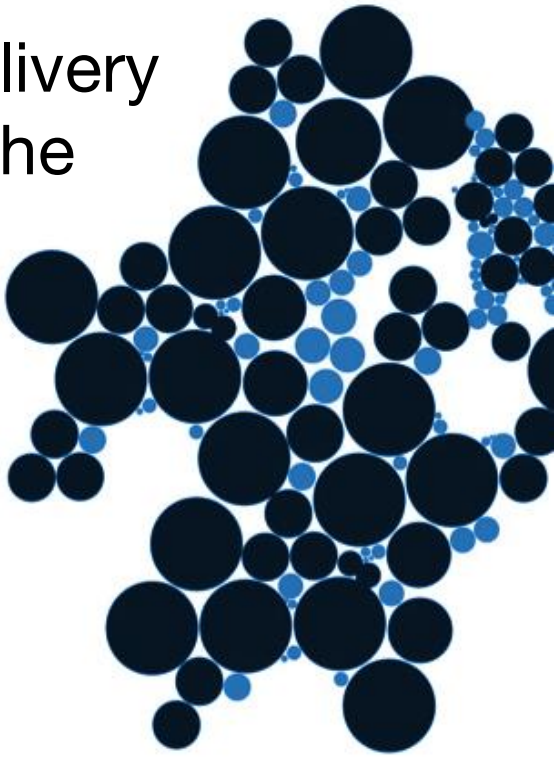
MASTER THESIS

Adoption of Smart Lock Delivery in the E-grocery Market in the Netherlands



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In front of you is my thesis which is the final piece for the completion of my master Business Administration at the University of Twente. A year in which I followed the specialization track: Entrepreneurship, Innovation and Strategy with great interest resulting in a great ambition: becoming a corporate innovator who seeks for opportunities to make sustainable change. Without this master I would not have the theoretical knowledge to succeed in the practical field to pursue this goal.

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Abstract

The e-grocery market in the Netherlands is struggling to find a profitable business model. Currently the favorable business model in the market, home delivery specific timeslot, is facing two major challenges: 'last mile' and 'high consumer delivery costs'. The literature proposes unattended delivery as an alternative business model what might tackle these challenges. This research explores the potential adoption rate of one of the solutions within unattended delivery: smart lock delivery. Based on the Behavioral Reasoning Theory a study is performed to seek for the factors enabling and reject e-grocery smart lock delivery. A survey (N=150) was conducted and analyzed in a Structural Equation Model. The findings present that the increase of convenience and flexibility are factors that lead to adoption whereas high potential installation costs, security issues and risk are factors that lead to resistance. These insights are extra valuable as turns out that concerning the concept e-grocery smart lock delivery, potential customers follow a well-considered decision path. Moreover, in general, it shows the importance of determining the enabling and rejecting factors towards new business models as it approves to be very valuable information and perhaps even key for a successful market-entry.

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1. INTRODUCTION

1.1 General Introduction

The online market for grocery shopping is rapidly expanding. More customers find their way to this market while more providers are participating in this market. The expectations for future of this market are that the market growth will continue (McKinsey & Company, 2017). The transition of the total market shares between offline and online markets took already place in other retail industries (e.g. fashion industry) and the prospects are that the food industry follows. Therefore, grocery firms are investing highly. However, they struggle to find the profitable business model (Hübner et al., 2016). Currently companies take losses for granted because they don't want to miss out. The growth is currently focused on gaining market share and strengthening customer loyalty rather than a question of profitability (Saskia et al., 2016).

Today, the common business model in the Dutch e-grocery market is that the groceries are delivered home in a chosen time slot picked by the customer (Hübner et al., 2016). The delivery of each specific order must be adapted to the chosen timeslot what results in half-empty vehicles driving inefficient routes and therefore raising delivery costs (Alberts & Frank, 2017). Besides this, the customer is required to be at home during the delivery time slot what is undesirable (Goethals et al., 2000) and shows the lack of flexibility for both supplier and customer. Considering the above issues of the supplier and customer, the so-called 'last-mile' could be seen as a bottleneck in the business model of online grocery shopping (Gevears et al., 2009; Hübner et al, 2016).

Also, Goethals et al. (2000) state that the current business model of e-grocery fails mainly because of the gap between the costs incurred by e-grocers and the willingness of customers to pay is too great and perhaps too fundamental. Consumers prioritize costs over service concerning groceries (Pan et al., 2017) and the current 'high' delivery costs are an obstacle for potential consumers. Considered that the grocery business is an industry with one of the leanest profit margins (5%) it seems inevitable that e-grocers have to charge delivery costs to limit losses (Aspray et al., 2013).

Briefly, we could state that the main challenge for e-grocers is to address to question of how to deliver the groceries to the customers in a way which benefits both parties that much, to succeed in a complete e-grocery business model. Concerning the previous mentioned high costs and the complexity of fulfilment for groceries bought online it is assumed that logistics will decide the future of e-grocery shopping (Saskia et al., 2016). In the literature the concept of unattended delivery is often suggested as a solution to the above addressed problems. The unattended delivery model should free both suppliers and customers from depending on a specific time-frame for the delivery and eliminates the need for redeliver including its associated costs (Punakivi & Saranen, 2001).

In the past, home attended delivery received much attention as well as instant delivery but unattended delivery is still not fully explored while the unattended delivery model is just as interesting to study from a customer, financial and environmental perspective (Liao et al., 2007). Due emerging technologies new opportunities of unattended delivery methods arise

and its overall potential increases (Lowe and Rigby, 2014; Ehmke and Campel, 2014; Iwan et al., 2016;). This paper evaluates the opportunities of the use of smart locks from a customer perspective within the field of unattended delivery.

Unattended delivery is often mentioned in the literature as a possible answer to the issues in the current business model regarding home delivery of groceries, actual research on the success and the potential of unattended delivery options are limited. The main reason for this is that the recent technological developments make new methods of unattended delivery possible. The most complex and promising one is the integration of smart locks in the delivery route. This paper explores and evaluates the use of smart locks as solution to unattended delivery from a customer perspective to determine the potential adoption of it. Besides, enlarging the knowledge on unattended delivery in the literature this paper adds another case-study, e-grocery delivery of smart-locks, of innovation adoption to the literature. This paper contributes to the literature on unattended delivery, the customers perceptions of it. Moreover, this paper is another example of how to use theories on innovation adoption to determine the adoption rate of an innovation in this case: smart locks for the delivery of groceries.

Next to the academic contribution of this paper practical implications are provided for business. A critical review of the current business model of online grocery shopping and research on unattended delivery could help e-grocers to improve their business model by enclosing or disclosing the use of smart locks. Furthermore, innovation managers and business developers could use this study as an example of how to determine potential adoption rate of new innovations by using the Behavioural Reasoning Theory following this example.

This paper is structured as follows. First, the central research question is stated. Second, an overview of the current literature on unattended delivery and in particular e-grocery smart lock delivery is given. Third, the research design of this research is described. Next the results and discussion of the findings are provided where after theoretical and managerial implications are drawn.

1.2 Central Research Question

To determine the potential of unattended delivery in the business model of home delivery of groceries we first study the suggested solution by literature, e-grocery smart lock delivery. This study sets a first by evaluating the opportunities of smart locks within unattended delivery in the e-grocery shopping market of the Netherlands from a consumer perspective. The central research we therefore address is:

What are the factors enabling and rejecting smart lock delivery adoption in the e-grocery market in the Netherlands?

In order to fully answer this question, we will use the following sub questions. The following sub questions will be used to answer the main research question:

1. What are the challenges of current business model of e-grocery delivery in the Netherlands?

2. What are the benefits of the suggested business model of e-grocery smart lock delivery?

3. In what way can we explore and determine the consumers adoption rate of e-grocery smart lock delivery?

4. What are the enabling factors for adoption of e-grocery smart lock delivery?
5. What are the rejecting factors for adoption of e-grocery smart lock delivery?

2. THEORITICAL FRAMEWORK

Developments of e-commerce have had a significant impact on food supply chains between supplier and customer the last decades. Today, many traditional grocery retailers offer their customers opportunities to purchase food items online and have them delivered to their home (Ogawara et al., 2003; Agatz et al., 2008). The key reasoning for offering e-grocery delivery is the emerging convenience for customers (Hand et al., 2009). Also, situational factors (e.g. young children, 60h working week) appear to be a good reason to order groceries online (Hand et al., 2009; Robinson et al., 2007). As earlier mentioned the e-grocery market will continue to expand and continue to innovate (McKinsey & Company, 2017).

2.1 Innovation and Business Models

Zott, Amit and Massa (2011) reviewed the recent literature on business models concluding that the literature is largely developed in silos, according to the interest of the respective researchers. However, they found four common themes among scholars of business models. First of all, the business model is emerging as a new unit of analysis. Second, business models emphasize a system-level, holistic approach to explaining how firms do business. Third, business model seeks to explain how value is created, not just how it is captured. And last, firm activities play an important role in the various conceptualizations of business that have been proposed.

Furthermore, Zott, Amit and Massa (2011) addresses the business model concept in the domains of innovation and technology management. The outcome of study reveals two complementary ideas. First, companies commercialize innovation ideas and new technologies through their business model. This also counts for new technologies confirm Chesbrough and Rosenbloom (2002) who argue that an important role of the business model is to unlock the value potential embedded in new technologies and convert these into market outcomes. Besides this, the business model represents a new subject of innovation, which complements the traditional product, process and organizational innovation. Also, it involves new forms of cooperation and collaboration. Johnson and Suskewicz (2009) argue that it key to shift the focus from developing individual technological innovations to developing technological innovations into whole new systems which could be represented by business models.

So, technological innovation is important for firms but it might suffice to guarantee firm success (Doganova & Eyquem-Renault, 2009). In order to embed the success of technological innovation, firms need to design unique business models to fully realize the commercial potential of technological innovations because technology per se has no inherent value (Chesbrough, 2007).

2.2 (Lean) Business Model Canvas

Scholars have recognized the value of business models as a tool for exploring new innovations and moreover a good way to analyze them (Osterwalder & Pigneur, 2010, Amitt & Zott, 2011). Based on research on several business model configurations Osterwalder and Pigneur (2010) developed the business model canvas which is a practical framework that equips firms and its

managers with a 'shared language for describing business models'' (Osterwalder & Pigneur, 2010, p.13). The business model canvas helps managers to design, analyze, understand, capture, change and communicate the business logics of the firm (Osterwalder, 2011). The business model canvas is a widely accepted approach to describe business model and perhaps the most common one which is used today by practitioners and researchers (Kaplan, 2012).

Osterwalder (2011) defines his canvas as a 'the rationale of how an organization creates, delivers and captures value' (p.106). The purpose of the canvas is the development of a business model by all departments in the organization in an understandable way. The business model canvas could be seen as a strategic scheme in which different structures, processes and systems of the firm are visualized and assigned to nine fundamental elements that show the logic of developing profit (Gierej, 2017). Appendix A shows a template. Those elements are: key partners, key activities, key resources cost structure, value proposition, revenue streams, channels, customer relationships and customer segments. Understand that the business model canvas is not a dogmatic framework but more of a starting point that could be modified or refined to depending specific business context, customer segments or technological solutions (Borseman et al., 2016). In the case of e-grocery smart lock delivery the approach of Maurya (2011) would be helpful to determine the business model.

Maurya (2011) adapted the business model canvas to the Lean Startup approach resulting in a Lean Business Model Canvas. The original strategy scheme of the business model canvas was converted in the spirit of the lean start up approach (Ries, 2012). This approach provides more focus to mitigate risk in new product, service and business development (Borseman et al., 2016). The lean Canvas appears to be better suited to address the multiple risks and uncertainties that are typical in the context of new technology startups than the Business Model Canvas. Therefore, the following trades were executed: (1) 'key partners' for 'problem', (2) 'key activities' for 'solution', (3) 'key resources' for 'key metrics' and 4) 'customer relationships' for 'unfair advantage'. Appendix B shows a template of the Lean Canvas.

2.3 E-grocery and Business Models

The online grocery business is a perplex venture as it requires high capital investments, fulfilment costs, delivery costs and price transparency (Hübner et al., 2016). Furthermore, a high variety of delivery options exists. A complete and successful business model is not there yet and perhaps will not arise. Moreover, several different business models have evolved serving specific customer segments in different geographical areas.
For example, home delivery under elderly is most preferred in the Netherlands whereas in France pick-up points are the most popular under young families (Palmer et al., 2000; Ehmke, 2012). This is just one example of the variety and geographical preference in business models of e-grocery shopping.

Today, the common business model in the Dutch e-grocery market is that the groceries are delivered home in a chosen time slot picked by the customer (Hübner et al., 2016). The delivery of each specific order must be adapted to the chosen timeslot what results in half-empty vehicles driving inefficient routes and therefore raising delivery costs (Alberts & Frank, 2017). Besides this, the customer is required to be home during the delivery time slot what is

undesirable (Goethals et al., 2000) and shows the lack of flexibility for both supplier and customer.

Although a variety in current business models exists they all face two challenges inseparable connected to each other: the last mile and high costs of delivery.

2.4 Last Mile

In e-grocery, the process of delivering food from the retailer storage point to a customers' home, plays a crucial role (Punakivi & Saranen, 2001). The costs of this so-called last-mile have a large impact on online grocery profit and/or losses and solving this could make online grocery more profitable than traditional grocery (McKinsey & Company, 2017). However, the last mile of home delivery of groceries creates the greatest logistical problems for retailers (Fernie et al., 2010).

Last mile delivery involves decisions related to delivery method, time, routes, presence of customer, drop density, geographical areas and the return of unwanted products (Saskia et al., 2016; Hübner et al., 2016) whereas one variable influences the other variable. For example, the use of time frames is contra dictionary. When no specific deliver time is assigned, home deliveries are marked by a so called ''not-at-home syndrome'' but when home delivery is assigned with a specific deliver time we speak of a 'ping-pong effect'. This effect increases economic and environmental costs through driven kilometres (Gaevers et al., 2009; Edwards et al., 2010; Hübner et al., 2013). This ping-pong effect is especially devastating for routes with a low drop density increasing delivery costs fast. Low consumer density lacks the advantages of economic of scale (De Marco et al., 2014).

We can conclude that three main issues the last-mile faces are: 1) home-deliveries: consumer not at home 2) lack of critical mass in a given region, due to an inadequate market density, 3) customers awareness of the environmental impact (Weberal et al., 2008; Saskia et al., 2016; Hübner et al., 2016).

2.5 Service vs. Price

In most of the current business models of e-grocery shopping the high costs of delivery are passed on to customers in the form of high delivery fees. However, these high delivery costs are an insurmountable barrier to many of the potential customers (Albertz & Frank, 2017). The trend of e-shopping to receive and return your packages for free makes the consumer spoiled. The delivery costs for groceries are unfairly compared to the delivery costs of normal packages by the consumers because the delivery process is not comparable (Albertz & Frank, 2017). The margins of groceries are must lower while the delivery process is more complex and therefore delivery costs much higher. Furthermore, consumers prioritize cost over service. A recent research shows that 70% of customers look for the cheapest home delivery while 20% really value speed (Dickey & Lewis, 2009). This is generalizable across various countries.

The costs of online grocery compared to traditional grocery in a supplier perspective are completely different. The main reason for this is that many of the online costs (picking and

delivery) are largely fixed (Goethals et al., 2012) and could even further increase when the previous last-mile issues arise. Reducing delivery costs has priority for many e-grocery retailers. Currently, delivery costs are around 10-12% of the basket value. Reducing this by -50% would increase the basket profitability by -5%, making it at least as profitable as traditional grocery (McKinsey & Company, 2017). Distance to distribution centre and drop density are the main levers that drive cost in the last mile. Changing these two makes delivery cheaper. Considering the bright prospects of e-grocery future it is expected that the cost of delivering groceries will become less expensive in the coming years (from 10 -12% to 5- 7%) in 2025 caused by drop density -20% (McKinsey & Company, 2017).

Where service is prioritized in retail the last decades and e-grocery shopping is in fact a 'service', price perception of customers is always present (Goethals et al., 2012). From the above studies we can conclude that there is a misfit in the price perception of (potential) e-grocery customers. Somehow this might be created by promotion actions of retailers and some part by customers for not understanding the challenges of e-grocery delivery (Goethals et al., 2012; Saskia et al., 2016).

Concerning these two challenges the literature proposes several solutions. One of the solution the literature addresses is unattended delivery.

2.6 Business Model of Unattended Delivery

Unlike traditional in store sales where customers are able to receive psychical products directly after their purchase, e-grocery requires a set of logistics operations that are crucial not only for the right delivery of a product but also for the overall satisfaction of the end-customers (Hübner et al, 2016). Next to high delivery costs the following issue decreases the overall satisfaction of ordering online groceries.

Most houses in the Netherlands are likely to be unoccupied during the day. This is mainly the result of the sharp increase in the proportion of double-income and single-person households over the past 30 years. The growth of leisure activities outside the home is also reducing the probability of anyone being at home outside normal working to receive orders (McKinnon & Tallan, 2003). The mandatory presence of the customer to be home to receive your groceries is unwanted (Punakivi & Saranen, 2001).

Unattended delivery is being promoted as a means of reconciling these lifestyle preferences with commercial pressures to cut distribution costs (Kämäraïnen et al., 2001). The unattended delivery model frees both suppliers and customers from depending on a specific time-window for the delivery and decreases financial and environmental costs due a more efficient delivery (Kamerainez, 2001; Punakivi and Saranen, 2001, Weberal et al., 2008). Also, from an operational perspective unattended delivery is the most optimal solution (Kallio et al., 2015; Kämäriänen, 2001; Punkakivi et al., 2001). Kämäriänen et al. (2001) suggested two ways of unattended delivery for home delivery:

1) Placing the order at a home-based reception (or 'drop' / 'parcel') box
2) Giving the delivery driver internal access to the home or an outbuilding

In the past decades research has mainly focused on the first suggested way of unattended delivery: placing the order at a home-based reception box. This solution is helpful to the problem but their disadvantages are significant; product security issues, reception boxes storage condition issues, reception boxes size issues (Iwan et al., 2016; Lowe & Rigby, 2014; Ehmke & Campel, 2014). The perishability and storage conditions of food and drink items are subjected to strict policies and often the demanded conditions cannot be assured by reception boxes (Hsu et all., 2007; Ehmke, 2012). These issues make this method for unattended delivery: such as delivery boxes and reception boxes hard and unsafe to use (Pan et al., 2017).

The second suggested way of unattended delivery received less attention of context of literature due previous operational and logistic incompetence. Today, emerging technologies (e.g. Nuki Smart Lock) have made this unattended delivery solution operational possible and in theory profitable (Gevears et al., 2011; Iwan et al., 2016). Although, previous issues (e.g. last mile) might disappear with the suggested delivery solution new complex issues arise. For example, this delivery solution has greatly impact on privacy and legal matters of customers (Iwan et al., 2016). To gain better insights in the suggested solution a lean business model canvas for e-grocery smart lock delivery is created in the next section.

2.7 Lean Business Model Canvas of E-grocery Smart Lock Delivery

The Lean Canvas (Maurya, 2011) provides more focus to mitigate risk in new product, service and business development (Borseman et al., 2016). The lean Canvas is suited to address the multiple risks and uncertainties that are typical in the context of new technology startups and therefore a suitable tool to explore the possibilities of e-grocery smart lock delivery.
Table 1 visualizes a lean business model canvas for the suggested solution: e-grocery smart lock delivery. An explanation follows.

<table>
<tr>
<td rowspan="2">Problem

1. I have to stay at home to receive my groceries.
2. I am dependent on the available time-windows.
3. I missed the deliverer and my groceries were not delivered.
4. The costs of e-grocery delivery are too high for me.</td>
<td>Solution

- E-grocery smart lock delivery where the customer does not have to be at home during delivery.</td>
<td rowspan="2">Unique Value Proposition

- Customer does not have to be at home during delivery of groceries.
- Customer not dependent on time-window.
- Delivery route more efficient.
- Lower delivery costs.
- No 'failed' deliveries.</td>
<td>Unfair Advantage

- First to delivery by smart locks as additional service.
- Efficiency lowers delivery costs.
- Unique service for customers.</td>
<td rowspan="2">Customer Segments

- Families (minimal average income) with a busy life and preference for online consuming.

Early adopters:

- Families (above average income) with a busy life, plenty of online consumption and above interest of smart homes.</td>
</tr>
<tr>
<td>Key Metrics

- Adoption rate.
- % increase in orders.
- % increase Efficiency.</td>
<td>Channels

- E-platform to order groceries (website/application)
- Smart lock and smart lock platform.
- Delivery van with deliverer.</td>
</tr>
<tr>
<td colspan="3">Cost Structure

- Solution costs (smart locks).
- Platform keys.
- Education of deliverers.
- Operations costs.</td>
<td colspan="2">Revenue Streams

- New customer segment: people not at home.
- Increase average orders
- Lower delivery costs, efficiency stroke (long term).</td>
</tr>
</table>

Table 1. Lean Canvas e-grocery smart lock delivery (Maurya, 2011)

The problem and customer segments pair drive the rest of the canvas and should be tackled first (Maurya, 2011). We assume that families with at least an average income, busy life and preference for online consuming experience the following problems: (1) I have to stay at home

to receive my groceries, (2) I am dependent on the available time-windows, (3) occasionally I miss the deliverer, and (4) the costs of e-grocery delivery are too high for me. Now the problems of our customers are addressed we need to set a unique value proposition why these customers might choose us to deliver of their groceries. The unique value proposition is that customer do not have to be at home for the delivery of their groceries and at the same time delivery-costs decrease. In order to achieve this unique value proposition, we suggest the solution: e-grocery smart lock delivery. But how does our new suggested solution gain attention from our potential customers? In channels we describe the ways how we want to reach our customers. In this case, we address our customers with the use of our current e-grocery platform offering this solution as a new option of delivery. Also, social media and potential press is used to reach 'new' customers. In cost structure and revenue streams the profitability of the concept is made visible. This concept offers a new customer segment the opportunity to delivery their groceries at home. Also, we assume that when customer does not have to be at home they order more as a barrier has disappeared. Furthermore, due more efficient delivery routes the delivery costs drop. On the other hand, investments have to be made in solution development, purchase costs e-lock platform and smart locks, deliverer education next to the already existing operations costs. Key metrics needs to be set to measure the potential success or failure. The first key metric is the adoption rate of the suggested solution. In order to measure the second, increase orders, and third, efficiency stroke, the solution needs to be adopted. Final, Unfair advantage. The unfair advantage of this project is to start this project early before competitors and create trust between the firm and early adopters.

So now we have our concept 'e-grocery smart lock delivery' extracted in a lean business model canvas without knowing if there's possible interest in this concept. Customers perceptions of this delivery solution in which the delivery driver enters the home of the customer with the use of a smart lock and stores the groceries in the kitchen are hardly found in literature to our best knowledge. However, Goethals et al. (2012) addressed the perceptions of French consumers on unattended delivery in general.

2.8 Customers Perceptions of Unattended Delivery

To the best of our knowledge, only Goethals et al. (2012) have investigated whether and which customers are interested in unattended delivery of groceries. Their research shows that gender differences do not emerge with respect to the interest of customers in unattended delivery for e-grocery in France. They also observed that age does not make the differences when it comes to the interest in the unattended delivery model of e-grocery in France. Goethals et al. (2012) did not make a distinction between the several methods of unattended delivery (Pick-Up-Points e.g.). Also, it only explores the interest of customers in unattended delivery and did not look into the reasons for or the reasons against underlying this interest. The following study of did.

A qualitative study during the exploration phase of this research looked for content-specific reasons for and against adopting unattended delivery in e-grocery markets of the Netherlands. In order to properly understand consumers reasons for and against adopting e-grocery smart lock delivery a focus group session was held. This method is one of the most common methods used in the literature for qualitative research (Gill et al., 2008). Focus

groups are used to generate information on collective views and the assumptions behind those views. Further, focus groups are often used to explore a topic that can be used in later stages of the research (Gill et al., 2008), as in this case.

The focus group consisted of ten persons (N = 10) with of an equal number of men and women, different age groups and different cultural background. However, all of them were highly-educated. In the findings of the focus group it became plausible that the main reasons for adopting an innovation as e-grocery smart lock delivery were convenience and flexibility. Convenience refers to the increase of placing online orders with the knowledge no presence at home is needed. Increased flexibility is experienced at the day of delivery as the customer does not have to be at home. The main reasons against the adoption of e-grocery smart lock delivery were potential high costs, security- and risk issues. Where potential high costs refer to the installation costs of a solution. The knowledge of these smart lock solutions is limited and therefore customer experience a factor risk with the installation of such a lock. Furthermore, the concern of the safety of the customers properties and belongings during the delivery is derived as reason against during this explorative research.

To better understand the meaning of these findings we discuss in the next section the existing literature of adoption factors and resistance factors of innovation.

2.9 Adoption - and Resistance Factors of Innovation

Understanding whether and why consumers will adopt innovations is critical for firms developing and marketing new products and services (Claudy, Garcia & O'Driscoll, 2015). Therefore, consumer response to innovation has top priority in the marketing science.

Traditionally, consumer response to innovation is conceptualized as the adoption decision process, often compared to a hierarchy of effects model (Gatignon & Robertson, 1989; Claudy, Garcia & O'Driscoll, 2015). The innovation adoption process could be described as the ''the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, implementation of the new idea, and to confirmation of this decision (Rogers, 1962). Therefore, Gregan-Paxton and John (1997) argue that the adoption of an innovation can thus be explained by the outcome of a cognitive process: The search for information and the processing of it by the individual (consumer).

Traditionally seen, studies on adoption of innovation can broadly categorized into research on innovation adoption (Rogers, 1962) and research on innovation resistance (Ram & Sheth 1989). In the remainder of the BRT, Claudy, Garcia and O'Driscoll (2015) put together a framework (table 2) to collect the adoption factors and resistance factors of innovation.

Adoption factors	Definition	Resistance factors	Definition
Innovation Attributes		*Functional Barriers*	
Relative Advantage	Degree to which an innovation is perceived as being better than the idea/product it supersedes	Usage Barriers	Degree to which an innovation is perceived as requiring changes in consumers' routines (Ram and Sheth 1989)
Compatibility	Degree to which an innovation is perceived as consistent with existing values, past experiences, life styles and needs of potential adopters	Value Barriers	Degree to which an innovations' value-to-price ratio is perceived in relation to other product substitutes (e.g., Molesworth and Suortti 2002)
Complexity	Degree to which an innovation is perceived as relatively difficult to understand and use	Risk Barriers Financial Performance Social	Degree of uncertainty in regard to financial, functional and social consequences of using an innovation (e.g., Posavac et al. 2007)
Trialability	Degree to which an innovation may be experimented with on a limited basis	*Psychological Barriers*	
Observability	Degree to which the results of an innovation are visible to others (Rogers 1962)	Tradition and Norm Barriers	Degree to which an innovation forces consumers to accept cultural changes (Day and Herbig 1992)
Perceived Usefulness	Degree to which using a particular system would enhance job performance	Image Barriers	Degree to which an innovation is perceived as having an unfavorable image (e.g., Ram and Sheth 1989)
Perceived Ease of Use	Degree to which using a particular system would be free from effort (Davis 1989)		

Table 2. Adoption and resistance factors (Claudy, Garcia & Driscoll, 2015)

The innovation adoption factors described in the framework are based on the Theory of Reasoned Action (TRA) (Fisbein and Ajzen, 1975) and the technology acceptance model (TAM) of Davis (1989). Generally, TRA assumes that people evaluate innovations considering innovation attributes like relative advantage, compatibility, complexity, trial ability and observability. These factors have a strong influence on their decision of adoption the innovation (e.g., Bartl et al., 2012). Davis (1989) re-used the TRA and introduced the TAM. This theory was specifically developed to explore the adoption of new information technologies. TAM provides the theoretical link between the two specific beliefs; perceived usefulness and perceived ease of use with the potential adopters' attitudes, intentions, and computer usage behavior. The influence of these motives in adoption of technological innovation is proven (e.g., Lu et al., 2009). Both TRA and TAM are rooted in the assumption that consumers evaluation of innovation attributes in case, results in the formation of positive or negative attitudes towards an innovation, which in the end determines the decision of adopting or rejecting a new product or service (Claudy, Garcia & Driscoll, 2015).

The factors of resistance towards adoption of innovation find their heritage in a less established stream of diffusion of innovation literature (Garcia et al., 2007; Kleijnen et al., 2009: Ram 1987; Ram and Sheth 1989). Claudy, Garcia and O'Driscoll (2015) have classified the resistance factors into functional barriers and psychological barriers. Functional barriers refer to usage, value and risk barriers that people might associate with a new product or service. For example, usage barriers occur when an innovations conflicts with existence usage patterns (Ram and Sheth, 1989). Likewise, value barriers occur when perceived performance-to-price ratios of innovations are below level (Molesworth and Suortti, 2002) and risk barriers occur when degree of uncertainty in regard to financial, functional and social consequences of using an innovation are high (Posavac et al., 2007).

On the other hand, psychological barriers occur when innovations require consumers to change existing beliefs or to break with traditions and norms (Antioco and Kleijnen 2010). The literature has categorized psychological barriers into two psychological impediments: tradition barriers and image barriers (Kleijnen et al., 2009; Ram and Sheth; 1989). Tradition

barriers arise when innovations deviate from accepted societal norms, or force consumers to break with rooted traditions while image barriers emerge when the perceived image of the innovation is high (or low) what might result in adoption (or resistance) (Kleijnen et al., 2009).

In the literature, values are described as important determinants of adoption – and resistance factors towards an innovation (Schwartz, 2006). Therefore, the consideration of values in the adoption process is important. In the context of innovation, values are often reflected in people's general openness to change (e.g. Schwartz, 2006). Openness to change refers to the values that ''motivate people to follow their own intellectual and emotional interest in unpredictable and uncertain directions'' (Schwartz, 1992, p. 43). The construct openness of change has two underlying dimensions; stimulation and self-direction (Schwartz, 2006; Gupta and Arora, 2017). Stimulation reflects the need for excitement, variety and novelty whereas self-direction reflects the need for independence and autonomy. Wu et al. (2009) observed that consumers who score high on the construct openness for change have a higher probability to adopt and such consumers are readier to experience new technologies (Raajpoot and Sharma, 2006).

Adoption factors and resistance factors including their underlying values are part of the Behavioral Reasoning Theory of Westaby (2005). They are important factors in the framework of theory which can be a helpful tool to understand the context behind the interest or so-called adoption rate of customers in a certain innovation or new business model.

2.10 Behavioral Reasoning Theory

So, the Behavioral Reasoning Theory helps to discover potential interest of consumers in a certain adoption based on several factors. The study examines both the determinants and barriers of the adoption of smart locks by e-grocery consumers. Literature on social psychology (Westaby et al., 2010) state that the factors of adoption and barriers to adoption might not be logical to each other (Gupta & Arora, 2017) and therefore can be studied during the one study. The behavioral Reasoning Theory (Westaby, 2005) proposed a framework which can be used to test the relative influence of adoption factors and resistance factors at the same time. This theory has been used during several studies with the aim of understanding innovation adoption (Chatzidakis & Lee, 2013; Claudy et al., 2015; Claudy, Peterson & O'Driscoll, 2013; Westaby et al., 2010). The findings of these studies support that determinants for adoptions as well as barriers to adoptions can be studies in a single framework. The BRT is in this way unique.

The BRT states that context-specific reasons serve as important linkage between people's belief, global motives, intention and behavior (Westaby, 2005). Westaby (2005) separated these context-specific reasons under two broad dimensions in reasons for and reasons against describing a certain behavior and theorizes that they do not have to be opposing. For example, Claudy, Garcia and O'Driscoll (2015) discovered while applying this framework in the context of a service innovation (car sharing) that the reasons for, convenience and flexibility, were not logical opposed compared to the reasons against, safety and availability. In the next we outline the Behavioral Reasoning Theory framework as the conceptual framework guiding this research.

2.11 Conceptual framework: Behavioral Reasoning Theory Framework

Within the conceptual framework we apply BRT framework to our suggested innovation: e-grocery smart lock delivery. Hypothesizes are presented with the aim to measure the perceptions of customers towards the addressed solution, e-grocery smart lock delivery, in this study.

The assumption of the BRT is that reasoning serves a critical role during the mental process of behavior (Claudy, Garcia & O'Driscoll, 2015). As said before, BRT offers a way to study reasons for adoption as well reasons against adoption. Figure 1 summarizes the hypothesized relationships in behavioral reasoning theory in a theoretical framework. (Westaby, 2005).

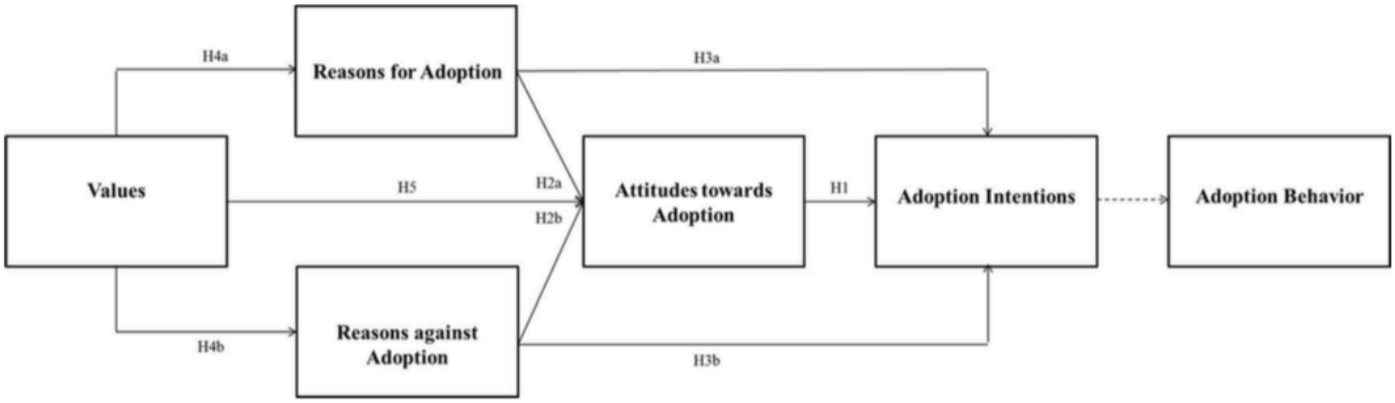


Figure 1. The Behavioral Reasoning Theory Framework (Westaby, 2005)

The Behavioral Reasoning Theory hypothesizes that adoption intentions predict adoption behavior. In our case you could explain adoption behavior as the potential adoption rate of our customers in e-grocery smart lock delivery. The adoption intentions are predicted by attitudes towards adoption [H1]. Reasons for and reasons against predict both attitudes towards adoption [H2a, H2b) as well as adoption intentions [H3a, H3b] (Westaby, 2005; Gupta & Arora, 2017). Reasons are presumed to be the result of people's values [H4a, H4b]. Also, there is a direct link between people's values and attitudes towards adoption [H5] (Westaby, 2005; Gupta & Arora, 2017). Considering all these hypothesizes the BRT shows different paths influencing the final adoption behavior of the consumer. So, the 'BRT allows for distinct psychological processes, or paths in behavioral decision making, which may vary depending on the decision context such as the type of innovation' (Westaby 2005, p. 103). Resulting in a deeper understanding of what factors lead to adoption and resistance of innovations. The following hypothesizes are developed to gain insights in the factors (and their strength) which may lead to adoption or resistance towards e-grocery smart lock delivery.

Attitudes and Adoption Intentions

In line with related theories (e.g. TAM and TRA), Behavioral Reasoning Theory states that adoption intentions can be predicted by their attitudes where attitudes are a ''psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor'' (Eagly & Chaiken, 1993, p.1). Westaby (2005) describes attitudes as global motives

constituting broad substantive factors, which influence behavior in various areas. Attitude is a strong predictor of adoption intentions (Gupta and Arora, 2017). Furthermore, attitudes are recognized as the key determinants of consumers purchase behavior in the marketing literature (Claudy, Garcia & O'Driscoll, 2015). Research shows that people who have more positive attitudes towards innovation are more likely to adopt and less likely to resist (Bagozzi, 1992). For example, extent research in mobile commerce (Yang, 2005; Wu and Wang, 2005) confirms a positive relationship between attitude and adoption. In the context of m-banking similar results have been reported (Aboelmaged & Geba, 2013; Lule et al., 2012; Shaikh & Karjaluoto, 2015; Wessels & Drennan, 2010). We thus hypothesize that:

H1. Consumers' positive attitude towards e-grocery smart lock delivery will positively affect their adoption intentions.

Reasons and Attitudes

In general, reasons are strong determinants of behavior according to reasoning theory and as discussed earlier could be theorized into adoption factors (reasons for) and resistance factors (reasons against). BRT adopts the functional theorizing (e.g. Snyder, 1992) that states individuals use reasoning to support the acceptability of decisions, to justify actions and to pursue certain goals. Further, Westaby (2005) states that reasons are specific cognitions and so a specific factor has a subjective probability of being part of an individual's behavioral explanation set.

Moreover, reasons can influence the formation of attitude (Wilson et al., 1992). Based on the spreading action theory (Collins and Loftus, 1975), reasons play next to values and the derivate beliefs an important role in the judgment process of innovation adoption. Even when a customer holds a favorable belief towards a certain adoption, resistance still might appear because of the presence of ''reasons against' the behavior (Claudy, Garcia & O'Driscoll, 2015). So, in the context of e-grocery smart lock delivery, values would reflect someone's opinion about e-grocery smart lock delivery in general, whereas reasons for and/or against influenced by values would form specific factors that may influence the attitude towards adoption. So, we expect that reasons influence adoptions intention indirectly via attitudes resulting in that consumers who have strong reasons for (or against) adoption will also have positive (or negative) attitudes towards it (Claudy, Garcia & O'Driscoll, 2015). As previously mentioned, we found two potential reasons for; increase of convenience and increase of flexibility, that might influence attitude towards adoption. Also, we found three potential reasons against: potential high costs, security- safety issues. We formulate the following hypothesis concerning these topics:

H2a. Consumers' increase in experienced convenience and flexibility will positively influence their attitude towards of e-grocery smart locks delivery.

H2b. Consumers' concerns towards risk, security and potential high costs will negatively influence their attitude towards e-grocery smart lock delivery.

Reasons and Adoption Intentions

Furthermore, Westaby (2005) argues that besides the above mentioned indirect influence of reasons via attitudes towards adoption intention, reasons influence people's adoption intentions also directly. People feel more comfortable when they find reasons that defend or justify their actions (Westaby, 2005). The base of it lies in the striving to simplify decisions making by using cognitive shorts cuts or heuristics (Tversky and Kahneman, 1974). For example, consumer might hold a positive attitude towards delivery of groceries with smart locks but might still decide against adoption because of the of a critical reason as purchase costs of the smart lock. So according to BRT, reasons explain intentions beyond that the reasons that are explained by attitude alone. Various technology adoption models including TAM (Davis, 1989) and UTAUT (Venkatesh et al., 2003) confirm that context specific factors play a critical role in explaining intentions. Traditional constructs are unable to explain context specific justifications but reasons are able to do so (Gupta and Arora, 2017).
We thus hypothesize:

H3a. Consumers' increase in experienced convenience and flexibility will positively influence the adoption intention of e-grocery smart lock delivery.

H3b. Consumers' concerns towards risk, security and potential high costs will negatively influence the adoption intention of e-grocery smart lock delivery.

Values to Reasons

Fisbein and Anzjen (1975) expectancy value theory assumes that the beliefs (values) that people hold about the expected outcome and the potential value of those outcomes impact the motivational process significantly. Knowing that, 'reasoning does not occur in isolation and is expected to be influenced by consumers' deep-rooted values' (Westaby 2005, p.102), values are considered as important attribute in the decision process. These deep rooted or personal values describes Schwartz (2006) as motivational constructs which refer to desirable goals individuals strive to attain. In the following, Claudy et al. (2013) states after widely research on various innovation studies that consumers are likely to adopt new innovations when it suits with their personal values. So, values provide underlying guidance in individuals' evaluations and/or selection of enhancing new innovations. In the context a research on innovation we describe values as the earlier discussed factor 'openness towards change' according to Schwartz's (2006) theory.

We thus expect that:

H4a. Consumers 'openness towards change' will influence their experienced convenience and flexibility towards the adoption of e-grocery delivery through smart locks.

H4b. Consumers 'openness towards change' will influence the barriers potential high costs, security and risk towards the adoption of e-grocery delivery through smart locks.

Values and Attitudes

Finally, Westaby (2005) argues that values could also have direct impact on attitude because in some circumstances the decisions making process of individuals is more heuristic and simplified. ''people use different, distinct, and systematic psychological processes, or paths'' in decision making states Westaby (2005). With other words, consumers might choose to simplify the decision and decide to adopt the innovation without evaluating its (dis) advantages. Consumers directly form an attitude towards the innovation instead of justifying the anticipated behavior (Gupta and Arora, 2017). Furthermore, the consumer behavior literature mentions the importance of values in the consumption decision process (Rokeach, 1973; Kahle et al., 1986). Likewise, values are often used to determine specific attitudes on consumptions (Gupta and Arora, 2017). Resulting the expectation that:

H5. Consumers' 'openness towards change' will influence their attitude towards e-grocery smart locks delivery.

Briefly, BRT should serve as a theoretical framework to better understand the decision-making process of consumers in adoption or resistance of e-grocery smart lock delivery.

2.12 Conclusion

The two described main challenges of e-grocery are the last mile and high delivery costs and could potentially be decreased by the use of smart locks within unattended delivery (Goethals et al., 2011, Hübner et al., 2016; Frank & Albertz, 2017). Knowing that the most expensive delivery model, for both supplier and customer, is attended delivery on the following day in a one-hour time-windows while the least expensive delivery model is unattended weekly delivery on a defined weekday we can conclude that e-grocery smart lock delivery should be explored. Due emerging technologies the issue of customers not being at home during the day disappear and makes it worth to research the opportunities of it (Iwan et al., 2016). Moreover, this unattended delivery model will reduce home delivery costs to less than a half (Ferrand et al., 2014). From an operational perspective unattended delivery is the most optimal solution (Kallio et al., 200; Kämäräinen, 2001: Punkakivi et al., 2001) but unattended delivery has been hardly explored in the literature or in practise. To evaluate the adoption rate of delivery by smart locks the Behavioural Reasoning Theory can be used. This consumer behavior model tests the relative influence of both reasons for and, importantly, reasons against adoption in consumers' innovation adoption decisions. Therefore, this model can be used to gain insights in the underlying assumptions of adopting an innovation or not.

3. METHODOLOGY

3.1 Introduction of Methodology

This chapter describes the methodology used to answer the central research question of this thesis. The central research question, ''**What are the factors enabling and rejecting smart lock delivery adoption in the e-grocery market in the Netherlands?''** required a analysing method in which finds the factors influencing consumers decisions in the adoption process. In the conceptual framework we framed several factors what might influence the adoption process of consumers towards e-grocery delivery. In order to test the outlined hypothesizes of the conceptual framework we conducted a survey. The findings of survey are analyzed with the use of a structural equation model.

3.2 Survey

Based on the BRT framework a survey was set up to study the adoption of e-grocery smart lock delivery. The survey was composed in line with previous studies based on BRT (Westaby et al., 2010; Westaby, 2005; Claudy, Garcia & O'Driscoll, 2015; Gupta & Arora, 2017).

The variable adoption intentions as well as the variable attitude were assessed via measures used in the behavioral intention frameworks of Fishbein and Ajzen (1957) and Westaby et al. (2010). The measures of adoption intentions where composed with items stating direct use of e-grocery smart lock delivery in the future. The measures of attitude where composed with items concerning a more general though of the concept e-grocery smart lock delivery. Westaby et al., (2010), Westaby (2005), Claudy, Garcia and O'Driscoll (2015) and Gupta and Arora, 2017 have used the same measurements in their surveys regarding adoption of innovation research. All items were measured on five-point Likert scales ranging from strongly agree (5) to strongly disagree (1).

In the survey, values are reflected in people's general openness towards change (Schwartz, 2006). Wu et al. (2009) observed that consumers who score high on the variable openness towards change have a higher probability to adopt and such consumers are readier to experience new technologies (Raajpoot & Sharma, 2006). A two-item five-point Likert scale was used to measure openness towards change. One item measured stimulation resulting in a statement concerning an active look for change whereas one item measured self-direction resulting in a statement how they see themselves. Expected is that consumers who are high on openness of change will have favorable attitude towards e-grocery smart lock delivery.

In line with BRT and previous studies, qualitative elicitation studies allow researchers to develop categories representing reasons for and against and allow them to formulate items for the survey (Westaby, 2005; Claudy, Garcia & O'Driscoll, 2015; Gupta & Arora, 2017).
The earlier discussed reasons for and reasons against we explored and to accept or reject with the use of the proposed hypothesizes are conducted in the survey as separate variables.

The main reasons for adopting e-grocery smart lock delivery are convenience and flexibility. Convenience represents a perceived usefulness adoption factor and is measured with a three-item Likert scale. Flexibility represents a relative advantage adoption factor and is measured

with a two-item five-point Likert scale. As mentioned before the three reasons against adoption factors are security, risk and cost. The framed reasons against adoption: the variables risk and cost are reflections of risk barriers while the variable security is represented as usage barrier. All items were measured on two or three-item five-point Likert scales, ranging from strongly agree (5) to strongly disagree (1). Appendix C gives a complete overview of the conducted survey including every specific item.

3.3 Data Collection

The study was conducted with a sample of N = 150 Dutch consumers of groceries who were asked about their intentions to use the service of e-grocery smart lock delivery. A campaign was built in which consumers could get acquainted with the innovation, e-grocery smart lock delivery, in order to make them fully understand and aware of what the innovation meant. In early orientation studies we found that respondents found it difficult to understand the innovation properly and fully. So, we presented e-grocery smart lock delivery during the campaign, as the process in which a customer sends during his online order a virtual key to the delivery man to access the house. The deliverer has only one-time access during a time window the customer chooses. After completing the delivery, the customer receives a notification of groceries delivered and door locked. Purpose of the campaign was to envision and to let potential respondents experience e-grocery smart lock delivery.

The final data was collected via a web-survey, which was sent to all the visitors in the campaign via mail. 235 visitors were sent a survey. 152 visitors completed the survey resulting in a respondent rate of 64,7%. After the election of the partially completed forms 150 surveys were considered for the final analysis resulting in a sample size of n = 150. Table 3 shows the characteristics of the respondents.

	Characteristics	Frequency	%
Gender	Male	82	54,70%
	Female	68	45,20%
	Total	150	100%
Age	<25	38	25,40%
	26-35	55	36,70%
	36-45	30	20%
	46-55	20	13,30%
	>56	7	4,70%
	Total	150	100%

Table 3. Characteristics of respondents

3.4 Method: Structural Equation Model

Structural equation modeling (SEM) based on partial least squares (PLS) in SmartPLS software version 3.0 is used to test our hypothesizes. PLS-SEM is a well-established technique which can be used to test structural models (Richter et al., 2015). PLS can provide much value for

causal inquiry in communication-related and behavioral research fields (Gaskin, 2014). Especially, in explaining complex models comprising of formative and reflective constructs PLS is very useful. The PLS-SEM analysis of this study is completed in two stages following Gerbring and Anderson's (1988) two-step approach. Within the first stage, the development of the measurement model is done including an assessment of it. In the second stage a full structural equation model is developed. Before conducting this approach, the underlying assumptions of SEM will be explained and the model will apply to this specific research concerning the adoption rate of e-grocery smart lock delivery.

3.5 SEM statistical model

According the theory of SEM statistical models represent causal relationships as paths (Lowry & Gaskin, 2014) A path is the hypothesized relationship between the suggested variables representing the causal constructs of the theoretical proposition. So, each path represents a hypothesis which tests the theoretical assumption. For example, in this case, 'reasons for' cause an intention to adopt e-grocery delivery by smart locks, then SEM would represent that relationship as a path between the variables 'reasons for' and 'adoption intention'. Paths are presented with the use of arrows in diagrams of the statistical model where the arrows point in the proposed direction of causation (Lowry & Gaskin, 2014). Figure 2 shows the statistical model of the research in where the dark grey circles represent the reflective variables and the light grey circles represent the descriptive variables. Table 4 shows the content of both the variables.

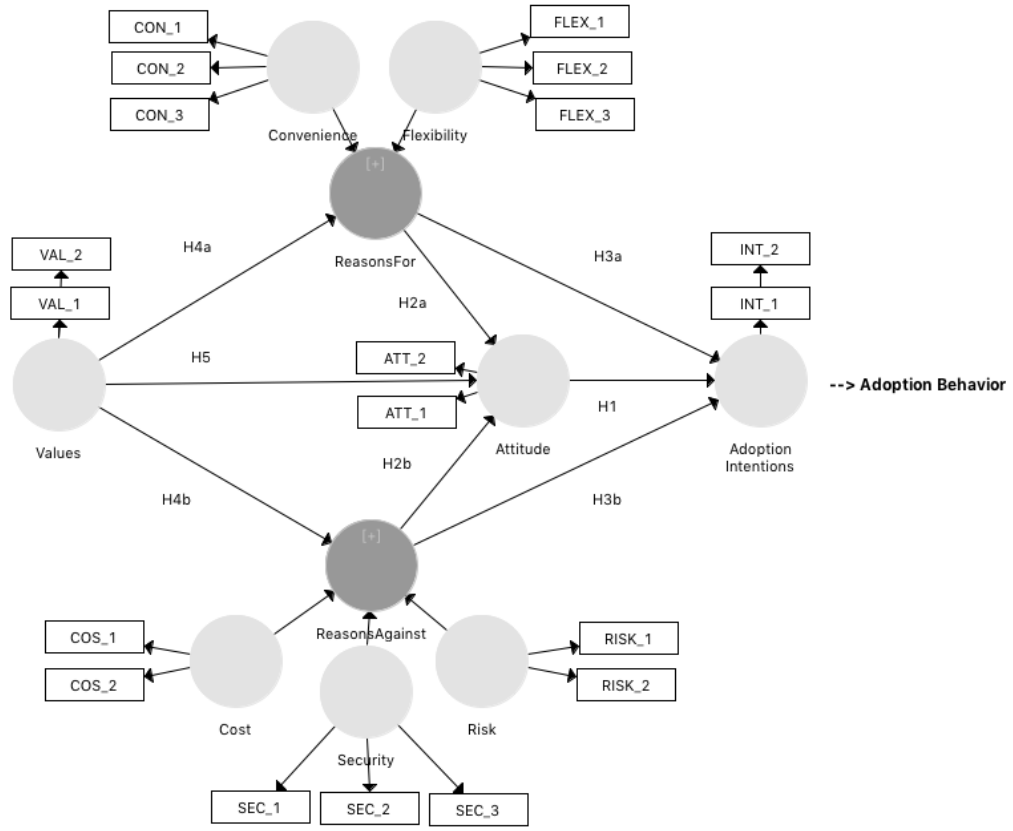


Figure 2. SEM statistical model

Adoption intentions (descriptive)	
INT_1	I will use e-grocery delivery through smart locks in the future.
INT_2	I see myself using e-grocery delivery through smart locks in the future.
Attitude (towards adoption - descriptive)	
ATT_1	In general, I think e-grocery delivery through smart locks is a good idea.
ATT_2	E-grocery delivery through smart locks has many advantages.
Reasons For (reflective)	
Convenience (perceived usefulness - descriptive)	
CON_1	E-grocery delivery through smart locks is a good idea because I do not want to spend time waiting on the arrival of my groceries.
CON_2	E-grocery delivery trough smart locks suits me better than regular e-grocery delivery.
CON_3	E-grocery delivery through smart locks makes my life easier.
Flexibility (relative advantage - descriptive)	
FLEX_1	E-grocery delivery trough smart locks is useful because I do not have to stay at home for the delivery of groceries.
FLEX_2	E-grocery delivery enlarges my flexibility.
FLEX_3	Due E-grocery delivery through smart locks I am capable of receiving my groceries at home.
Reasons Against (reflective)	
Security (usage barrier - descriptive)	
SEC_1	I am worried about the safety of smart locks.
SEC_2	I feel my privacy comes in jeopardy during e-grocery delivery through smart locks.
SEC_3	I am worried about the security of my personal belongings during e-grocery delivery through smart locks.
Costs (value barrier -descriptive)	
COS_1	I think the installation costs of a smart lock is too high.
COS_2	The benefits if e-grocery delivery through smart locks outweighs the costs of installing a smart lock.
Risk (risk barrier - descriptive)	
RISK_1	I am worried about the reliability of performance of the smart lock.
RISK_2	I am worried if e-grocery delivery through smart locks can meet my expectations.
Values (openness of change - descriptive)	
VAL_1	I like surprises and I am open for change.
VAL_2	I seek for adventures and I like to take risks.

Table 4. Survey

4. RESULTS

4.1 Measurement Model

In the first stage of the results we discuss the measurement model. The convergent and discriminant validity of all constructs and reliability of all the item scales is examined.

In PLS-SEM convergent validity is shown when a measurement loads significantly highly (coefficient above 0.60) on its assigned construct and the average variance extracted is greater than 0.50 (Hair Jr et al., 2013). The reliability of measurement items was assessed by computing composite construct reliability coefficients. Reliability refers to the degree to which a scale yields consistent and stable measures over time and applies online to reflective indicators, in this case reasons for and reasons against (Straub 1989). PLS computes a composite reliability score as part of its integrated model analysis. This approach is similar to Cronbach's alpha in that they are both measures of internal consistency however ''composite reliability'' is recommended instead of Cronbach Alpha (Hair et al., 2012) as it tends to provide a conservative measurement. Each construct in our research model demonstrated a level of reliability well above the recommended threshold of 0.70 (CR) and 0.5 (AVE) (Bagozzi and Yi, 1988; 42. Chin, 1998) (see table 5).

	Composite Reliability	AVE	Cronbach's Alpha
Adoption Intentions	0.992	0.856	0.832
Attitude	0.897	0.814	0.771
RF - Convenience	0.852	0.659	0.741
RF - Flexibility	0.822	0.616	0.673
RA - Security	0.901	0.753	0.837
RA - Cost	0.773	0.639	0.484
RA - Risk	0.848	0.737	0.651
Values	0.905	0.827	0.794

Table 5. (composite reliability, AVE and Cronbach alpha coefficient)

	Value	Attitude	Convenience	Cost	Flexibility	AI	Risk	Security
Value	**0.909**							
Attitude	0.283	**0.902**						
Convenience	0.420	0.486	**0.812**					
Cost	0.066	0.021	0.043	**0.799**				
Flexibility	0.292	0.401	0.607	-0.005	**0.785**			
Adoption Intentions	0.474	0.597	0.596	-0.014	0.372	**0.925**		
Risk	-0.163	-0.271	-0.250	-0.004	-0.159	-0.322	**0.858**	
Security	-0.203	-0.263	-0.232	-0.041	-0.042	-0.351	0.460	**0.868**

Table 6. Discriminant validity of constructs

The discriminant validity of the latent constructs is sustained if the square root of AVE of each latent variable is greater than the correlations among latent variables (Fornell and Lacker, 1981). Furthermore, the cross loadings of the constructs are examined. Table 6 shows that all the factor loadings of all indicators are greater than the construct of them on any other factor. Besides this, all cross loadings are below 0.60 which confirms discriminant validity of constructs. Concluding, all latent constructs satisfy to both conditions (table 5 and 6. All the above, results support the validity and reliability of the scales.

4.2 The Structural Equation Model

In the structural equation model our hypothesized relationships between the constructs in our research: adoption intentions, attitudes, reasons for, reasons against and values were estimated. The hypothesizes were assessed during a PLS-SEM analysis. To test the path significance of the structural equation model, we use the re-sampling method in smartPLS-SEM. In the re-sampling method are 5000 re-samples used next to the 150 cases per sample to provide a basis for confidence intervals allowing an estimations of factor stability (Ringle et al., 2012). Also, the path coefficients were examined by performing bootstrapping procedure with 5000 iterations.

The findings in our analysis indicate that the collected data supported seven hypotheses and did not support one. The results imply that reasons are important determinants in the adoption process of e-grocery smart lock delivery. The findings suggest that consumers reasons for adoption (H3a: $\beta = 0.332$, $p < 0,01$) and consumers reasons against adoption (H3b; $\beta = -0.205$, $p < 0,05$) explain adoption intentions. Furthermore, reasons for adoption (H2b: $\beta = 0,551$, $p < 0,01$) as well reasons against adoption (H2b: $\beta = -0,228$, $p < 0,05$) have significant influence on attitude. So, both are important determinants of consumers attitude towards e-grocery smart lock delivery. Also, attitude towards e-grocery smart lock delivery has a positive significant relation with adoption intentions (H1: $\beta = 0,455$, $p < 0,01$). Finally, we observe that values (openness of change) influence reasons for adoption and reasons against adoption however values do not influence attitude. Openness of change does have significant effect on reasons for adoption (H4a: $\beta = 0,494$, $p <0,01$) and reasons against adoption (H4b: $\beta = -0,266$, $p < 0,01$). However, In the context of e-grocery smart lock delivery consumers values does not influence attitude (H5: $\beta = 0,022$, $p > 0,05$).

In the following, all second-order path coefficients of the reasoning construct are significant. The findings indicate that Convenience ($\beta = 0,576$, $p < 0,01$) and Flexibility ($\beta = 0,534$, $p < 0,01$) are important reasons for adoption of e-grocery smart lock delivery whereas Security ($\beta = 0,676$, $p < 0,01$) is an important reason against adoption of e-grocery smart lock delivery. Risk ($\beta = 0,425$, $p < 0,01$) is a significant determinant of reasons against adoption and Cost ($\beta = 0,143$, $p < 0,01$) has also a moderate effect.

Code	First order constructs	Std. estimates	P values	Hypothesis
H1	Attitude -> Adoption Intentions	0.455	0.000	Supported
H2a	ReasonsFor -> Attitude	0.551	0.000	Supported
H2b	ReasonsAgainst -> Attitude	-0.228	0.018	Supported (0.05)
H3a	ReasonsFor -> Adoption Intentions	0.332	0.003	Supported
H3b	ReasonsAgainst -> Adoption Intentions	-0.205	0.023	Supported (0.05)
H4a	Values -> ReasonsFor	0.494	0.000	Supported
H4b	Values -> ReasonsAgainst	-0.266	0.008	Supported
H5	Values -> Attitude	0.022	0.856	Rejected
	Second order constructs	Std. estimates	P values	
	Convenience -> ReasonsFor	0.576	0.000	
	Flexibility -> ReasonsFor	0.534	0.000	
	Costs -> ReasonsAgainst	0.143	0.000	
	Risk -> ReasonsAgainst	0.425	0.000	
	Security -> ReasonsAgainst	0.676	0.000	

Figure 7. Summary of test results structural equation model.

5.DISCUSSION OF FINDINGS

5.1 Discussion

The focus of this research was to gain more insights in the potential adoption rate of e-grocery smart lock delivery in the Netherlands. This interest is caused by the proposition of the literature that unattended delivery might be a solution to the challenges e-grocery delivery faces at the moment (Geavers et al., 2011). Therefore, we stated a research question that might help us to find valuable insights for a successful introduction of an unattended delivery business model: e-grocery smart lock delivery. Moreover, we want to find reasons why consumers would adopt this innovation and why not. Therefore, this research tries to answer the following general research question: *What are the factors enabling and rejecting smart lock delivery adoption in the e-grocery market in the Netherlands?*

The first question of this study was concerned with the understanding of the current business model of e-grocery home delivery. We can conclude that the most used business model of e-grocery delivery in the Netherlands is home delivery in a chosen time slot picked by the customer (Hübner et al., 2016). The challenges this business model faces are the last mile and high costs of delivery for consumers (Fernie et al., 2010; These two challenges are interconnected. The last mile is a very complex variable in the delivery process. Besides that it's very complex it's also one of the most expensive parts the delivery process for the retailer (Saskia et al., 2016). Low consumer drop density and 'not-at-home syndrome' contribute to this. These costs are passed on towards the consumer resulting in high service costs for e-grocery delivery. These high service costs can withhold customers the use e-grocery delivery what might results in a low consumer drop density. Low consumer drop density lacks the advantages of economic of scale (De Marco et al., 2014) what seems key for a profitable business model in the e-grocery market in the Netherlands (McKinsey & Company, 2017) as the current e-retailers are concentrating on market share and strengthening customer loyalty instead of profitability (Saskia et al., 2015).

The literature makes suggestions towards an business model based on unattended delivery in order to solve last mile issues (Kämäriänen et al., 2001; Gaevers et al., 2011; Iwan et al., 2016). The solving of last mile issues will results in lower delivery costs for both retailer as consumer (Kämäriänen, 2001) looking from an operational perspective (Punkakivi et al., 2001). In order to give the business model of unattended delivery more context we focused on smart lock delivery what is suggested by Gevaers et al. (2011) and (Iwan et al. (2016) as solution.

To get a complete understanding of e-grocery smart lock delivery and its benefits the concept is applied in a Lean Business Model Canvas (Maurya, 2010). It gave valuable insights in the pains customers experience in the current business model. The central problem is that it's mandatory for the customer to stay home at a specific time to receive their groceries. E-grocery smart lock delivery tackles this problem as the unique value proposition explains. Customers do not have to be at home to receive their groceries. The prior explorative study confirmed this assumption with the findings of the following reasons for adoption. The reasons for adoption are increased convenience (perceived usefulness adoption factor) and flexibility (relative advantage adoption factor) (Claudy, Garcia & O'Driscoll, 2015). Besides these reasons for, the explorative study also found three reasons against adoption. The

reasons against are potential high costs (value barrier resistance factor), security (usage barrier resistance factor) and risk (risk barrier resistance factors) (Claudy, Garcia & O'Driscoll, 2015). So as the new business model of e-grocery delivery might solve issues which the present business model faces, new issues arise. Iwan et al. (2016) confirm that unattended delivery has greater impact on the personal life of customers and therefore complex issues on for example privacy and security could arise. In order to confirm and determine the importance of these assumed reasons for (adoption factors) and reasons against (resistance factors) we conducted a research.

The Behavioural Reasoning Theory is used as a framework in this research to determine the importance of the hypothesized reasons for and reasons against. This relatively new way is unique as combines adoption and resistance factors in one study and moreover considers them not as opposite but factors next to each other. Furthermore, it gave us the opportunity the find the impact of the constructs we have stated in the hypothesises. It helped us to answer our last three sub-questions.

The findings of our research confirm that convenience and flexibility are reasons that positively influence the attitude towards adoption (H2a) as well as the adoption intentions (H3a) itself. So perceived usefulness and relative advantage are important adoption factors of the concept e-grocery smart lock delivery. Concerning the second order constructs of the research both factors create an equal impact on the adoption of e-grocery smart lock delivery. Furthermore, the findings of our research confirms that cost, security and risk are reasons that negatively influence the attitude towards adoptions (H2b) as well as the adoption intentions (H2a) itself. So value -, usage-, and risk barriers are important resistance factors of the concept e-grocery smart lock delivery. Concerning the second order constructs of the research we can conclude that risk and security have stronger impact on not adopting the new business model than costs.

Looking at other constructs of the framework we can conclude that attitude towards adoption, which is influenced by reasons for and reasons against (H2a, H2b), has a stronger impact on adoption intentions (H1) than reasons for and reasons against itself (H3a, H3b). It suggests that customers consider and deliberate the concept of e-grocery smart lock delivery well and have difficulty to simplify the adoption process towards it (Tversky and Kahneman, 1974; Westaby, 2005). The finding of no relationship between the value openness of change and attitude towards innovation (H5) confirms this as well. Consumers do not directly form an attitude towards e-grocery smart lock delivery and instead they justify the anticipated behaviour extensively (Gupta & Arora, 2017). The supported hypothesizes H4a and H4b endorse this. The value 'openness of change' influences the formulation of reasons for and reasons against e-grocery smart lock delivery and therefore contributes to the adoption process of the innovation. Moreover this shows again, the importance of revealing and discovering reasons for and reasons against e-grocery smart lock delivery as it turns out to be extra relevant in this case.

Our findings have noticed that potential customers of e-grocery smart lock delivery follow a well-considered path in order to decide to adopt or to this innovation. The understanding of the enabling and rejecting factors has helped us to reveal critical points of attention. These

valuable insights can help us introduce e-grocery smart lock delivery as an alternative business model in the e-grocery market of the Netherlands in the future.

5.2 Theoretical Implications

This study contributes to the literature of innovation by using the behavioral reasoning theory (BRT) to test the influence of reasoning in consumers' innovation adoption decisions. The contribution of this study consists is three folded.

Firstly, besides focusing on reasons for adoption our research focuses also on reasons against adoption which has not often been addressed in empirical adoption of innovation studies (Kleijnen et al., 2009; Venkatesh et al, 2003; Claudy, Garcia & Driscoll, 2015: Gupta & Arora, 2017). This study contributes in following of the previously mentioned scholar to the awareness of including reasons against adoption in innovation studies. As earlier discussed, reasons for and against are not just opposites of each other. They are distinctive constructs which influence adoption decisions in different and more ways. With the use of the BRT salient factor and their relative influence on consumers adoption decision are identified. In the context of e-grocery smart lock delivery we notice people see the benefits of it in achieving more convenience and flexibility but people have also good reason to not adopt this innovation, including costs and security issues and potential risks. For example, our study reveals that security is the greatest barrier (second-order path coefficient of 0,676) that prevents consumers from adopting. Likewise, path coefficient of the first-order constructs implies that reasons against adoption have a significant influence on consumers adoption intentions (first order path coefficient of – 0,205) and consumers attitude (first order path coefficient of -0,228). These results provide a potential plausible explanation for a disruptive and slow adoption process of e-grocery smart lock delivery. In order to increase consumers intent to adopt e-grocery smart lock delivery into the market, managers should in this manner focus more on overcoming barriers to adoption besides just focusing in emphasizing reasons for adoption.

Secondly, this study contributes to the innovation literature by examining the influence of context-specific reasons instead of the common manner of focusing on more broadly beliefs and values. Reasons for and against adoption depend on the type of innovation and the context of adoption and are therefore likely to vary. Knowing this, we can conclude that reasons differ from more general beliefs and values. Reasons form context-specific understanding which are translated in behavioral explanation towards an innovation. So, consumers can have many beliefs or give value to the attributes of an innovation, beliefs and values are not necessarily salient determinants of consumers adoption or rejection processes. The rejection of hypothesis 5 validates this. Also, beliefs on innovation characterizes have been widely criticized in the literature (Claudy, Garcia & O'Driscoll, 2015). Researchers have described beliefs as the garbage pail in which 'undefinably innovation adoption characteristics are dumped' (Tornatzky & Klein, 1982). BRT enhance this criticism.

BRT states that reasons need to be withdraw in regard to specific behavior and context. By doing so the chance of identifying the salient factors that contributes to people's decision process to adopt or reject an innovation increases. In order to elicit those context specific reasons for and against scholars and managers can use qualitative methods like interviews

and focus groups. This study shows that such a qualitative method as focus group is an effective way to identify specific reasons for and against adoption. Within BRT these elicited reasons can be evaluated and their relative importance in consumers adoption decisions can be determinant. With the potential results in considering, innovations can be more effectively developed and/or marketed.

Thirdly, BRT allows for distinction between the several different psychological paths during consumer adoption decisions and to see which may or not be activated. The literature consists of many experimental studies on specific psychological processes that consumers experience during the evaluation to adopt or not to adopt an innovation (Wood & Moreau, 2006), empirical research on innovation adoption often over-simplifies psychological process in consumer adoption decisions (Claudy, Garcia & O'Driscoll, 2015). On the other hand, frameworks and model that become too extended might be too complex to test empirically. So, BRT should be more adopted by researchers as it is capable of separating different psychological paths without being over complex. It allows to test additional cognitive routers in consumers' adoption decisions in an empirically way.

In our study, we found evidence of two distinct cognitive paths in in the adoption process of the consumer. First, people's values positively influence their reasons for adoption, which results in more positive attitudes, and in a higher intention of adoption. In this matter, individuals values (openness of change) motivate their reasoning what leads to a higher potential adoption rate. Literature on motivational reasoning confirms this arguing that consumers search, evaluate and weigh resulting in a judgement for a self-serving, goal affirming purpose (Kunda, 1990). However, we now just evaluated one distinct psychological path concerning reasons for adoption what very commonly to do is in the literature of adoption. The inclusion of a distinctive psychological path of reasons against makes this study more valuable. When including reasons against in our assessment a different image appears. In this matter, Individuals values (openness of change) influence their reasoning against adoption, which results in more negative attitudes, and in a lower intention of adoption. So, besides that individuals values positively influence reasons for adoption and therefore attitudes and adoption intentions it becomes apparent that individuals can still resist adoption because of strong reasons against.

5.3 Managerial Implications

The study holds important implications for managers in the context of adoption and resistance of innovation. Comparatively to the literature, managers have been focused traditionally seen on embracing the positive attributes of innovations value propositions. Firms and their marketers have been advised to focus on communicating the relative advantage of innovations in comparison with existing products and services. However, this study argues that just focusing on the advantages might be too short-sighted. Especially, when innovations might need changes in the behavior, norms and traditions of the customers in daily-life (Ram & Sheth, 1989). For example, consider the strong influence of security, as reason against adoption of e-grocery smart lock delivery in this study.

Furthermore, this study demonstrates again that anti-adoptions constructs are not logical opposites of adoption constructs in the pursue of previous studies (Westaby, 2005; Claudy,

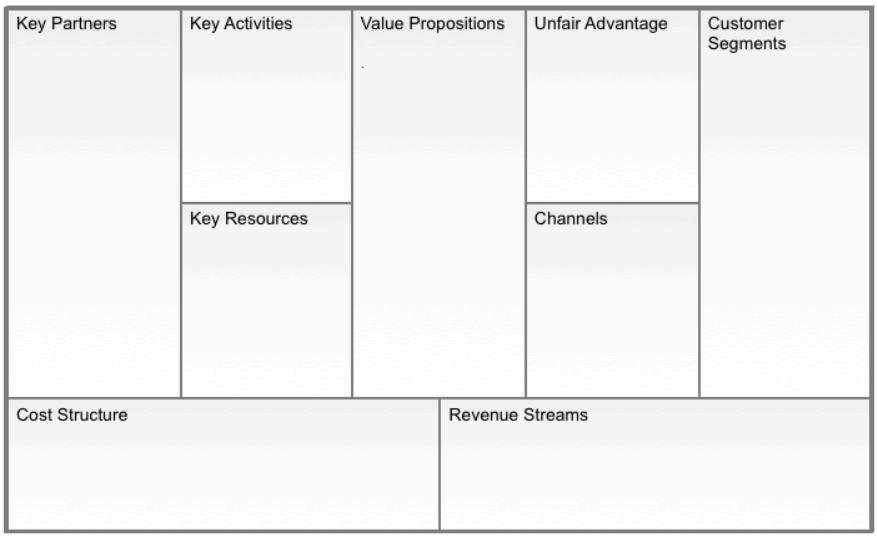
Garcia & O'Driscoll, 2015; Gupta & Arora, 2017). As well as they, we argue that managers should focus more on context-specific reasons for and against adoption of innovations. Especially, reasons against adoption deserve more attention know to the fact that consumers often weight anti-adoption factors disproportionally higher than adoption factors (Gourville, 2006).

The above implications are especially relevant in this case as we have noticed that potential customers follow a well-considered path to decide to adopt or to reject e-grocery smart lock delivery. Concerning this specific innovation, potential customers do not simplify their decisions and therefore the understanding of adoption and resistance factors is crucial. It could help marketers to position this concept successfully in the market. For example, the use of a security-camera in the smart lock solution might dissolve the usage barrier. Future research on the enabling and rejecting factors of e-grocery smart lock delivery could help to determine solutions to solve the barriers the resistance factors raise.

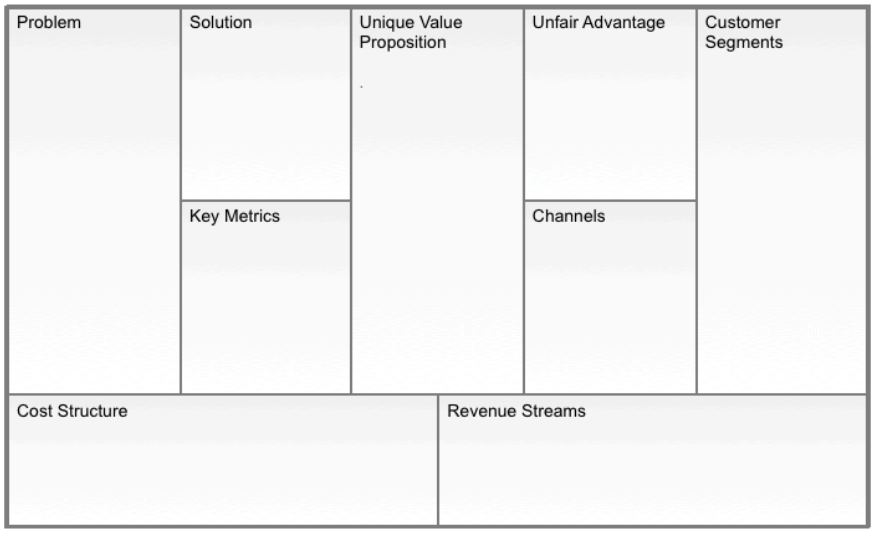
This study shows that Behavioral Reasoning Theory offers the business and its managers a framework in which effectively reasons for and against adoption can be identified and moreover evaluated. In a two-step research, valuable insights can be achieved. First, managers should identify the critical reasons that influence attitude and adoption intentions by qualitative research such as a focus group as presented in this example. Second, further validation of these insights should be made using quantitative approaches like consumer surveys. Resulting in an estimation of the relative influence of reasons for and against during the consumers adoption process. Especially, in the digital world of today, it has never been so easy to collect data from your targeted customer segment for managers (Claudy, Garcia & O'Driscoll, 2015). Summarized, Behavioral Reasoning Theory could provide managers a framework to seek for valuable and deeper consumer insights and therefore help to achieve adoption of the particular innovation into mainstream markets.

6. APPENDIX

A. Business Model Canvas (Osterwalder & Pigneur, 2010)



B. Lean Business Model Canvas (Maurya, 2011)



C. Survey

Adoption intentions

1) I will use e-grocery delivery through smart locks in the future.
2) I see myself using e-grocery delivery through smart locks in the future.

Attitude towards adoption

3) In general, I think e-grocery delivery through smart locks is a good idea.

4) E-grocery delivery through smart locks has many advantages.

RF Convenience (perceived usefulness)

5) E-grocery delivery through smart locks is a good idea because I do not want to spend time waiting on the arrival of my groceries.
6) E-grocery delivery through smart locks suits me better than regular e-grocery delivery.
7) E-grocery delivery through smart locks makes my life easier.

RF Flexibility (relative advantage)

8) E-grocery delivery trough smart locks is useful because I do not have to stay at home for the delivery of groceries.
9) E-grocery delivery enlarges my flexibility.
10) Due E-grocery delivery trough smart locks I am capable of receiving my groceries at home.

RA Safety (usage barrier)

11) I am worried about the safety of smart locks.
12) I feel my privacy comes in jeopardy during e-grocery delivery through smart locks.
13) I am worried about the security of my personal belongings during e-grocery delivery through smart locks.

RA Costs (value barrier)

14) I think the installation costs of a smart lock is too high.
15) The benefits if e-grocery delivery through smart locks outweighs the costs of installing a smart lock.

Ra Risk (Risk barrier)

16) I am worried about the reliability of performance of the smart lock.
17) I am worried if e-grocery delivery through smart locks can meet my expectations.

Values - Openness of change

18) I like surprises and I am open for change.
19) I seek for adventures and I like to take risks.

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