and children	4.89% 11	9.33% 21	29.33% 66	27.56% 62	28.89% 65	27.41% 225	3.66
Information exchange							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	2.32% 8	10.72% 37	29.28% 101	31.30% 108	26.38% 91	42.02% 345	3.69
Living with partner	1.99% 5	10.76% 27	33.07% 83	34.26% 86	19.92% 50	30.57% 251	3.59
Living with partner and children	1.78% 4	12.44% 28	30.22% 68	28.89% 65	26.67% 60	27.41% 225	3.66
Comfort							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	2.61% 9	5.80% 20	22.03% 76	36.23% 125	33.33% 115	42.02% 345	3.92
Living with partner	2.79% 7	3.98% 10	23.90% 60	37.85% 95	31.47% 79	30.57% 251	3.91
Living with partner and children	3.11% 7	5.33% 12	24.89% 56	31.56% 71	35.11% 79	27.41% 225	3.90
Expenditure Reduction							
	1 - NOT VALUE CREATING AT ALL	2	3	4	5 - VERY VALUE CREATING	TOTAL	WEIGHTED AVERAGE
Living alone	2.32% 8	5.80% 20	18.55% 64	27.83% 96	45.51% 157	42.02% 345	4.08
Living with partner	2.39% 6	4.78% 12	18.33% 46	33.07% 83	41.43% 104	30.57% 251	4.06
Living with partner and children	0.89% 2	4.44% 10	24.44% 55	22.67% 51	47.56% 107	27.41% 225	4.12

What is value creating for you?

Q11 Which of the following types of user data would you share in order to receive better service?

Answered: 762 Skipped: 59



	ENERGY AND CONSUMPTION	TEMPERATURE, HUMIDITY, SMOKE, PRESSURE AND FREQUENCIES	WHEN THE LAUNDRY ROOM IS USED	WHEN THE PARKING LOT IS OCCUPIED/NOT OCCUPIED	WHICH MEDIA THAT IS CONSUMED	WHICH HOME DELIVERIES THAT ARE RECEIVED AND WHEN THEY ARE RECEIVED	DAILY ROUTINES	OTHER	TOTAL
Living alone	60.06% 191	48.74% 155	63.21% 201	32.70% 104	10.69% 34	23.27% 74	17.92% 57	6.60% 21	109.84% 837
Living with partner	66.53% 157	61.44% 145	61.86% 146	42.37% 100	13.14% 31	21.19% 50	13.56% 32	5.51% 13	88.45% 674
Living with partner and children	61.54% 128	60.58% 126	57.69% 120	43.27% 90	14.90% 31	28.37% 59	14.42% 30	5.29% 11	78.08% 595
Total Respondents	476	426	467	294	96	183	119	45	762

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