

Navigating the Aisles

Examining the Impact of Technology-enabled Personalisation on Consumer Behaviour in
the Dutch Grocery Retail Sector

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ABSTRACT

Various retailers worldwide are enacting personalisation strategies to provide their consumers personalised content. Studies have shown that these personalisation strategies play a significant role in their ability to achieve a competitive advantage. Over the past decade, retailers around the world have experimented with offering highly personalised content by utilising the collected user data from their digital and physical buying experience. This is done to achieve more seamless and deeper levels of personalisation across different touchpoints beyond transaction data. This personalisation is driven both by collecting data about consumers' online behaviour and about their real-life behaviour captured by in-store sensors, such as Internet of Things (IoT) infrastructures and consumer-operated interactive digital screens. Although previous research outlined how the implementation of smart objects improves or deteriorates the social dynamics and interactions between consumers and retailers and what individual factors affect consumers' intention to adopt new technologies, it remains unknown how the behaviour of Dutch consumers is affected when Technology-enabled Personalisation (TEP) technologies are implemented by supermarkets. Additionally, it is unclear how supermarkets could implement TEP technologies in a way that suits Dutch consumers' needs and what measures should be taken for protecting their privacy. Unravelling these gaps assist supermarkets in achieving a competitive advantage in which consumer-object relationships are created that foster a positive privacy calculus and increase consumers' technology adoption. This study aims to fill this gap by answering how TEP technologies used in the grocery retail sector affect consumers' behaviour in the Netherlands. Fifteen in-depth interviews were conducted to gain a thorough understanding of consumers' perspectives, experiences, and perceptions when interacting with TEP technologies. Two scenarios were devised in which participants reflected on their imaginary interaction with TEP technologies. Each scenario was depicted as a storyboard to increase the clarity of the context in which these technologies will be used. This study found that Dutch consumers should have more control over their own decisions and over the actions of the implemented technologies than the technologies themselves, making that consumers should be the final decision-maker. This entails that technology usage should be voluntary and that consumers must be voluntarily informed about supermarkets' substantiation on their data collection procedure. Moreover, consumers desire a transparent explanation on supermarkets' data collection procedure to improve their perceived data congruence on datapoints to be collected and to make informed choices about what personal data to share. Consumers also stressed that the presence of an independent external party that monitor supermarkets' working of their data collection practices will increase the reliability of supermarkets' substantiation. To protect consumers' privacy, TEP technologies should ask for consumers' consent before enacting decisions. Recommendations should also be as private as possible, as consumers preferred staying anonymous during grocery shopping. Lastly, consumers expect the depicted recommendations to be highly personalised in order to assist them during grocery shopping. This can be achieved by providing content adapted to consumers' eating style and by assisting them in navigating and remembering what products to buy.

KEYWORDS: *Technology-enabled Personalisation, Assemblage theory, Technology Readiness, Personalisation-Privacy Paradox, Consumer surveillance*

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1. Introduction

1.1. Personalisation strategies and smart technologies

Retailers worldwide have enacted various personalisation strategies to provide their consumers personalised content. Several studies argued that the implementation of personalisation strategies plays a significant role in retailers' ability to achieve competitive advantages (Scholdra et al., 2023, p. 2), as it allows them to offer the right content to the right customer at the right time and at the right place (Sunikka and Bragge; 2012, p. 2). A well-known personalisation strategy is the implementation of loyalty or reward programmes. These are programmes in which personally identifiable data at the point of transaction are collected and used for providing points that can be redeemed for discounts and free goods (Pridmore, 2008, p. 17). Several retailers around the world have experimented over the past decade with offering highly personalised content by utilising the collected user data from their digital and physical buying experience. This allows for creating more seamless and deeper levels of personalisation across different touchpoints beyond transaction data (Boudet et al., 2019, para 13; Riegger et al., 2021, p. 2).

This personalisation is driven both by collecting data about consumers' online behaviour and about their real-life behaviour captured by in-store sensors (Cena et al., 2019, p. 7), such as Internet of Things (IoT) infrastructures and consumer-operated interactive digital screens (Chen & Chang, 2023, pp. 3 – 4). The use of technologies for providing relevant and context-specific information to encourage certain shopping behaviour is conceptualised as Technology-enabled Personalisation (TEP) (Riegger et al., 2022, p. 2). Various retailers in Asia, Europe, and North America have experimented with implementing TEP technologies in their stores. This was done to target consumers with personalised recommendations and advertisements, for instance based on consumers' biometrical characteristics and in-store behaviour by tracking their smartphone's location (Hess et al., 2020, p. 2; Riegger et al., 2022, p. 3). A small range of supermarkets also experimented with implementing TEP technologies. Asian supermarkets 7-Eleven and Lotus experimented with providing personalised recommendations based on consumers' loyalty card data and their predicted emotions through facial recognition (Chan, 2018; KanKan, 2019). British supermarket Tesco and German supermarket Real also experimented with providing personalised recommendations on public digital screens by predicting consumers' emotions through facial recognition (Jansen, 2017; Hawkes, 2013). However, these supermarkets also predicted consumers' gender and age for providing fitting personalised advertisements. Furthermore, Dutch supermarkets Albert Heijn and Jumbo conducted pilot studies on

implementing beacon technologies that track consumers' location (Homan, 2016; NOS, 2015), but are currently not deploying any TEP technologies.

1.2. Previous research on technology adoption

Previous research has shown that consumers' attitude to use and adopt new technologies depends both on technological and individual factors. It is known that the way how TEP technologies are deployed determines the extent to which social dynamics and interactions between consumers and retailers are affected. To elaborate, Novak and Hoffman (2019, p. 10) showed that smart objects can affect and be affected by other human and non-human agents by enacting different levels of agency, authority, and autonomy. This entails that smart objects can be implemented by companies in ways that enable or constrain the agency of itself and that of consumers during consumer-object interactions. The study argues that this ultimately determines whether consumers experience positive or negative consumer-object relationships.

Furthermore, previous research has indicated that the presence of consumer-object relationships increases companies' ability to enact surveillance capabilities that can record user data (Haggerty & Ericson, 2000, p. 6). Elnahla and Neilson (2021, pp. 13 – 16) conceptualised that surveillance technologies can be implemented in various ways, for instance in public or hidden ways and to assess collected data in real-time or in retrospect. This contributes to achieving a competitive advantage for companies, as these technologies enable them to examine their collected user data by reassembling them in the hope of devising new strategic practices (Haggerty & Ericson, 2000, p. 11).

Previous research has also stressed that consumer-company relationships crumble when consumers feel that companies' surveillance practices endanger how and when their personal data is collected (Plangger & Montecchi, 2020, p. 2; Westin, 1967). This is for instance the case when companies are insufficient in mitigating the sensitivity of the data to be collected, increasing the transparency of the data collection process, and increasing the amount of control that consumers have in altering the data collection process (Bleier et al., 2020, pp. 7 – 9). It is argued that consumers will only share their personal information as long as they believe that they will obtain sufficient benefits in return that outweigh the perceived risks associated with disclosing this information (Culnan & Armstrong, 1999, p. 4; Thibaut & Kelley, 1959), which is conceptualised as the 'privacy calculus' (Culnan & Bies, 2003, p. 5; Laufer & Wolfe, 1977, p. 14). Elnahla and Neilson (2021, pp. 16 – 18) described that consumers can become aware of companies' surveillance practices and understand the

broader benefits and risks of sharing personal data. When consumers experience a negative privacy calculus and when companies are insufficient in creating an environment where control is given to consumers, consumers will take various countermeasures to curb a company's power and protect their privacy, such as by giving false information and refusing to share information (Lwin et al., 2007, p. 3).

Lastly, research has shown that various individual characteristics determine to what extent feelings of privacy insecurity emerge when adopting new technologies. Both Goldfarb and Tucker (2012, p. 4) and Venkatesh et al. (2012, p. 16) found age, gender, and experience influencing consumers' intention to utilise technologies. For instance, privacy concerns increased quicker over time when consumers were aged 45 years and older and younger consumers with little usage experience have a greater tendency to experiment with technologies to seek novel information (Venkatesh et al., 2012, p. 7). Moreover, older men that already have technological usage experience tend more to rely on their habits when experiencing new situations, making that processing new information is harder (Venkatesh et al., 2012, p. 16). While people with high levels of Technology Readiness (TR), which are individuals' attitudes to use and adopt new technologies (A. Parasuraman, 2000, p. 308), are more open to experiencing and successfully utilise new technological situations, people with low levels of TR feel more anxious and are more inclined to reject new technologies (Roy et al., 2018; Wang et al., 2017).

1.3. Academic and social relevance

Various studies have been conducted on consumers' motives of using smart technologies in supermarkets. These include their experienced advantages and disadvantages of using smart technologies (Inman & Nikolova, 2017; Riegger et al., 2021; Roy et al., 2018), hedonic and utilitarian values of technologies (Chang et al., 2023; J. Chen & Chang, 2023), and feelings influencing their technology usage (Plangger & Montecchi, 2020; Venkatesh et al., 2012; Xu et al., 2011). Furthermore, various studies also addressed consumers' experienced privacy concerns of using smart technologies in supermarkets (Elnahla & Neilson, 2021; Graeff & Harmon, 2002; Krishen et al., 2017; Scarpi et al., 2022; Xu et al., 2011) and what individual factors (A. Parasuraman, 2000; Blut & Wang, 2019; Culnan & Bies, 2003; Goldfarb & Tucker, 2012; Plangger & Montecchi, 2020; Venkatesh et al., 2012; Xu et al., 2011) and external factors (Lwin et al., 2007) alleviate or deteriorate these concerns. Although these studies outlined how the implementation of smart objects improves or worsens the social dynamics and interactions between consumers and retailers,

and what factors affect consumers' feelings of privacy invasion and intention to adopt new technologies, there is limited research on the reaction of Dutch consumers to the implementation of TEP technologies in supermarkets in the Netherlands. To the best of the researcher's knowledge, this is one of the first studies that addresses the intersection of TEP, changes in consumer-object relationships, and fostering consumer privacy in the Netherlands aimed at supermarkets as a specific retailer. It therefore remains unknown how the behaviour of Dutch consumers is affected when TEP technologies are implemented by supermarkets and how supermarkets could implement TEP technologies in a way that suits consumers' needs and what actions should be taken for protecting consumers' privacy. Unravelling these gaps assist supermarkets in creating consumer-object relationships that foster a positive privacy calculus and increase consumers' TR.

1.4. Research question and chapter outline

This study aims to fill the aforementioned gap by answering the following research question: how do Technology-enabled Personalisation (TEP) technologies used in the grocery retail sector affect consumers' behaviour in the Netherlands? Chapter two provides an overview of the relevant theoretical concepts needed for understanding the intersection of TEP, changes in consumer-object relationships, and fostering consumer privacy. This chapter first examines what TEP technologies are currently used by supermarkets to unravel the current state of this phenomenon. Second, this chapter examines how TEP technologies affect the social dynamics and interactions between consumers and retailers. This is done to unravel Dutch consumers' feelings when these technologies are implemented in a way that enables or constrains their behaviour. Third, this chapter examines what concerns TEP technologies create for consumers regarding the collection and use of their personal data. This is done to specify how and when Dutch consumers' privacy is invaded by TEP technologies. Lastly, this chapter seeks consumers' potential future trends in TEP in the grocery retail sector. This is done to unravel preferences of consumers that supermarkets should consider when implementing TEP technologies. Chapter 3 described in detail how these concepts are operationalised and how in-depth interviews as method is used for gathering relevant data on this study's aim. The results are critically discussed in chapter 4, which reflects on previous conducted studies and link to the theory described in chapter 2. Lastly, chapter 5 presents the main findings and its implications for society and academia.

2. Theoretical framework

This chapter will elaborate on relevant theoretical concepts related to the main goal of this research. Section 2.1. highlights how various contemporary personalisation technologies open possibilities to collect user data and identify preferences of individuals. Section 2.2. focuses on how the possible different implementations of these personalisation technologies can deteriorate or improve a user's experience. Section 2.3. highlights which personal characteristics play a role in accepting or rejecting technology usage and how privacy concerns can emerge due to retailers' implementation of personalisation technologies. Section 2.4. describes how this implementation affects consumers' feelings of privacy. Lastly, section 2.5. describes consumers' current awareness on already implemented personalisation technologies and how potential future trends might impact consumer behaviour in the Netherlands.

2.1. In-store smart retail technologies

2.1.1. User identification through enacting personalisation strategies

An array of studies argued that the adoption of personalisation strategies plays an important role in retailers' functioning for gaining competitive advantage, as it allows them to offer the right content to the right customer at the right time and at the right place (Scholdra et al., 2023, p. 2; Sunikka and Bragge; 2012, p. 2). Personalisation is generally understood as both the automatic and manual adaptation of content to fit users' preferences (Frias-Martinez et al., 2009, p. 2) based on their previous transactions or behaviour (Montgomery & Smith, 2009, p. 4). Scholdra et al. (2023, pp. 2 - 14) devised a framework that illustrates five main steps that retailers should follow for achieving a successful personalisation experience.

The first step consists of identifying preferences that fit each individual customer. These are the preferences that are already known to the customer and identified by the retailer, and those that are unconscious to the customer and remain unclear for the retailer (Coupey et al., 1998, p. 4; Scholdra et al., 2023, p. 4). Retailers can identify these preferences both on an individual-level or segment-level. Individual-level identification entails the creation of customer profiles containing detailed information on characteristics, preferences, behaviours, and needs of individual customers (Khan et al., 2009, p. 3; Scholdra et al., 2023, p. 5), while segment-level identification refers to dividing homogeneous groups of customers into separate groups (Scholdra et al., 2023, p. 5). Scholdra et al. (2023, p. 9) noted hereby that segment-level identification fits physical retailers better than individual-

level identification, as the presence of multiple customers at the same time complicates the process of offering personalised content to each individual.

The second step aims at preparing the personalised content by analysing the various touchpoints customers interact with during their customer journey, which is coined as attribution modelling by Kannan et al. (2016, p. 2). Attribution modelling assist retailers in detecting touchpoints that have the greatest influence on changing customer behaviour by providing personalisation, such as increasing the store visiting time (Scholdra et al., 2023, p. 10). When providing personalised content, retailers should adapt the breadth and depth of the personalisation to fit each individual customers' preferences. Breadth refers to the ability of frontline employees and the utilised technologies to create intimate personalisation experiences, such as greeting customers by name and providing them location-based pricing, while depth describes the degree of intimacy, such as recommending products based on customers' familiarity with a certain topic (Scholdra et al., 2023, p. 6).

The third step focuses on delivering the personalised content to customers via employees, technologies, or a combination of both. Customers can both play an active role in this process, whereby they interact with employees and technologies to receive personalise content, or a passive role whereby personalisation occurs without interactions or awareness of the customer (Scholdra et al., 2023, p. 6). The fourth step reflects whether the enacted personalisation is conducted in an ethical way. Scholdra et al. (2023, p. 13) posit that retailers need to be aware of legal regulations, such as the General Data Protection Regulation (GDPR), and respect ethical concerns that may arise when collecting user data. In addition, retailers need to understand and adapt individual customer characteristics, such as their willingness to digest personalised content in order achieve a successful personalisation experience (Scholdra et al., 2023, pp. 13 - 14).

The fifth and final step entails deciding whether the personalisation will be conducted by employees or technologies. In the last decade, various retailers have utilised smart retail technologies to combine frontline employees' traditional personalisation skills with information on customers' past and real-time interactions captured by these technologies (Hess et al., 2020, p. 2; Inman & Nikolova, 2017, pp. 17 - 18; Riegger et al., 2021, p.3; Riegger et al., 2022, p. 3; Scholdra et al., 2023, p.5). This combination of digital and physical personalisation dimensions is known as Technology-enabled Personalisation (TEP) and is characterised by the analysis of vast amounts of user data to make data-driven recommendations (Scholdra et al., 2023, p. 3; Riegger et al., 2022, p. 2). According to Simmler and Frischknecht (2021), TEP contains of both a low-level and high-level degree of

automation. The low-level degree of automation posits that a technology assists people to make decisions by making suggestions but remains absent in making their final decision (Simmler & Frischknecht, 2021, pp. 5 – 6). The high-level degree of automation entirely replaces frontline employees' functioning and autonomously personalises content for customers (Simmler & Frischknecht, 2021, pp. 6 – 8).

By contrast, the exploitation of user data by retailers is considered as a fear of customers. It is known that consumers dislike retailers manipulating their decision-making by misusing their personal information (Riegger et al., 2021, p. 5). Furthermore, TEP technologies and their human-like functioning may cause incongruences negatively affecting the shopping experience, as customers do not expect these technologies to take over human tasks (Riegger et al., 2021, p. 10). This coincides with consumers' lack of confidence in using (new) technologies. Section 2.2. and section 2.3. will elaborate on how these factors affect consumer-object relationships. Lastly, customers' feelings of privacy invasion can lead to negative reactions. Riegger et al. (2021, p. 8) report that customers' disclosure of identity, feelings of being watched, and retailers' lack of transparency on their data collection procedure all evoke anxiety among customers. Section 2.4. describes consumers' (un)willingness to sacrifice their privacy for receiving potential benefits and how companies play a role in tackling occurring privacy concerns.

2.1.2. Technologies deployed in Smart Physical Retail Spaces

Stores that deploy TEP are known as Smart Physical Retail Spaces (SPRS), which personalise the customer experience across different touchpoints based on digital and physical user data (Riegger et al., 2021, p. 2; Roy et al., 2017, p. 3). SPRS deploy technologies that provide customers a self-service experience that give them more control over their in-store surroundings (Chen & Chang, 2023, p. 1; Roy et al., 2017, p. 2). Both the studies of Riegger et al. (2021, p. 3) and Chen and Chang (2023, pp. 3 – 4) conceptualise that TEP technologies deployed by SPRS can be divided in different categories. Riegger et al. (2021, p. 3) made hereby the distinction between immersive and immobile systems, mobile systems, and hybrid systems. Immersive and immobile systems refer to technologies that are provided by retailers and can be used by customers as self-service technologies to complete tasks without the assistance of employees, such as smart mirrors. Mobile systems contain customers' personal smartphones on which applications of retailers are used for collecting user data and providing personalised content. Hybrid systems are a combination of the two and refer to mobile devices that are provided by retailers, such as handheld

scanners. The conceptualisation of Chen and Chang (2023, pp. 3 – 4) differs and posits that the deployed TEP technologies consists of retail-facing technologies and consumer-facing technologies. While retail-facing technologies refer to technologies that are implemented but cannot be perceived by customers, such as hidden sensors for Internet of Things (IoT) infrastructures, consumer-facing technologies are exposed to and can be used by customers, such as interactive devices and digital screens.

A technology that can influence customers' behaviour when using immersive and immobile, mobile, or hybrid systems are IoT technologies. IoT technologies consist of an infrastructure of sensors that collect user data, such as customers' real-time in-store motion and emotions, to provide them with tailored content and ultimately influence their decision-making (Hamilton et al., 2020, p. 2; Roe et al., 2022, p. 2). With use of the collected user data, IoT technologies are able to predict and address customer needs in real-time (Roe et al., 2022, p. 2). This is, for instance, done by identifying customers through beacon technologies when entering a certain aisle and giving them personalised recommendations based on their purchase history (Roe et al., 2022, p. 2), making that their path through the store and possible items bought are altered (Hui et al., 2013, p. 2).

An array of companies has already deployed TEP technologies in their daily operations. Both Samsung and supermarket Real utilised facial recognition cameras that scan customers' faces when looking at digital displays to predict their estimated age and gender (Harman, 2019, para 5; Jansen, 2017, para 1). This was done to provide customers with product recommendations and background audio fitting their predicted demographic clusters, meaning that user preferences were predicted by using segment-level identification. Moreover, both Nordstrom and Timberland tracked customers' in-store location by identifying the location of their smartphones or utilised retailer-owned tablets (BeaconEdge, 2016; Hutchings, 2016). By doing so, personalised content was depicted on these devices.

Overall, the five personalisation strategies for achieving successful personalisation experiences, available contemporary TEP technologies, and their ability to identify customers' short-term and long-term user features open possibilities to track consumers' in-store actions. The utilisation of immersive, immobile, mobile, and hybrid IoT technologies make it possible for retailers to collect detailed information about customers' past and real-time interactions. This collected data can then be analysed by retailers to offer benefits for customers by showing personalised content on TEP technologies. Retailers should be aware that this content and TEP technologies can be viewed as intrusive by customers when they are deployed in a way that does not suit their needs and beliefs.

2.2. Affected consumer-object relationships

2.2.1. Changes in consumer-object assemblages

Due to the ability to provide personalised content based on collected user data, one could argue that the TEP technologies described in chapter 1 can be considered as smart objects. Harman (2002) posits that objects can be described as implemented items that are taken for granted. Both Franklin and Graesser (1997, p. 2) and Novak and Hoffman (2019, p. 10) argue that smart objects have the ability to affect and be affected by other human and non-human agents. Novak and Hoffman (2019, p. 10) posit hereby that three characteristics determine the degree of this ability: authority, autonomy, and agency. Authority describes the degree to which smart objects are entitled to control how they react to other agents and how these agents react to them (Hansen et al., 2007, p. 13; Novak & Hoffman, 2019, p. 10). Consequently, Bulygin (1986, p. 211 – 218) argues that objects with higher authority have more permits than objects with lower authority. Autonomy refers to the degree to which smart objects can replace tasks that were carried out by humans before (R. Parasuraman et al., 2000, p. 2). One could argue that objects possessing high levels of autonomy are experienced negatively by consumers, as Riegger (2021, p. 7) confirmed that consumers do not expect TEP technologies to take over human tasks. Lastly, agency refers to the ability to affect and be affected when interacting with other agents (Franklin & Graesser, 1997, p. 3). A vast array of studies utilised the assemblage theory to assess how the properties of humans and objects stabilise or destabilise the quality of their interactions (Bryant, 2011; DeLanda, 2016; Deleuze & Guattari, 1987; Harman, 2002). The assemblage theory is characterised as a socio-material theory acknowledging that objects have their own importance in existence and that their properties give them more importance than the perceptions or interactions of consumers (Harman, 2002).

2.2.2. Agentic and communal roles of consumers and objects

Novak and Hoffman (2019, p. 8) posit that consumers and objects can enact agentic and communal roles during consumer-object interactions. Agentic roles entail that consumers and objects affect the assemblage by enabling and constraining the interactions, while communal roles entail that consumers and objects are affected the assemblage itself, either by being enabled or constrained. Novak and Hoffman (2019, pp. 4 – 5) argue that both roles define the experience of each consumer and object in an assemblage and that these experiences can either be positive or negative. These positive experiences are conceptualised as self-extension experiences and as self-expansion experiences (Aron et al., 2004, pp. 4 – 5;

Belk, 2014; Hoffman & Novak, 2018, p. 6) and the negative experiences are conceptualised as self-restriction experiences and self-reduction experiences (Hoffman & Novak, 2018, p. 6).

Self-extension experiences acknowledge that digital and physical objects can enhance consumers' identities to broaden their sense of self, giving their lives greater purpose (Hoffman & Novak, 2018, p. 6). This means that consumers use their own agentic role to improve the quality of the whole assemblage (Hoffman & Novak, 2018, p. 6). Self-expansion experiences refer to consumers' absorption of the abilities of other objects in the assemblage to empower their own agentic role (Aron et al., 2004, p. 4). This combination of multiple abilities results in a greater influence for consumers to affect a part of the assemblage itself (Hoffman & Novak, 2018, p. 6). Contrary, self-restriction experiences and self-reduction experiences refer to the opposite. Self-restriction experiences entail that consumers' agentic roles constrains its part-whole interaction in the assemblage, for instance by having limited knowledge on how to control the other objects and therefore slowing down the assemblage's effectivity (Hoffman & Novak, 2018, p. 6). Self-reduction experiences describe the situation in which the other objects in an assemblage have gained the power to restrain the agentic role of the consumer itself (Hoffman & Novak, 2018, p. 6), making that these objects have a higher authority than the consumer.

2.2.3. Four styles of consumer-object relationships

Novak and Hoffman (2019, pp. 8 – 11) conceptualise that the consumer-object assemblages established by the different types of consumer-object interactions and accompanying agentic and communal roles ultimately result in four different consumer-object relationships. The study showed that these relationships are the most positive when one of the agentic roles is high and the other one is low and when communal roles are both high or low. Novak and Hoffman (2019, pp. 11 – 12) made hereby a distinction between three different relationships, which will be discussed in the next paragraphs.

Master-servant relationships are considered as the most positive relationships and include two types, complementary master-servant relationships and non-correspondent master-servant relationships. Complementary master-servant relationships contain reciprocal agentic roles and correspondent communal roles, meaning that consumers feel more agentic than the objects around them and trust the agentic role of objects for making appropriate decisions (Novak & Hoffman, 2019, p. 11). Non-correspondent master-servant relationships contain reciprocal agentic roles and opposite communal roles, meaning that

this relationship is less steady and self-restriction experiences are more likely to occur (Novak & Hoffman, 2019, p. 11).

Partner relationships contain only high or low agentic and communal roles, meaning that consumers and object have a mutual dependence (Novak & Hoffman, 2019, p. 12). Due to this characteristic, partner relationships are less stable than master-servant relationships and cause consumers to experience tensions with other objects in the assemblage (Horowitz et al., 2006, p. 11; Novak & Hoffman, 2019, p. 12).

Lastly, unstable relationships are considered as the most negative type of consumer-object relationships (Novak & Hoffman, 2019, p. 12). These relationships contain non-reciprocal agentic roles and non-correspondent communal roles, meaning that unstable relationships emerge as consumers and objects behave in opposite ways they expect from each other (Horowitz et al., 2006, p. 12). This leads to product abandonment on the long term (Novak & Hoffman, 2019, p. 12).

To balance a consumer-object relationship, Novak and Hoffman (2019, pp. 13 – 16) argue that two types of consumer-object relationships should be maintained to prevent a relationship to deteriorate. First, relations should be maintained where consumers own a high agentic role and objects a low agentic role, called consumer master-object servant relationships. Second, object master–consumer servant relationships should be maintained where consumers own a low agentic role and objects a high agentic role. Being aware of the type of relationship that currently occurs helps managers to understand when consumer-object relationships might become unstable and helps them to take appropriate actions on time.

One could argue that the way how TEP technologies are deployed determines the extent to which social dynamics and interactions between consumers and retailers are affected. The way how preferences are identified by deploying individual- or segment-level identification and the extent of the breadth and depth of the shown personalised content, as described in section 2.1.1., determines the level of authority, autonomy, and agency of the technologies described in section 2.2.1. For instance, technologies with high levels of individual-level identification could have high levels of autonomy, as they can replace human tasks that focus on identifying preferences of individual customers. These technological characteristics, together with retailers' awareness of ethical technology implementation and consumers' drivers and barriers of technology usage, as also described in section 2.1.1., determine the extent of the agentic and communal roles that both consumers and object can enact to influence each other, as described in section 2.2.2. These

characteristics determine whether consumers feel enabled or constrained by the implemented technologies, for instance when they feel that they are not in control over a technology's actions and that their privacy will be breached by how a technology is implemented. This ultimately creates a consumer-object assemblage that deteriorates a user's experience, as mentioned in section 2.2.3.

2.3. Consumers' technology usage

2.3.1. Technology Readiness

To further understand how consumer-object relationships are established, one should look at individuals' Technology Readiness (TR) in an assemblage. TR refers to individuals' attitude to use and adopt new technologies in order to accomplish a variety of objectives in their daily lives (A. Parasuraman, 2000, p. 308). The TR construct describes that consumers both hold positive and negative beliefs towards new technologies and that they balance these beliefs to maximise the added value of a technology without experiencing failure or frustration (A. Parasuraman, 2000, p. 6; Chen & Chang, 2023, p. 6). The study of A. Parasuraman (2000, pp. 4 – 5) conceptualised that TR consists of the dimensions optimism, innovativeness, discomfort, and insecurity. Optimism refers to having a positive feeling towards technology and believing that technologies provide increased flexibility, efficiency, and control (A. Parasuraman, 2000, p. 5). Innovativeness describes peoples' propensity to be a pioneer in technology or an opinion leader (A. Parasuraman, 2000, p. 5; Roy et al., 2018, p. 3). Discomfort described peoples' perception of lacking control over a technology and feeling too overwhelmed to understand its functionalities (A. Parasuraman, 2000, p. 5; Roy et al., 2018, p. 3). Insecurity refers to peoples' distrust and scepticism about a technology's capability to assist them in achieving their current tasks (A. Parasuraman, 2000, p. 5). The study of A. Parasuraman (2000, p. 3) shows that optimism and innovativeness are considered as drivers that encourage individuals' TR, while discomfort and insecurity are considered as inhibitors that deter individuals' TR. These drivers and inhibitors are individual-specific and system-independent (Roy et al., 2018, p. 3) and make up individuals' positive and negative beliefs towards new technologies.

While people with high levels of TR are more open to experiencing new technological situations and can easier handle difficulties and discomforts when using new technologies, people with low levels of TR feel more anxious and suspicious and are more inclined to oppose new technologies (Roy et al., 2018, p. 3; Wang et al., 2017, p. 4). Moreover, people with high levels of TR are considered more enthusiastic, at ease, and

skilled when using innovative technologies and, therefore, less likely to run into technical problems (Chang & Chen, 2021, p. 4). These characteristics make that people with high levels of TR are more likely to understand the sophisticated features of SPRS and how these features can assist them in fulfilling their shopping objectives (Roy et al., 2018, p. 3).

2.3.2. Technology Readiness classifications

Parasuraman and Colby (2015, p. 13) devised five segments that classify consumers based on their TR levels: sceptics, explorers, avoiders, pioneers, and hesitators. Sceptics refer to consumers who have a distanced view on technology and have less extreme positive and negative views on technology. Explorers are described as consumers who exhibit strong motivation and low resistance on using technology. Avoiders are consumers who exhibit high levels of resistance towards technology and have low levels of motivation. Pioneers are consumers that hold strong positive and negative views towards technology and hesitators are consumers who lack innovativeness. Most consumers are regarded as sceptics (38%), followed by explorers (18%), avoiders (16%), pioneers (16%), and hesitators (13%) (A. Parasuraman & Colby, 2015, p. 13). A. Parasuraman and Colby (2015, p. 13) show that explorers have the highest levels of TR and are young, higher educated, and have more technology-related experiences. Sceptics, avoiders, and hesitators are on average older than 50 years, lower educated, and have less technology-related experiences (A. Parasuraman & Colby, 2015, p. 13).

Similarly, both Goldfarb and Tucker (2012, p. 4) and Venkatesh et al. (2012, p. 16) found age influencing consumers' intention to utilise technologies. Goldfarb and Tucker (2012, p. 4) found that privacy concerns about technology usage for young consumers (aged 25 to 45) and old consumers (aged 45 years and older) increased gradually over time, while older consumers' privacy concerns increased quicker over time. This is in line with Venkatesh et al. (2012, p. 7), who confirmed that age moderates consumers' behavioural intentions to utilise technologies. This effect was stronger among older consumers who identified themselves as female, as older women rely more on external supporting factors that assist them in utilising new technologies than older men (Venkatesh et al., 2012, p. 16).

2.3.3. Factors mediating Technology Readiness

Blut and Wang (2019, pp. 5 – 18) found that the establishment of peoples' TR is mediated by several factors. The study found that the two user attitudes of the Technology Acceptance Model (TAM) mediate peoples' TR levels. The TAM is a concept used to

explain peoples' acceptance of various digital technologies and includes the user attitudes usefulness and ease of use (Blut et al., 2016, p. 1; Davis et al., 1989, p. 3). Usefulness describes potential users' likelihood that utilising a specific technology would enhance their capacity to finish a particular task (Davis et al., 1989, p. 7). Users who consider themselves as innovative are more likely to consider technologies as useful, as they are keener to discover benefits by exploring and experimenting with a technology's functionalities (Blut & Wang, 2019, p. 7). Similarly, users who are high in optimism are more likely to concentrate on the positive features of a technology, making that they see more advantages (Blut & Wang, 2019, p. 7). Users who are sceptical and high in discomfort tend more to focus on the risks and inability of controlling a technology, making that they have a harder time perceiving useful features of technologies (Blut & Wang, 2019, p. 7). Ease of use refers to the extent to which potential users expect the technology they will use to be error-free (Davis et al., 1989, p. 5). Blut and Wang (2019, p. 7) note that users who consider themselves as optimistic and innovative are willing to spend more time to understand how a technology functions, making that they show less effort to use a technology efficiently. Users who are sceptical and high in discomfort are generally less able to use technologies efficiently, as their attitudes prevent themselves from learning how to prevent difficulties when using a technology (Blut & Wang, 2019, p. 7). According to the TAM, technologies that are simple to use and provide benefits are more probable to be adopted by users than technologies that are more challenging and rarely provide benefits (Meuter et al., 2005, p. 2).

Furthermore, Blut and Wang (2019, p. 18) found that the three factors of the quality-value-satisfaction (QVS) chain also mediate peoples' TR levels. The QVS chain consists of three factors and posits that people who possess higher levels of TR rate a technology higher in terms of quality, value, and satisfaction, leading to an increased usage and adoption intention (Blut & Wang, 2019, pp. 7 – 8). Quality refers to the extent to which people feel that a technology fulfilled their tasks in an effective way (Venkatesh & Davis, 2000, p. 7). It focuses on the outcomes of technology usage and evaluating the efficacy of these outcomes (Blut & Wang, 2019, p. 7). Value describes how people weigh the perceived benefits of a technology against its costs (Venkatesh et al., 2012, p. 6). It entails consumers' assessment of a technology's utility based on which efforts were needed to receive its results (Blut & Wang, 2019, p. 7). Satisfaction refers to the emotional reaction to the experience created by a technology (Spreng et al., 1996, p. 2). It influences consumers' technology usage behaviour and is one of the factors that creates consumer loyalty (Blut & Wang, 2019, p. 8). Blut and Wang (2019, p. 17) describe that the three QVS factors are linked to individuals'

technology usage intentions, whereas the two user attitudes of the TAM have a greater association with individuals' technology usage itself. Both the TAM and QVS chain help to better understand individuals' TR motivators than their inhibitors (Blut & Wang, 2019, p. 17).

2.3.4. Factors moderating Technology Readiness

Consequently, Blut and Wang (2019, p. 17) proved that various moderating factors influence the establishment of peoples' TR. These factors include the hedonic stimuli and utilitarian stimuli that can be obtained when using technologies. Hedonic stimuli refer to positive emotions experienced by users from interacting with, becoming familiar with, and enjoying the usage of a technology (Gao et al., 2022, p. 3). Utilitarian stimuli describe how user-friendly, navigable, and useful a technology is experienced by users (Gao et al., 2022, p. 3). Blut and Wang (2019, p. 17) showed that hedonic stimuli resonate more with TR motivators and utilitarian stimuli with TR inhibitors, meaning that consumers are more likely to utilise technologies that provide hedonic benefits. This is in line with previous literature describing that people who experience high levels of innovativeness and optimism receive joy from new technologies and that people with high discomfort are sceptical about a technology's functionalities (A. Parasuraman, 2000, p. 11; Massey et al., 2013).

Venkatesh et al. (2012, p. 16) note that age, gender, and experience with using a technology moderate consumers' hedonic motivation on behavioural usage intention. The study confirmed that younger men with little usage experience have a greater tendency to experiment with technologies to seek novel information influencing their hedonic stimuli. Another moderator of TR includes the voluntariness of technology usage, which resonates with TR motivators (Blut & Wang, 2019, p. 17). Voluntariness refers to the degree of free will involved in using technologies (Wu & Lederer, 2009, p. 3). This means that a technology reflects consumers' beliefs about the technology and that they do not have to comply with policies devised by the company (Hartwick and Barki, 1994, pp. 4 – 5).

Lastly, consumers' age, gender, and experience with using technologies moderates their habits to use technologies (Venkatesh et al., 2012, p. 16). This effect was stronger for older men with high levels of experience with using a specific technology (Venkatesh et al., 2012, p. 16). Habits are described as the degree to which people prefer to carry out actions automatically because of learning (Limayem et al. 2007, p. 6). The study confirmed findings of previous research indicating that older consumers, especially men, that already have technological usage experience tend more to rely on their habits when experiencing new

situations. This is the case, as a person's ability to process new information decreases with age (Venkatesh et al., 2012, p. 10) and men tend to rely more on cues from their previous experiences than women (Darley and Smith 1995, pp. 13 – 15).

Overall, one could argue that not only technological factors, as described in chapter 1, affect the social dynamics and interactions between consumers and retailers, but also that individual characteristics play a significant role in this process, as they also create concerns about a technology's use and collection of consumer data. The drivers and barriers of TR described in section 2.3.1. affect whether the consumer-object interactions described in section 2.2.2. will be stabilised or destabilised. For instance, consumers with low levels of TR could be more likely to experience self-restriction and self-reduction experiences, as they feel more anxious and suspicious about utilising new technologies than consumers with high levels of TR. Furthermore, the effect of age, gender, and experience, as described in section 2.3.2. and section 2.3.4., again determines whether consumers feel enabled or constrained by the implemented technologies and to what extent concerns emerge. It was described that these factors influence consumers' intention to rely on external factors assisting them, their hedonic motivation on behavioural usage intention, and their habits to cope with new situations. One could argue that these factors determine whether an established consumer-object assemblage deteriorates or improves a user's experience, as mentioned in section 2.2.3. Lastly, one could also argue the same for the two user attitudes of TAM and the three factors of the QVS chain described in section 2.3.3. A positive or negative user attitude and the experienced satisfaction with a technology can determine what agentic and communal roles, as described in section 2.2.2., are experienced during technology usage.

2.4. Consumer privacy

2.4.1. Surveillant assemblages

Haggerty and Ericson (2000, p. 6) argue that the creation of consumer-object relationships ultimately increases the degree of surveillance capabilities that record user data. Surveillance is described as the consistent and systematic scrutiny of personal details with the intention of managing, influencing, protecting, or directing it (Lyon, 2007, p. 14). Haggerty and Ericson (2000, p. 7) posit that surveillance is for the most part focused on electronically monitoring the human body by deploying technologies that capture user data. The study argues that surveillance is driven by the desire to unite technologies and practices and incorporate them into a more comprehensive whole, making surveillance an assemblage in which flows of captured user data are turned into 'data doubles'. Deleuze and Guattari

(1987) describe flows as fluid and primary phenomena that already exist before an assemblage is established and are momentarily and spatially captured by the assemblage. The study argues that assemblages can alter the flows present, making that assemblages hold a powerful position. Flows are anchored in the assemblage by desire, which is the inner will to achieve a certain situation (Deleuze & Guattari, 1987; Haggerty & Ericson, 2000, p. 5). Haggerty and Ericson (2000, p. 11) argue that surveillance practices serve as an essential part for companies to attain a competitive advantage. This advantage is conceptualised as surplus value, which is the profit derived from the surplus data that individuals accumulate over time.

2.4.2. Privacy calculus

Haggerty and Ericson (2000, p. 12) posit that individuals are becoming aware of companies' surplus value that is achieved by assessing their data doubles. Plangger and Montecchi (2020, p. 2) argue that consumer-company relationships, of which truth and honesty are its foundations, can crumble when consumers feel that a company's surveillance practices endanger their information privacy, which is individuals' ability to affect how and when personal data is collected (Westin, 1967). Similarly, Culnan and Armstrong (1999, pp. 3 - 4) argue that two types of information privacy concerns emerge when individuals' information privacy is low. The first type refers to experiencing feelings of intrusion because another party gained unauthorised access to personal information, for instance caused by a security breach or by having low control over your data. The second type refers to the risk of secondary use, which is that consumers' provided information for one specific goal is reused by another party for different purposes without their consent or knowledge. It is argued that consumers will share their personal information during consumer-company relationships if they believe that they will obtain sufficient benefits in return that outweigh the perceived risks associated with disclosing this information (Culnan & Armstrong, 1999, p. 4; Thibaut & Kelley, 1959). This risk-benefit analysis is conceptualised as the 'privacy calculus' and entails that consumers make a non-monetary exchange about their personal information for benefits such as better service and customised offers (Culnan & Bies, 2003, p. 5; Laufer & Wolfe, 1977, p. 14).

Consumers continue with disclosing their personal information when they perceive a net benefit from the privacy calculus they undertake (White, 2004, p. 4). More specifically, Plangger and Montecchi (2020, p. 3) posit that consumers' final decision utility (u) of their privacy calculus is established by assessing the perceived benefits (v) minus the involved

search costs of finding alternatives that also provide benefits (s), risks of giving up privacy (h), and monetary price (p), making that $u = v - (p + s + h)$. It is important for companies to win consumers' trust during this process, for instance by addressing possible privacy risks, as trust increases consumers' willingness to continue their relationship with a company (Gundlach & Murphy, 1993, p. 9). Two types of personal concerns emerge when consumers face difficulties with a company during their privacy calculus: consumer privacy concerns and consumer value concerns (Plangger & Montecchi, 2020, p. 3). Consumer privacy concerns describe individuals' uneasiness about their personal data being exposed to others (Smith et al., 2011, p. 3), while consumer value concerns are individuals' anxiety on missing out on functional, emotional, social, epistemic, and conditional benefits when not exposing their personal data (Plangger & Montecchi, 2020, pp. 3 – 4).

Xu et al. (2011, pp. 2 – 5) found several factors influencing consumers' privacy calculus. In line with Plangger and Montecchi (2020, p. 3), the study proved that consumers' perceived benefits and perceived risks of information disclosure determines their final decision utility of their privacy calculus. Xu et al. (2011, p. 2) describe that perceived benefits are the advantages obtained from technology usage, such as a more efficient task fulfilment. Perceived risks are described as the degree of experiencing disadvantages associated with sharing personal data, such as improper handling of personal data by third parties (Xu et al., 2011, p. 3). The study conceptualises consumers' final decision utility as perceived value, meaning that both perceived benefits and perceived risks influence consumers' overall assessment of sharing their personal data (Xu et al., 2011, p. 3). Furthermore, Xu et al. (2011, p. 8) found that consumers' perceived benefits and perceived risks of information disclosure were both stronger when covert personalisation approaches were used than when overt personalisation approaches were used. Covert personalisation approaches entail that personalised content was automatically sent by tracking consumers' physical location, while overt personalisation approaches entail that personalised content was only sent when users made specific requests (Xu et al., 2011, p. 2). The study further found that several individual factors are of importance during this process. First, consumers' perceived risks of information disclosure are positively affected when they experienced a privacy breach before, for example if they have ever been the victim of improper use of their personal information. (Xu et al., 2011, p. 7). Similarly, consumers' personal innovativeness, which is the tendency to try out new technologies, and coupon proneness, which is consumers' likelihood of responding to offers, both influence their willingness to share personal information. Consumers' attitude towards personal innovativeness, coupon

proneness, and their willingness to use location-aware marketing technologies were again stronger when covert personalisation approaches were used (Xu et al., 2011, p. 7).

2.4.3. Power–Responsibility Equilibrium

Both Inman and Nikolova (2017, p. 11) and Bleier et al. (2020, pp. 3 – 5) argued that retailers should take consumers' privacy concerns seriously to prevent them from having a negative privacy calculus, as a negative privacy calculus can create unwanted outcomes for retailers. In addition, Eastlick et al. (2006, p. 8) showed that consumers' purchase intentions are negatively affected when experiencing privacy concerns. This can lead to a direct loss of revenue for retailers, bad word of mouth, reluctant behaviour of consumers to share their personal information, legal actions undertaken by consumers against retailers that violate their privacy, and difficulties for retailers in attracting new customers (Bleier et al., 2020, pp. 3 – 5). Bleier et al. (2020, pp. 7 – 9) showed that retailers should, next to the privacy calculus, also take account with several other factors to reduce consumers' privacy concerns. These include increasing consumers' trust in the retailer, mitigating the level of personal sensitivity of the data to be collected, increasing the transparency of the data collection process, and increasing the amount of control that consumers have in altering the data collection process. Trust is defined as the readiness to depend on someone else in whom one has faith and high standards (Bleier et al., 2020, p. 7). Moreover, consumers' confidence and purchase intentions were increased by their ability to control the usage of their personal information (Phelps et al., 2000, p. 8; Xu et al., 2012, p. 7). Retailers can reduce consumers' perceived vulnerability and increase transparency about their data practices by informing them about how personalised advertisements are created and what kind of data is used for this (Acquisti et al., 2016, pp. 483 – 485; Aguirre et al., 2015, p. 10).

In order to effectively reduce consumers' privacy concerns when capturing their personal information, companies should understand consumers' views on the privacy and fairness of the data collection before implementing certain practices (Krishen et al., 2017, p. 1). The Power-Response Equilibrium (PRE) framework posits that social responsibility and social power are connected, and that the most powerful agent is responsible for creating an environment of confidence and trust (Lwin et al., 2007, pp. 2 – 6; Murphy et al., 2005). The PRE framework highlights that companies ultimately fall short when adopting a strategy where it holds more power than responsibility, as consumers will then take countermeasures to curb a company's power (Lwin et al., 2007, p. 2).

Lwin et al. (2007, pp. 2 – 4) describe that the PRE framework consists of three parts and that these parts together positively affect consumers overall sense of privacy concerns: power holders, the interaction context of privacy, and users' response. The study argues that companies are power holders when owning consumer data and that their perceived influence is enacted through their policy and regulation. While policy refers to the company's stance on exerting power and ownership over consumer data, regulation describes how governmental agencies direct companies' policy (Lwin et al., 2007, p. 3). The interaction context of privacy describes consumers' data privacy concerns by focussing on their experienced information sensitivity and information congruency. Information sensitivity describe the level of personal sensitivity of the data to be collected and information congruency describe the relevance of the context for which data is being collected (Lwin et al., 2007, p. 4). In addition, Graeff and Harmon (2002, p. 12) showed that consumers are concerned about how marketers are collecting and using their personal data. Consumers indicated that they should be informed about how their data is used for what purpose and that they should be able to influence how their data is being used. Lastly, user response includes three countermeasures that users enact to regain control over their personal information when they experience privacy concerns: protect, fabricate, and withhold. Protect means that consumers utilise tools to protect their privacy, fabricate entails that consumers disguise their identity by using false information, and withhold describes consumers' complete refusal of sharing information (Lwin et al., 2007, p. 3).

Similar to the five consumer segments towards TR of A. Parasuraman and Colby (2015, p. 13), Krishen et al. (2017, pp. 4 – 5) added a fourth part to the PRE framework that describes that individual differences between consumers affects their overall sense of privacy concerns. The study found that consumers' internal locus of control, which is their perceived influence on actions that might influence their personal life, also positively affects consumers overall sense of privacy concerns. Consumers with a high internal locus of control are found to believe that their own control over their decisions and behaviours decides the outcomes and events that will occur in their lives, while consumers with a low internal locus of control think the opposite (Karkoulian et al., 2016, p. 6).

One could argue that the TEP technologies described in section 2.1.2. and section 2.1.3. increase the degree of surveillance capabilities that collect user data. This ultimately increases retailers generated surplus value, making these technologies attractive for them to implement. Furthermore, one could also argue that an insufficient company policy aiming to exert power and ownership to consumers over their data, as described in section 2.4.3., could

result in experiencing a negative privacy calculus and ultimately self-restriction and self-reduction experiences, as described in section 2.2.2. For instance, the use of sensitive personal data by TEP technologies and an unlogic information congruency could trigger feelings among consumers about improper secondary use and feelings of insecurity about their privacy. Moreover, besides technological factors, personal characteristics again determine the extent of any experienced feelings of privacy insecurity. One could argue that a negative privacy calculus is not only established by an insufficient company policy and improper technical implementation, but also due to someone's experienced discomfort and insecurity when using a technology, as described in section 2.1.1. and section 2.3.1. A negative privacy calculus and sense of privacy concerns could also be determined by consumers scepticism, personal innovativeness, and experienced discomfort towards the implemented technologies, as described in section 2.3.3., and their internal locus of control, as described in section 2.4.2.

2.5. Consumers' awareness on TEP implementation

2.5.1. Retailance practices

Retailance, consisting of the words 'retail' and 'surveillance', focuses on the face-to-face or technologically mediated observation of consumers to collect their data to affect their decision-making (Elnahla & Neilson, 2021, p. 9). Like the surveillant assemblage concept of Haggerty and Ericson (2000, p. 2), Elnahla and Neilson (2021, p. 12 – 16) posit that retailance consists of a network of surveillance technologies that capture user data in order to increase their shopping experience and to increase retailers' profitability and control over users.

Elnahla and Neilson (2021, pp. 16 – 18) posit that consumers can become both individually aware and societally aware of retailance practices. Individual awareness entails that consumers are aware of the prevalence of retailance practices, for instance when they notice the presence of employees and cameras monitoring them. Individual awareness can cause consumers to respond in a defensive way to protect their privacy (Elnahla & Neilson, 2021, p. 16). This is done to mitigate any perceived threats so that control over privacy is regained. The study of Esmark, Noble, and Breazeale (2017, pp. 10 – 11) found that consumers respond negatively when employees monitor them while shopping, as they feel less in control over their privacy. The result is that consumers' purchase intentions decreased, leaving negative consequences for retailers. Societal awareness means that consumers understand the broader benefits and risks of sharing their personal data, so that

they are able to give their informed consent (Elnahla & Neilson, 2021, p. 17). This entails that retailers are transparent about their data collection practices and provide consumers the option to opt-out (Culnan & Bies, 2003, pp. 327 – 328). The result will be that consumers perceive sharing their personal data as less risky and feel more certain about whether to share their personal data, which ensures retailers to build trust and make consumers feel in control over their personal data (Elnahla & Neilson, 2021, pp. 17 – 18).

As section 2.5.1. describes, the TEP technologies described in section 2.1.2. and section 2.1.3. increase the degree of surveillance capabilities that collect user data. The various ways how retailance technologies can be implemented by retailers, as described in section 2.5.1., open possibilities for creating positive or negative consumer-object assemblages. For instance, real-time technologies enacting overt personalisation approaches could create feelings of distrust and ultimately result in a negative privacy calculus, especially when retailers have an insufficient policy that assists consumers to regain control over their data. It is hereby important to mention that consumers' individual characteristics, such as age, experience with using a technology, and their TR all influence to what extent they can successfully use these technologies.

2.5.2. Consumers' reactions to retailance practices

Several studies showed different responses of consumers to retailance practices. Esmark et al. (2017, pp. 10 – 11) found that consumers often try to regain control over perceived privacy risks when feeling negative towards prevalent surveillance practices, for instance when they feel being watched by employees and in-store technologies. Correspondingly, consumers' feelings of trust and control in companies' practices increase when companies increase their efforts for consumers to make an informed choice on whether or not to share their data (Culnan & Bies, 2003, p. 15). Furthermore, according to Grenville (2010), consumers dislike a company's surveillance practices the most when they are well-informed or when they have no knowledge of surveillance at all. The study also found that consumers agreed on being monitored when feeling that their personal data will be safe. Contrary, Turow et al. (2015, pp. 19 – 24) pointed that consumers' do not engage in privacy trade-offs when thinking that undesirable outcomes are inevitable. The results of this study highlighted that a large number of consumers do not obtain knowledge to make informed choices on how companies treat their data.

A similar study by Schweidel et al. (2022, pp. 4 – 6) researched consumers perspectives on the digital signals they left. The study conceptualised digital signals as the

tangible and intangible interactions between consumers and companies and that can be observed or not by companies. The degree to which a consumer feels at ease with the signal being seen by others determines a signal's visibility, making that three types of digital signals are proposed: anonymous signals, privately observable signals, and publicly observable signals. Anonymous signals cannot be tied to a specific person by the company, privately observable signals are tied to a specific person by the company (such as their location), and publicly observable signals are tied to a specific person by multiple companies and other consumers. In line with Turow et al. (2015), Morey et al. (2015, para 19) underlined that few consumers understand that companies collect their digital traces. According to them, a majority of consumers is concerned about how their personal data would be analysed by companies and that only a small number of them knows what type of data is being collected. Furthermore, Johnson et al. (2020, pp. 5 – 6) noted that companies' efforts on increasing consumer control over their data are inefficient when consumers are unaware about its presence and confused about its working.

Moreover, Inman and Nikolova (2017, pp. 17 - 19) pointed that the use of mobile apps, self-checkouts, and self-scanning devices was viewed favourably by consumers. Smart shelves, which show tailored advertisements on consumers' smartphones when walking by, and proximity marketing practices, whereby personalised content is shown on consumers' smartphones based on their loyalty card data and in-store location, were viewed not favourably, as these technologies evoked negative attitudes and feelings of privacy concerns. These two practices evoked high levels of privacy concerns and were not seen as fair and valuable, opening again the possibility for creating a negative privacy calculus and self-restriction and self-reduction experiences, as described in section 2.2.2 and section 2.4.2.

3. Methodology

This chapter provides information on the methodology applied to research how TEP technologies used in the grocery retail sector affect consumers' behaviour in the Netherlands. The following sections substantiate the chosen method (section 3.1.), sample (section 3.2.), operationalisation of relevant constructs (section 3.3.), processing and data analysis (section 3.4.), and the validity and reliability (section 3.5.).

3.1. Method description and justification

In-depth interviews were used to collect primary data for this qualitative study, which sought to gain a thorough understanding of consumers' perspectives, experiences, and perceptions. Flick (2018, p. 4) posited that qualitative research focuses on understanding experiences and its underlying meaning-making processes. This approach fits the aim of this study, which is to conduct a sociotechnical analysis for understanding how TEP technologies implemented in groceries affect consumers' in-store behaviour in the Netherlands. A qualitative approach allows the researcher to comprehend consumers' meaning-making process about grocery retailers' integration of TEP technologies, as it studies the way how people construct their surroundings (Flick, 2018, p. 4). Consequently, this study utilised the method of semi-structured in-depth interviewing. This method entails holding a conversation about several topics covered without sticking to questions in a particular order (Babbie, 2020, p. 347). By conducting interviews, insight were gained on consumers' reactions, changed sociotechnical relationships, and favourable integration of TEP technologies.

3.2. Sampling strategy

This study reached a sample of 15 participants. An anonymised overview of these participants can be found in Appendix A. This study focused hereby on a mixture of both young and old participants from different genders and possible differences in technology usage experience, as both Goldfarb and Tucker (2012, p. 4) and Venkatesh et al. (2012, p. 16) found that these factors influence consumers' intention to utilise technologies. More specifically, Goldfarb and Tucker (2012, p. 4) noted that privacy concerns both for young consumers (aged 25 to 45) and old consumers (aged 45 years and older) increased gradually over time, while older consumers' privacy concerns increased quicker over time. Moreover, Venkatesh et al. (2012, p. 16) confirmed hereby that the effect of age was stronger among older consumers who identified themselves as female, as older women rely more on external

supporting factors that assist them utilising new technologies than older men (Venkatesh et al., 2012, p. 16). The study also found that younger men with little usage experience have a greater tendency to experiment with technologies to seek novel information, and that older men with technological usage experience tend more to rely on their habits when experiencing new situations (Venkatesh et al., 2012, p. 16). This study used these insights to take account with participants' integration of TEP technologies.

The target audience was reached by deploying snowball sampling. Snowball sampling is characterised as a method where similar participants are approached after first reaching a few participants known to the researcher (Matthews & Ross, 2010, p. 189). According to Lamm and Lamm (2019, p. 5), snowball sampling is characterised as a non-probabilistic sampling method, meaning that it does not use a randomization approach that chooses which participants can take part. This lack of a randomization process is one of the downsides of snowball sampling, as this results that participants are not given an equal opportunity to participate in the current study, meaning that the results at large cannot be generalised to the target audience (Sarstedt et al., 2017, p. 6).

Snowball sampling is known as a purposive sampling method, meaning that participants are deliberately chosen for answering the research question of focus, rather than creating a statistically representative sample (Matthews & Ross, 2010, p. 189). Therefore, participants were selected on characteristics that have the most potential to shed light on the study's aim (Matthews & Ross, 2010, p. 189). Participants had to adhere to a few criteria to be eligible for taking part in this study. First, participants needed to visit physical supermarkets regularly, preferably at least twice per week, as this study focuses on grocery retailers' integration of TEP technologies. Smeets et al. (2023, p. 7) showed that Dutch people on average visit supermarkets two to three times per week, hence this number. Second, the Dutch focus of this study requires participants to visit these physical supermarkets in the Netherlands. All interviews were conducted in Dutch. Quotes from the interviews in chapter 4 were translated to English due to rules of the Erasmus University Rotterdam.

3.3. Operationalisation of relevant constructs

The semi-structured in-depth interviews consisted of different sections that aimed to get insight in consumers' meaning-making process about grocery retailers' integration of TEP technologies: 1. Introduction, 2. Consumer-object assemblages, 3. Technology

readiness and consumer awareness, 4. Privacy concerns, and 5. Benefits and pitfalls of TEP technologies in the Netherlands.

The first section of the interview was used to introduce the study's aim and the participants' rights. It was also used to get to know the participants better and to make them feel more comfortable during the rest of the interview. The questions asked were related to their usage of electronic devices and loyalty programmes when visiting grocery retailers. These questions were not directly related to the general research question but pictured a profile of their intention to utilise technologies that are currently implemented by grocery retailers in the Netherlands.

The second section focuses on participants' affected sociotechnical relationship caused by the implementation of TEP technologies. Since these technologies are currently not deployed by supermarkets in the Netherlands, two scenarios were devised in which participants reflect on their imaginary interaction with TEP technologies. The insights gained were important for answering the research question, as they gave an understanding about how consumers' social dynamics and interactions with grocery retailers were affected by the manner of implementation of TEP technologies. Using the four classes of consumer-object relationship styles of Novak and Hoffman (2019, pp. 8 – 11), one positive scenario benefitting consumers and one negative scenario harming consumers were devised. A complementary master-servant relationship was chosen to let participants experience a beneficial relation between themselves and the implemented TEP technologies, as this relationship enables self-extension experiences and self-expansion experiences due to the high communal roles of both consumers and objects (Novak & Hoffman, 2019, pp. 8 – 11). Correspondently, an unstable relationship was chosen for letting participants experience a negative relation between themselves and the implemented TEP technologies, as this relationship enables self-restriction experiences and self-reduction experiences due to the non-reciprocal agentic roles and non-correspondent communal roles of both consumers and objects (Novak & Hoffman, 2019, pp. 8 – 11). To increase the clarity of the context in which the implemented TEP technologies will be used, each scenario was depicted as a storyboard. Storyboarding can play an assisting role in visualising the technical, social, and environmental factors that form the context of where, how, and why people interact with products (Martin et al., 2012, p. 170). This ultimately results in increasing the empathy of end users early in the design process (Martin et al., 2012, p. 170). The created storyboards followed four design guidelines of visual storytelling devised by Truong et al. (2006, p. 15). The first followed guideline entails that the created drawings provide enough detail to

understand the context but are not too detailed to get distracted from the message that each drawing conveys. Second, text is depicted underneath each drawing to increase its clarity. Third, the majority of drawings include a human user interacting with the implemented TEP technologies for creating empathy among participants with this human user. Fourth, changes of time are portrayed by showing a storyline that contains a clear start and ending.

The third section focused on discussing participants' awareness and usage intentions of new technologies tracking their behaviour. This section therefore addressed participants' Technology Readiness (TR) in using TEP technologies. Based on the factors influencing individuals' TR discovered by Blut and Wang (2019), participants used the two scenarios to reflect on how they feel about the implementation of TEP technologies and what makes them feel utilising or rejecting TEP technologies. This section also paid attention to the factors discovered by Xu et al. (2011) that influence their individual privacy trade-off. Participants were therefore asked on what their motivations were for disclosing their personal data to get the benefits of these technologies. By addressing participants' TR on using TEP technologies, insights were gained on the concerns that these technologies create for consumers and how these technologies affect their social dynamics and interactions with grocery retailers.

The fourth section dived deeper into the possible privacy concerns caused by the implementation of TEP technologies. Using the two scenarios, participants were asked how they feel about TEP technologies regarding privacy concerns and what makes them feel experiencing privacy invasion. In addition, participants had to answer how they think regulation can protect them from experiencing privacy concerns. Participants also had to answer how they would like to be informed about the benefits and risks of sharing their personal data with grocery retailers. These insights were crucial for answering the research question, as these insights focused on understanding the underlying reasons causing consumers' concerns regarding TEP technologies collecting and using their personal data.

Based on the discussed topics in the previous sections, the fifth and final section held an elaborate discussion on revealing potential future trends in Technology-enabled Personalisation in the grocery retail sector. Participants were asked about how they would like to see the implementation of TEP technologies in a way that suits their needs, but also what should be avoided during the implementation. They had to elaborate on how their view would affect their behaviour and if it would contribute to experiencing a positive or negative experience. These insights were crucial to formulate an insightful and actionable answer to the research question. Altogether, an overview of participants' affected social dynamics and

interactions with grocery retailers caused by TEP technologies, usage intentions, privacy concerns, and future trends regarding the implementation of TEP technologies were gathered. The interview questions can be found in Appendix C. The operationalisation of relevant constructs can be found in Appendix D.

3.4. Processing and analysis of data

Thematic analysis was used to analyse the interview results. This method is able to localise patterns, meanings, realities, and to unravel experiences of individuals (Braun & Clarke, 2006, p. 79). This makes it an appropriate method to find out how the implementation of TEP technologies affects consumer behaviour. This study used hereby a deductive and semantic approach for analysing themes. This entails that only themes were identified related to the theoretical interests of the main research question and that only the surface meanings of these themes were identified (Braun & Clarke, 2006, p. 84).

To conduct a thematic analysis successfully, six steps need to be conducted: familiarisation with the dataset, the generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and reflecting on the conducted analysis (Braun & Clarke, 2006, p.87). First, each interview's transcript was read twice in order to comprehend its essence. Braun and Clarke (2006, p. 87) claim that doing so is a way to generate ideas of potential patterns that might exist. Parts of the dataset that might contain patterns regarding consumers' meaning-making process about grocery retailers' integration of TEP technologies were highlighted. Next, a theory-driven approach was enacted, meaning that initial codes were created that were considered as relevant for answering the research question (Braun & Clarke, 2006, p.89). Data was coded and assigned to operationalised sections two to five. Third, the various codes were grouped together to create possible themes. Here, a difference between overarching themes and related sub-themes was formed. This stage makes it possible to comprehend the relevance between individual themes (Braun & Clarke, 2006, p. 91). Fourth, the found themes and related sub-themes were refined. This meant that themes were evaluated for their ability to follow a logical pattern and for their validity considering this study's theoretical goals (Braun & Clarke, 2006, p. 91). The theory mentioned in the theoretical framework was thus reflected in the themes. Fifth, evaluating each theme's content helped to improve the themes' overall quality. It was verified whether data was assigned to the right theme, whether each theme encompassed all relevant details of its essence, and that the themes weren't overly complex and varied. (Braun & Clarke, 2006, p. 92). Finally, an analysis was made in which the created themes were outlined according to

the theory mentioned in the theoretical framework. These results are depicted in thematic maps, see Appendix B. Moreover, this process made use of Braun and Clarke's (2006, p. 21) 15-point checklist for good thematic analysis.

3.5. Validity and reliability

Moisander and Valtonen (2006, p. 149) stated that the reliability of a qualitative research can be improved by increasing the transparency of its working process. This entails that the methods used for conducting research and analysing data are described in a detailed and sufficient manner, but also that it is shown how the taken theoretical stance produces and excludes certain interpretations. Correspondingly, Tracy (2010, p. 13) underlined that researchers, who fulfil the role of powerholders, are successful when facing their own actions from a critical viewpoint. This ensures that their research can reach a higher quality by overcoming misvaluations and misunderstandings of their working (Tracy, 2010, p. 13). In order to bolster the quality of the conducted thematic analysis, several measures were taken into account throughout the different research phases. These measures include conducting pilot tests, self-reflexivity, transparency, rich rigor, and taking account with ethical considerations. These measures are described in the following paragraphs.

The quality of the devised interview questions was tested by conducting several pilot interviews before executing the actual interviews. This was done to check the clarity of the questions, their jargon, overall structure, depth, and the coherence of the interview. These pilot tests were conducted with two young participants who fit the target audience of this study. The interview questions were also checked with the thesis supervisor, who has experience with conducting interviews. Revisions have been made after receiving feedback. When conducting pilot tests, the storyboards of both scenarios were also checked. It was checked whether the drawings and depicted texts were sufficient to understand and whether both storyboards were successful in letting the participants experience a beneficial and harmful relation with implemented TEP technologies.

Self-reflexivity was applied for keeping the sincerity of this study at a high level. Tracy (2010, p. 5) described sincerity as the researcher's ability to reflect transparently about their own role and possible biases that may occur during the research. Self-reflexivity is characterised as the honesty and authenticity of the research and oneself and is achieved when clearly assessing the shortcomings, biases, motivations, and strengths that affect the research (Tracy, 2010, p. 6). Correspondingly, the coding process of the thematic analysis was shaped by the sociotechnical perspective.

In addition to self-reflexivity, Tracy (2010, p. 6) described transparency as being honest about the steps conducted in the research process. This entails that this study is open about describing how a sufficient level of detail was achieved throughout its research phases. First, all main concepts (e.g., Technology Readiness) and accompanying variables (e.g., Technology Readiness motivator: innovativeness) described in the theoretical framework were used to devise interview questions. This meant that all accompanying variables were compared and grouped together when one or multiple questions could be devised about a topic fitting these grouped variables. This way the researcher ensured that all described main concepts and accompanying variables were addressed when devising interview questions. Furthermore, both scenarios and storyboards were created after devising the interview questions. It was hereby checked whether each scenario contained the characteristics for creating a complementary master–servant relationship or unstable relationship, and whether both scenarios were sufficient for answering the devised interview questions. Moreover, to achieve a rich rigor, the six steps and 15-point checklist of Braun and Clarke (2006, p. 21) were followed to achieve a thematic analysis that is conducted in a sufficient way. Codes were compared by going over them multiple times in annotated transcripts in ATLAS.ti and by using online workspace Miro.

Lastly, this study took account with procedural ethics. Procedural ethics are described as categorical ethical considerations that are enacted by a certain party (Tracy, 2010, p. 11). This meant that participants were informed by the researcher about the study's nature, goal, and aim before interviews would take place. Participants were also informed on their rights, processing, use, and storage of their data via a General Data Protection Regulation (GDPR) form. This consent form informed participants on the researcher's contact details, the goal of the data processing, participants' rights to withdraw consent, information on sharing data with any third parties, and the time their data will be stored before destroying (Erasmus University Rotterdam, 2024). Participants' personal data was only collected after they gave their verbal consent. This data was anonymised by using pseudonyms (e.g., interview 1), except for their age and gender, as this information is relevant for this study's goal. This data will be stored for a period of three months on the researcher's Miro account and OneDrive account using two-factor authentication. Furthermore, the researcher took account with relational ethics by being mindful about his actions, character, and consequences to the participants. This meant that all participants were treated with respect and that their dignity was recognised (Tracy, 2010, p. 11).

4. Results

This section describes this study's results according to the sub-questions mentioned in the introduction. The first three themes are corresponding with the second sub-question. The first theme, consumer-object assemblages (section 4.1.), describes consumers' desire to control their own behaviour and the actions of a technology. The second theme, technology readiness (section 4.2.), covers consumers' feelings of discomfort and utilitarian values when utilising TEP technologies. The third theme, consumer awareness (section 4.3.), focuses on consumers' experienced benefits of TEP technologies and their preference for voluntary use. The fourth theme, privacy concerns (section 4.4.), is corresponding with the third sub-question and describes the experienced privacy concerns that emerged over TEP technologies. Lastly, the fifth theme, named Benefits and pitfalls of TEP technologies in the Netherlands (section 4.5.), is corresponding with the fourth sub-question and highlights consumers' future trends on the implementation of TEP technologies. The thematic maps of these themes can be found in Appendix B.

4.1. Consumer-object assemblages

As described in section 2.2.3., consumer-object assemblages can both deteriorate or improve a user's experience. It was argued in this section that the way how TEP technologies are deployed determines the extent to which social dynamics and interactions between consumers and retailers are affected. This includes, among others, the degree of the enacted authority, autonomy and agency of a technology and if consumers and objects enact hereby high or low agentic and communal roles.

This theme, named consumer-object assemblages, consists of one sub-theme that is about consumers' experienced individual sense of control. This sub-theme describes the importance of consumers' need to be in control over their own behaviour and over the implemented technologies and highlights consumers' feelings when feeling to lack control over them.

4.1.1. Power-response equilibrium: individuals' sense of control

All participants indicated that they should have as much control over their own decisions as possible, and that their final decision should never be made by an implemented technology. These participants indicated to feel more at ease about their shopping experience when they had a lot of control over the shown recommendations of a technology. A pattern became visible between having control over the shown recommendations and experiencing

them as helpful or unhelpful. Participants, particularly older participants, who were more experienced in grocery shopping indicated that they wanted to do their grocery shopping in their own way and therefore did not want to be guided by a technology's recommendations: "When I go to the supermarket, I have already thought out in advance what I want to buy and what I want to eat" (interview 8, 22-year-old female), and "Shopping is not a challenge for me. Very often I know what I am going to buy, because I take into account what people here at home like and don't like to eat" (interview 12, 68-year-old male). This meant that these participants wanted to decide on their own what they wanted to buy and did not feel like following a recommended recipe. Recommendations were experienced as distractive and intrusive when they were not able to control them: "When I go shopping, I know what's on my mind. And then I don't want to keep getting recommendations like, you can do this, you can do that, you can do this." (interview 11, 73-year-old male). Due to their preparedness and experience with grocery shopping, these recommendations were mostly experienced as unhelpful, especially when they were not tailored to their individual needs and when the technology kept continuing with showing them. These findings are in line with the findings of Riegger (2021, p. 146), who indicated that customers do not expect technologies to take over human tasks, which are in this case devising a recipe on your own, as changes in humanisation cause interaction incongruences. The effect of age in these findings are also in line with Venkatesh et al. (2012, p. 10), who found that older consumers tend more to rely on their habits when experiencing new situations, as the participants did not want to engage in using the implemented technologies to change their grocery shopping behaviour.

In addition to having control over your own behaviour, all participants, regardless of their age and gender, also indicated that they want to have control over the implemented technologies. This entails that the utilised technologies should not enact decisions on their own without consumers' consent, such as collecting consumer data and showing certain recommendations, as this is experienced as detrimental to their privacy:

Soon I'll be walking around there on my birthday and the TV screen decides to congratulate me and to sing a song. Oh, I don't feel like doing that. You don't know where you stand, what he will and will not show and where the threshold is (interview 8, 22-year-old female).

This also includes that the technologies should not share consumers' data, such as their name and bought products, with other supermarket consumers and any third parties without their consent, as this is experienced as invasive. Participants emphasised hereby that the implemented technologies should ask for consumers' permission before enacting decisions on their own and that consumers should hereby have the freedom to tailor technologies' decisions to their liking, including the frequency and type of the content shown: "You must be able to turn recommendations off if you are not interested. And then it shouldn't come back again later" (interview 11, 73-year-old male), and:

Now it's just: do it this way, yes or no. And no means that you don't get the content any other way. I would then prefer a bit of customization, where you can just say per type of content, I find this useful and I don't find this useful. I don't want to see this on the TV screen, but rather on my handheld scanner (interview 5, 23-year-old male).

These findings are in line with Esmark et al. (2017, pp. 10 – 11), who found that consumers often try to regain control over perceived privacy risks when feeling negative towards prevalent surveillance practices.

4.2. Technology Readiness

Section 2.3. described the various factors that influence consumers' attitude to use and adopt new technologies. These include individual and technological characteristics, among them the influence of age. The theme of Technology Readiness consists of four sub-themes that describe consumers' experienced discomfort, risks, and utilitarian values when encountering TEP technologies in smart supermarkets. These sub-themes especially highlight consumers' need of control and fear of being mistreated after sharing personal data, which are factors that influence consumers' technology readiness.

4.2.1. TR motivator: innovativeness

It stands out that nearly all older participants and participants who identified to be high in discomfort are showing low signs of personal innovativeness. This means that these participants were mostly negative about the development of TEP technologies, as they lacked motivation to make an effort to understand the potential benefits that may derive from utilisation. In line with older participants' preparedness and experience with grocery

shopping, as described in section 4.1.1., they see these technologies as redundant and therefore do not want to discover their potential benefits: “There are so many ways to get recipes if you want some. The boxes are already ready for you in the store. Ready-made food, everything fresh. Everything is included. How can you have it easier?” (interview 15, 81-year-old female). These findings are in line with A. Parasuraman and Colby (2015, p. 13), who found that sceptical users and users high in discomfort are mostly older than 50 years. These findings are also in line with Blut and Wang (2019, p. 7), who found that sceptical users and users high in discomfort focus more on the risks of a technology and therefore have a harder time perceiving potential benefits.

Additionally, almost half of the participants are critical about the development of TEP technologies. They mostly fear that their grocery shopping experience will deteriorate due to the presence of these technologies, that technologies that they distrust will be part of this development, and that they have no influence to affect this development: “Young consumers also never have products in their hands anymore, they only have the handheld scanner in their hands. It's going to be poor. I believe that's the right word” (interview 13, 88-year-old female), and “You can't do anything about it either. But the supermarket can destroy you completely, and I think that's the worst part” (interview 15, 81-year-old female). These participants also indicated rather having employees assisting them than technologies, as human interaction is found as joyful. The habits described by these participants are again in line with Venkatesh et al. (2012, p. 10), who found that older consumers tend more to rely on their habits when experiencing new situations.

4.2.2. TR inhibitor: discomfort

The unstable relationship devised in scenario 2 caused all participants to feel dissatisfied with their shopping experience. They all indicated to have experienced negative feelings when they were being forced buying products or playing games recommended by the implemented technologies. Participants did not like that the technologies had more power than them in these situations, as this made them feel having less control over their own decisions: “Being forced feels a bit like a commercial mini prison. You can't leave, you can't move on” (interview 7, 23-year-old female), and “If you just know what you want to eat and you can't buy it, then it is a restriction” (interview 6, 24-year-old male). These participants stated that their lack of control resulted in experiencing a negative shopping experience. This is not only because they feel less empowered, but also because they fear ending up with buying unnecessary products and spending more time and money than

intended: “I would feel really cheated if I had to go shopping like that. You are interrupted, you come home with groceries that you don't need at all and that you normally don't have” (interview 15, 81-year-old female). Half of all participants mentioned hereby to visit a different supermarket if that supermarket allows them to have full control over their own decisions. Multiple participants felt confused about supermarkets' strategy to remove all control from their customers. They indicated that supermarkets should not strive to have full control over customers and to make them dependent on the implemented technologies: “The fact that you are forced to buy things should not be the goal of a supermarket. I have certain things that I want to buy. I can't be forced to buy anything, or I'll just leave” (interview 8, 22-year-old female).

One could argue that the experienced dissatisfied feelings of the participants are in line with the conceptualisation of self-reduction experiences of Hoffman and Novak (2018, p. 6), as these feelings show that the implemented objects restrain the agentic roles of the participants. One could also argue that these feelings revealed participants' experiencing low levels of information privacy due to having low control over their decisions, which is in line with Culnan and Armstrong (1999, pp. 3 – 4). This may explain why the participants want to have control over the implemented technologies, as described in section 4.1.1., making that their mentioned countermeasures are in line with the conceptualised ways how consumers try to regain control of Lwin et al. (2007, p. 3) and Elnahla and Neilson (2021, p. 16).

Additionally, multiple participants experienced an information overload due to the implemented technologies. All implemented technologies in both scenarios were together experienced as distractive, as participants felt not being able to make thoughtful decisions anymore: “It becomes a kind of information overload, you don't even know where to look anymore. And then there is a good chance that you will also make choices that you don't want to make” (interview 5, 23-year-old male). No differences between age and gender were present.

4.2.3. TR inhibitor: insecurity

Most of the participants felt insecure about the working of the implemented TEP technologies and the supermarket's intentions with these technologies. They feared that the supermarket is not implementing these technologies in a fair manner, as they think that recommended products are not in their favour and that the supermarket is benefitting more from these recommendations than consumers. This made that these participants felt sceptical about the actual benefit of the shown recommendations:

I don't think as a customer I would trust that the products presented to me are in my favour. Or that those are really healthier and hopefully cheaper products. I think I would automatically think that the store is just trying to sell me the most expensive products (interview 8, 22-year-old female).

These participants also feared that the implemented technologies will collect their data without their consent. This was in particular the case for the facial recognition camera, as this camera has the potential to scan your face without you noticing. The TV screens also caused distrust, as these publicly showed participants' names and diet, making that multiple participants feared that other customers will harass them when they get to know this information, for instance by stalking them. This potential misuse of personal data has made these participants suspicious of sharing their data with technologies.

Furthermore, a majority of participants indicated that companies' statements about privacy are empty words. They feared that companies will use a workaround to circumvent their statements in their own advance and were sceptical about the truth of their statements:

People are very often money-focused already and in the end rules about ethical data use are not followed. Stores can tell you that this and this will happen to your data. But I still want to see it. You know? It's not enough for me to say that we do this, we do that. It's not enough. You can also just flat-out lie. (interview 4, 25-year-old male).

Participants feared hereby that their collected data is prone to being hacked and that a third party will gain access, making that they are sceptical about companies' claims on data storage. Consumers' scepticism on the truth of companies' statements is consistent with the findings of Johnson et al. (2020, pp. 5 – 6), who noted that companies' efforts on increasing consumer control over their data are inefficient when consumers are unaware about its presence and confused about its working.

4.2.4. Hedonic and utilitarian technology usage

The majority of participants showed high levels of utilitarian stimuli. These participants said that they visit the supermarket solely for grocery shopping and not to get involved in any extra activities. This meant that participants were not keen playing the recommended game of the handheld scanner in both scenarios, but also that they do not want

to spend time on reading information on companies' statements about privacy and texts that inform them on the potential benefit of technology use. The reason for this is that they do not want to get distracted from buying the groceries they were planning to buy: "Oh no, I don't read all that. I'll skip that. I'm going to do some grocery shopping and then I'll leave again" (interview 15, 81-year-old female), and "I don't come to the store to play a game. I come to the store to get groceries. I want to do that at my pace, my way" (interview 12, 68-year-old male). Older participants showed higher levels of these utilitarian stimuli than younger participants. Together with the low signs of personal innovativeness shown by older participants, as described in section 4.2.1., these findings are in line with A. Parasuraman (2000, p. 11), Massey et al. (2013) and Blut and Wang (2019, p. 17), who argued that utilitarian stimuli resonate with TR inhibitors.

These participants requested the supermarket to inform them about privacy and potential benefits before entering the supermarket, so that they can solely focus on grocery shopping during their supermarket visit. Participants indicated that they feel more at ease when they can digest this information at home: "Preferably beforehand. Then you know where you stand and then you always have a specific, pleasant place to go if you have any questions about it" (interview 10, 25-year-old female). Most participants preferred email, as email is a known medium used by many other companies to inform customers about changes. Although email is preferred, a minority of participants said that they still might not read them and therefore requested that the supermarket should also inform them in the store, for instance by placing a sign or showing on-screen instructions. Older consumers who are not fond of using email requested the use of mediums familiar to the elderly, such as leaflets and organised information evenings.

4.3. Consumer awareness

While section 2.3.3 showed that the perceived quality, value, and satisfaction influences consumers' TR, section 2.4.2. added that consumers' final decision utility of their privacy calculus is, among others, affected by their perceived benefits of technology utilisation. Moreover, section 2.3.4. described that the involved degree of voluntariness in using technologies moderate consumers' TR. The consumer awareness theme consists of two sub-themes that describe consumers' experienced benefits of the implemented technologies in both scenarios and consumers' preference of voluntary usage. They highlight the saving of brainpower and mutual benefit for both supermarkets and consumers.

4.3.1. Privacy trade-off: perceived benefits of information disclosure

There is a stark difference between young and old participants when it comes to perceiving benefits of information disclosure. It stands out that only a minority of old participants saw clear benefits of using the implemented technologies, while all young participants could indicate what benefits they perceive. One could argue that this has to do with old participants' low signs of personal innovativeness due to their preparedness and experience with grocery shopping, as described in section 4.1.1. and section 4.2.1. Most of the benefits described were focused on saving brainpower. This entails participants to find it convenient that the implemented technologies devised recipes on their own, making that they can save time and stop contemplating:

I always think a thousand years before I buy something. Then I really think, is this better? Or is this better? I don't really know. What am I in the mood for? Then I stand in the supermarket for six months and I just actually want to leave. The handheld scanner ensures that that part is removed (interview 6, 24-year-old male).

Although section 4.2.4. showed that older participants have higher levels of utilitarian stimuli than younger participants, these findings indicate that the perceived benefits of young participants are also mostly utilitarian-driven. These young participants further indicated that both supermarkets and consumers can benefit from consumers' disclosed information, as they believe that supermarkets can analyse this data to improve their product range and drive more sales, ultimately benefitting consumers:

A supermarket can sell better as a result. And better sales for a supermarket means more room for improvements. A better experience, expanding branches, so the supermarket gets closer to you. Perhaps prices going down, improving products. These are all things that can help. That information helps a business. I think it's a good thing. Especially if it also helps us, then we help each other. So, in that sense, I think this is something we do need to move towards, because it can improve a lot of things (interview 5, 23-year-old male).

Multiple participants noted hereby again that consumers can only benefit from disclosing their information when the supermarket is not forcing them to buy products, as section 4.2.2. described that this dissatisfies their shopping experience. It appears that

participants made here a risk-benefit analysis with the conclusion that their perceived risks were greater than their perceived benefits.

4.3.2. Moderator: voluntariness

In line with the findings on that consumers should have as much control over their own decisions as possible, as described in section 4.1.1., all young and old participants noted that the use of implemented technologies should be voluntarily. This meant that supermarkets should not force them to use implemented technologies, but also that consumers should have the agency to control the behaviour of these technologies, as also described in section 4.1.1. Multiple participants indicated hereby that the current way of grocery shopping should be preserved, meaning that the technologies should function as an addition and not as an obligation: “I want to use my own mind. What do I want to eat today? What do I want to have in the house? And you don't have to interfere with me” (interview 13, 88-year-old female). Furthermore, participants indicated that the presence of voluntariness gives them feelings of control, as they will be the ones that make their final decision. These feelings are in line with Karkoulian et al. (2016, p. 6), who argued that consumers with a high internal locus of control believe that their own control over their decisions decides the outcomes that will occur, making that most participants think that the lack of voluntariness relates to experiencing possible negative outcomes.

4.4. Privacy concerns

Section 2.4. described the various factors that influence whether consumers' will disclose their personal information based on the privacy calculus they undertook, but also what factors reduce consumers' privacy concerns. The privacy concerns theme consists of five sub-themes that describe the types of privacy concerns experienced about the implemented technologies of both scenarios. These sub-themes highlight consumers' fear of being treated unethically, the types of personal data that are considered as sensitive and not congruent, and the importance of supermarkets' substantiation of their data collection procedure.

4.4.1. Privacy trade-off: privacy invasion experience

A majority of participants fear that supermarkets do not honestly inform consumers about the implemented technologies. It stood out that older consumers were more afraid of this than younger consumers. These participants fear that a supermarket will withhold

personal information about them without being aware of it. This means that they expect supermarkets to only share a small portion of the total collected personal information when requested, but also that they will not be transparent about the possible risks involved that may occur when sharing their personal information, as mentioning risks is not found as attractive: “I don't think any company would share that without being required by law to be. Yes, because no company is like, "Oh yeah, our data can be stolen. Oops.”” (interview 3, 24-year-old male). Participants further feared that supermarkets will give false information about the collection and processing of their personal data. It was noted that they expect supermarkets to bypass privacy laws to collect the data they want to collect: “If they have strategy A and it is not legally approved, then there will be a strategy B. But if that fails, then there will be a strategy C. Because they will get the information they want” (interview 12, 68-year-old male). Moreover, a minority feared that the collected personal data will be used for other goals than improving consumers’ grocery shopping experience. These participants referred hereby to goals that will benefit supermarkets more than consumers.

Furthermore, most participants felt being watched when the implemented technologies of both scenarios depicted recommendations. This had a negative effect on their sense of having control over their own behaviour, as these recommendations were experienced as unwanted when not requested: “It's incredibly invasive of my privacy. It's as if a shopkeeper is constantly following you around and telling you nice things about your own privacy. No, just let me do my thing” (interview 3, 24-year-old male). It appears that consumers respond negatively to these recommendations when not being aware of their existence, making these findings in line with Grenville (2010), who posited that consumers dislike a company’s surveillance practices when they have no knowledge of surveillance at all. These participants further stressed that they do not want to receive recommendations about products that fit their lifestyle that they did not even know about, as this made them question how the supermarket knows this. This was also the case when technologies made recommendations based on certain data that consumers did not know could be used for this purpose. These two types of recommendations were therefore experienced as invasive.

4.4.2. Power-response equilibrium: data sensitivity

Both scenarios included television screens where participants were addressed by their first name followed by product recommendations. The open use of their name on these screens was viewed negatively by almost all participants. They indicated that they do not want that other supermarket consumers get to know their name, as this made them feel

uncomfortable: “It no longer feels like you can walk through the supermarket in your own little bubble” (interview 8, 22-year-old female). Participants also do not expect that supermarkets will show personal information in such open ways, and they therefore cannot comprehend why supermarkets would suddenly do this. These findings are an addition to the findings of Inman and Nikolova (2017, pp. 17 – 19), who found that proximity marketing practices on consumers were experienced negatively. Some participants preferred depicting a salutation instead of their names, which is in line with the fabricate countermeasure devised by Lwin et al. (2007, p. 3) that takes place to regain control over personal information. Furthermore, participants were divided about the public way of showing product recommendations on these television screens. Some participants experienced these product recommendations as innocent and unharmed when other consumers get to see these, but other participants would rather keep this information more confident, as they feared negative comments from other consumers. The handheld scanner was therefore seen as more privacy-friendly than the television screens, as recommendations were experienced as more private due to its small screen size.

It was noticeable that participants were divided on the use of their personal information by the supermarket. They were fine with sharing general information that is probably already known by other companies, such as their phone number and address. The connection between previous buying history and product recommendations was also seen as logical by multiple participants. However, most participants were not fond of sharing information about their behaviour, such as their eating pattern, name, allergies, and facial recognition data, as this was experienced as too personal to share with the supermarket. It was indicated that supermarkets should focus on maintaining their stock and products, as consumers are paying for that and not for collecting their personal information.

4.4.3. Power-response equilibrium: data congruence

The use of consumers’ name and facial recognition data for receiving benefits was not found as logical by participants, making that this data had a low congruence. Participants did not understand how this data could be used by supermarkets for generating personalised benefits during grocery shopping. They therefore questioned the collection of this data and found it unnecessary: “What's that supposed to mean? It has nothing to do with store things, does it? You come into the store to buy things. Then they have nothing to do with you, with what your name is, do they?” (interview 14, 73-year-old male), and “And is that really necessary, I think? Why do you need to scan my face? I think that's really unnecessary for

when you go to the supermarket” (interview 10, 25-year-old male). Participants further indicated that they must benefit when sharing their personal data and that they do not intend to utilise technologies when fearing to not benefit. These benefits entail actions that assist consumers with grocery shopping, such as improving their speed and saving brainpower. They indicated that feelings of benefit arose when realising that the requested data has a function that assists them:

A supermarket is allowed to know what I eat every day, what I buy, what my budget is. What I like, all that stuff. But then it must have a function. And if that function is that it can make recipes and grocery lists for me, then that’s worth it to me (interview 5, 23-year-old male).

This is in line with Graeff and Harmon (2002, p. 12), who found that consumers should be informed about how their data is used for what purpose and that they should be able to influence how their data is being used.

4.4.4. Power-response equilibrium: company policy

Participants want to be informed by the supermarket on the goal of the data collection by an implemented technology. This means that supermarkets need to substantiate which potential benefits arise when sharing personal data. Participants indicated that this helps them to decide whether to share their data, improving their perceived data congruence: “I want to know the motive. Because for me, such a motive can be the choice that I agree or disagree with it. For me that is one of the things on which I base my decision” (interview 1, 22-year-old male). This is in line with Culnan and Bies (2003, p. 15), who found that consumers’ trust in companies’ practices increase when they increase their efforts for making informed choices on whether to share data. In addition to the digital and physical ways of providing this information, as described in section 4.2.4., participants want to be voluntarily informed about this information. This means that the supermarket must show their substantiation on their data collection procedure, but consumers must not be obligated to read this before continuing with grocery shopping, as this is experienced as distractive.

Additionally, all participants want to be informed by the supermarket about their data collection procedure. This means that consumers need to be transparently informed about what datapoints will be collected by a technology, the potential benefit of collecting a particular datapoint, what is possible and not possible when collecting datapoints, and how

recommendations are established based on the collected datapoints. Participants stressed hereby that an overview with this information helps consumers to decide what datapoints can and cannot be collected by the supermarket for assisting them. It was noted that this would increase consumers' confidence: "You give your data, then you actually expose yourself a bit. But actually, that also has to come from the opposing party to you. That they expose a bit with the question: what do we do with it?" (interview 2, 24-year-old male). These findings are in line with Culnan and Bies (2003, p. 15), Acquisti et al. (2016, pp. 483 – 485) and Aguirre et al. (2015, p. 10), who stressed that increased company transparency results in decreasing consumers' perceived risks on sharing their data.

Participants further indicated that they felt more secure about the truth of supermarkets' substantiation of their data collection procedure when they are monitored by an independent external party. It was described that the presence of an independent external party goes beyond supermarkets' substantiation and therefore shows that supermarkets are actively taking effort to protect consumers' privacy, but it also indicates which supermarkets are reliable and which are not. A quality mark given by this party was mentioned by participants to get to know this information, as a quality mark can be quickly understood by only casting a glance. However, participants who were sceptical about supermarkets' data collection procedure stressed that a quality mark is not always self-explanatory and can therefore be seen as useless. It was mentioned that the party should be of high quality and should not benefit from giving quality marks to supermarkets, making that the party must be external and independent. Although the presence of an independent external party was not specifically mentioned as a measure for improving consumers' data congruence in previous literature, this finding is in line with the study of Graeff and Harmon (2002). The study found that consumers prefer the government to regulate companies' data collection and usage procedures to alleviate their privacy concerns on these two topics (Graeff & Harmon, 2002, p. 8).

4.4.5. Retailance: societal awareness

Half of the participants were sceptical about how privacy legislation can protect them in practice when supermarkets mention that their data collection procedure complies with contemporary privacy legislations. These participants indicated that privacy legislation creates a false sense of protection. They feared that their data can still be hacked and leaked to third parties, that privacy legislation will not be followed by all shops of the same chain at an equal level, and that sufficient privacy legislation will only arrive when something goes

wrong: “I wouldn't necessarily immediately experience it as super safe. There is always a chance of a data leak for any large company. So, when I see a GDPR feature, I don't necessarily think that I am really protected” (interview 10, 25-year-old female).

Furthermore, almost all participants mentioned that supermarkets utilise TEP technologies to make more profit. They indicated that the primary goal of supermarkets is to earn more money by targeting consumers with recommendations and trying to increase their total shopping time with the collected user data.

4.5. Benefits and pitfalls of TEP technologies in the Netherlands

This section describes consumers' future trends on the implementation of TEP technologies by smart supermarkets. It highlights that technologies should enact a high level of personalisation by adapting to consumers' eating and life pattern, but that consumers must be in control over a technology' actions. Furthermore, this section highlights the importance of covert implementation, as described in section 2.5.1.

4.5.1. Do's and don't's

When asked about the future of smart supermarkets implementing TEP technologies, participants expect personalisation strategies to be applied at a level that saves their brainpower during grocery shopping and decreases the total shopping time. It was noted that these technologies should be able to adapt the content of the recommended products to their eating pattern, for instance by knowing consumers' allergies and diet, so that recommendations always fit. This also includes that technologies should focus on recommending alternative products when they are out of stock and adapt automatically their content type to fit consumers' intention to stay in the supermarket for a long or short time. It was further noted that these technologies should be able to assist consumers with devising recipes with unknown products, remembering what products to buy, and that they are able to automatically navigate consumers to the products they planned at home to buy. These functionalities make shopping easier and therefore increase the overall satisfaction of consumers' shopping experience: “Going through the supermarket as quickly as possible and still being satisfied. And arriving home and having everything in the house. That especially, so you don't have to go back. For me, that would be the most important thing” (interview 10, 25-year-old female).

Participants emphasised that smart supermarkets should always ensure that consumers are in control over their own behaviour and the actions of the implemented

technologies. This means that consumers should have the agency to enable and disable the type of recommendations and are able to decide what datapoints can and cannot be collected. This is in line with the findings of Graeff and Harmon (2002, p. 12), who found that consumers want to influence how their collected information is being used by companies. Technologies should also ask for consumers' consent before enacting certain actions and never force consumers to make certain decisions, making that participants must always be the final decision-maker. This prevents technologies from taking actions that consumers dislike. Participants further emphasised that the usage of implemented technologies must always be voluntarily, meaning that consumers are never obligated and can opt-out whenever they want. This ensures that the grocery shopping experience does not abruptly changes compared to the contemporary experience without implemented technologies, as this is found unnecessary. It was also mentioned that supermarkets should substantiate the goals of their data collection procedure of each technology, so that consumers can make informed choices on whether to share their personal data. Moreover, the implemented technologies should ensure that both consumers and the supermarket can benefit from its utilisation. This can be done by analysing the collected data, but also by giving consumers the possibility to give feedback on the quality of the shown recommendations, so that recommendations can be further refined. Lastly, the implemented technologies should ensure that both consumers and the supermarket can benefit from its utilisation.

4.5.2. Covert implementations

Participants preferred that their shared personal data should stay between them and the supermarket. Sharing this data with other parties without consent is considered as privacy invasive. This was especially the case when consumers' names were depicted on the television screens without consent. Participants feared that this will result in negative consequences, such as that other consumers can make comments about their shopping behaviour. Participants therefore preferred staying anonymous during grocery shopping: "In any case, you want to have the feeling that you can do your shopping in your own little bubble, without everything and everyone in the supermarket watching you" (interview 8, 22-year-old female).

5. Conclusion

5.1. Synthesis of this study's aim

This study aimed to identify how Technology-enabled Personalisation (TEP) technologies used in the grocery retail sector affect consumers' behaviour in the Netherlands. TEP technologies enable physical retail stores to personalise their customer experience across different touchpoints (Riegger et al., 2021, p. 2; Roy et al., 2017, p. 3), as these technologies can provide consumers with relevant and context-specific information to encourage certain shopping behaviour (Riegger et al., 2022, p. 2). A successful implementation of TEP technologies depends on the extent to which social dynamics and interactions between consumers and retailers are affected. Both technological and individual factors play a significant role in this process, as studies have shown that technologies can be implemented in a way to enable or constrain consumers' actions (Hoffman & Novak, 2018, p. 6; Novak & Hoffman, 2019, pp. 4 – 5) and that individuals' Technology Readiness (TR), which are individuals' willingness of using new technologies to accomplish various goals (A. Parasuraman, 2000, p. 308), age, gender, and experience with using technologies influence this process (Venkatesh et al., 2012, p. 16). These individual factors coalesce with retailers' company policy aiming to exert power and ownership to consumers over their data. A negative privacy calculus, which is a risk-benefit analysis entailing that consumers share personal information as long as benefits outweigh the risks (Culnan & Bies, 2003, p. 5), is not only established due to insufficient company policy and improper technical implementation, but also by someone's experienced discomfort and insecurity with technologies.

5.2. Main findings

Contemporary TEP technologies can be implemented in various ways by grocery retailers for personalising their customer experience. The deployment of Internet of Things (IoT) technologies empowers grocery retailers to collect relevant real-time user data, which increases the level of detail of the created individual-level and segment-level UMs. This results in achieving a greater level of breadth and depth for the depicted personalised content delivered by retail-facing and consumer-facing technologies.

The results of the semi-structured in-depth interviews revealed that supermarket consumers should have more control over their own decisions and over the actions of the implemented technologies than the technologies themselves, making that consumers should be the final decision-maker. This entails that technologies should never force consumers to

conduct certain actions, as this made consumers feel less empowered and therefore experience a negative shopping experience. Both younger and older consumers stressed hereby that technology usage should be voluntarily. Voluntary usage increases consumers' feelings of control over their own actions and ensures that the grocery shopping experience does not abruptly changes compared to the contemporary experience without implemented TEP technologies.

This voluntary usage further entails that consumers must be voluntarily informed about supermarkets' substantiation on their data collection procedure, as obligated reading is experienced as invasive. Consumers indicated that a transparent explanation on supermarkets' data collection procedure is desired. This improves their perceived data congruence on datapoints to be collected and assists them in making informed choices about what personal data to share. Consumers stressed that supermarkets should hereby substantiate how they would benefit when sharing certain personal data with a technology, as consumers do not intent utilising technologies if they fear they will not benefit from them. These benefits should be utilitarian-driven and focus on actions that assist consumers with grocery shopping, such as improving their speed and saving brainpower. Consumers said to visit supermarkets solely for grocery shopping and are therefore not interested in additional activities, as this is regarded as distractive. They preferred supermarkets substantiating their data collection procedure before arriving at the supermarket, so that they can digest this information at their leisure.

Consumers, especially older consumers, fear that supermarkets do not honestly inform them about the way how technologies are implemented and for what purposes. It is feared that information will be withheld, that false information will be distributed, and that privacy laws will be circumvented. These fears can be mitigated by allowing an independent external party to monitor supermarkets' working of their data collection practices. Consumers said that its presence goes beyond supermarkets' substantiation and shows that supermarkets are actively taking effort to protect their privacy. A quality mark was coined as an indication for consumers to get to know which supermarkets are reliable and which are not.

Consumers further feared that technologies would collect personal data without their knowing and publicly depict recommendations containing sensitive data. Consumers expect negative consequences when this would happen. They were especially concerned that other consumers would harass them when they would get to know their name that was publicly depicted on a screen. The sharing of personal data with others without consent was therefore

experienced as privacy invasive. To protect consumers' privacy, consumers stressed that it is of importance for supermarkets to always let their TEP technologies ask for their consent before enacting certain decisions and depicting certain results. It is preferred to give consumers hereby the freedom to tailor technologies' actions to their liking, such as enabling and disabling the type of depicted recommendations and collected datapoints.

When depicting recommendations, supermarkets should aim at keeping them as private as possible, as consumers preferred staying anonymous during grocery shopping. Recommendations should therefore be shown on private devices, such as handheld scanners, and not on public devices like TV screens. In order to assist consumers with grocery shopping, consumers expect the depicted recommendations to be highly personalised. This can be achieved by providing content adapted to consumers' eating style and by assisting them in navigating and remembering what products to buy.

5.3. Discussion of the main findings

It was expected that consumers would experience self-reduction experiences due to the lack of control created in the devised unstable relationship of scenario 2. Consumers' described feelings of lacking control and privacy invasion were therefore logical consequences of technologies' ability to force consumers to buy products and display names publicly. It was also expected that consumers would attempt to regain control over perceived privacy risks when feeling negative, meaning that their described attempts to increase control over their own actions were in line with the attempts found by Esmark et al. (2017, pp. 10 – 11), Lwin et al. (2007, p. 3) and Elnahla and Neilson (2021, p. 16). Although the presence of an independent external party was not specifically mentioned as a measure for improving consumers' data congruence in previous literature, this finding adds to Graeff and Harmon (2002, p. 8), who described the influence of governmental regulation for alleviating privacy concerns. This finding also adds to Culnan and Bies (2003, p. 15), Acquisti et al. (2016, pp. 483 – 485) and Aguirre et al. (2015, p. 10), who described that an increased company transparency decreases consumers' perceived risks on sharing their data. This means that consumers reflect a great awareness on possible privacy issues that might occur, therefore having high levels of societal awareness.

It was further expected that consumers want supermarkets to substantiate their data collection procedure before sharing their personal data, as this is in line with previous research demonstrating that an increased data congruency decreases consumers' perceived privacy concerns (Graeff & Harmon, 2002, p. 12). Lastly, it was also expected that older

consumers would be more sceptical about the added value of the implemented technologies, as previous research indicated that older consumers rely more on their habits when experiencing new situations (Venkatesh et al., 2012, p. 10) and that older consumers are usually higher in discomfort (A. Parasuraman & Colby, 2015, p. 13) and focus more on risks of technology usage (Blut & Wang, 2019, p. 7).

Although this shows that TR inhibitors are present when a technology provides utilitarian values, as described by Blut and Wang (2019), this study further found that the benefits of younger consumers are mostly utilitarian driven and that both older and younger consumers visit supermarkets solely for grocery shopping and not to engage in additional activities. This makes these findings to contradict with Blut and Wang (2019), as this study found that utilitarian values also provide motivations that increase consumers' TR. This difference could be explained due to qualitative nature of this study and to this study's specific focus on utilising TEP technologies in Dutch supermarkets, whereas Blut and Wang (2019) focused on TR motives in general while conducting a study of quantitative and global nature. Additionally, at the beginning of the research it was expected that consumers desired a substantiation on supermarkets' data collection procedure to decrease their perceived privacy concerns, but this study revealed the unexpected result that consumers prefer to get information about this at their leisure before entering the supermarket. This shows that consumers' utilitarian drive makes them not interested in conducting additional activities on top of their grocery shopping task.

5.4. Strengths and limitations

A strong point of this study is the diversity of its sample. As previous research found that differences between gender and between older and younger consumers affects consumers' TR, this study tried to recruit participants for creating a balanced ratio between older, younger, male, and female participants. This ensured that this study's findings were not solely focused on one specific age group or gender, resulting in a fruitful dataset. Another strong point was its creation of a storyboard in which two scenarios were devised in which participants reflected on their imaginary interaction with TEP technologies. Since these technologies are currently not deployed by supermarkets in the Netherlands, both scenarios increased the clarity of the context in which TEP technologies can be used and therefore helped to yield more insightful answers from participants in addition to the devised interview questions.

Although this study tried to keep consumers' imaginary interaction with contemporary TEP technologies as realistic as possible, one could argue that these scenarios are not a true depiction of how Dutch supermarkets would implement these technologies, as one could imagine that each individual supermarket would implement their chosen TEP technologies in a different way. Therefore, a limitation of both devised scenarios is that they are quite hypothetical and hence unlikely to correspond to the actual future implementation of TEP technologies by Dutch supermarkets.

Furthermore, although this study had a diverse sample regarding age and gender, the recruited participants all had a Dutch cultural background. This makes that this study's findings omit how consumers from non-Dutch cultural backgrounds react to supermarkets' implementation of TEP technologies, making that the findings most likely do not apply to all supermarket consumers in the Netherlands.

5.5 Social and theoretical implications

The findings of this study assist grocery retailers in implementing TEP technologies in a way that protects their privacy and suits their needs. This will ultimately help grocery retailers in preventing their consumers from experiencing a negative shopping experience due to the occurrence of unstable consumer-object relationships and negative privacy calculus. These findings will also assist grocery retailers in deciding what utilitarian-driven functionalities should be implemented to ensure that consumers will use the implemented technologies. This ensures that consumers will be assisted by receiving useful personalised content that improves their speed and saves brainpower.

Furthermore, the findings of this study add details to the existing research on factors influencing consumers' privacy calculus. The findings specifically add to the studies of Culnan and Bies (2003), Acquisti et al. (2016) and Aguirre et al. (2015), as these studies highlighted that increasing company transparency decreases consumers' perceived risks on sharing their data. This study adds by highlighting the order of which consumers should be informed about supermarkets' substantiation on their data collection procedure, namely at their leisure before entering the supermarket. The findings of this study also add to the research of Graeff and Harmon (2002) and Johnson et al. (2020) on increasing company transparency by showing that the existence of an independent external party contributes to increasing consumers' data congruency. Lastly, this study's findings further add to the research of Culnan and Armstrong (1999) and Grenville (2010) on achieving a sufficient company policy that exerts power and ownership to consumers over their data. This study

highlights which types of data are considered too sensitive to collect and what actions supermarkets should take to keep consumers' data private and increase their control over it. Future research could therefore take account with the influence of these findings when assessing consumers' TR.

5.6 Suggestions for future research

Although participants with a Dutch cultural background were recruited, this study conducted no specific research on the influence of cultural characteristics on consumers' TR. One could imagine that older consumers with non-western cultural backgrounds react differently to the implementation of TEP technologies than Dutch consumers. To ensure that the findings of this research also apply to consumers with different cultural backgrounds, future research should therefore focus on how consumers with a non-Dutch cultural background react to supermarkets' implementation of TEP technologies and unravel which characteristics cause differences. Future research could hereby focus on the most common non-western nationalities in the Netherlands, so that supermarkets can also take account with these groups when implementing TEP technologies.

Furthermore, this study did not take account with the current Technology Readiness Levels (TRL) of Mankins (1995) of the technologies implemented in both scenarios. TRL evaluate a technology's maturity with nine levels ranging from 1 (mere idea) to 9 (ready for full market deployment) (Martínez-Plumed et al., 2021, p. 3). To ensure that consumers' imaginary interaction with TEP technologies is as realistic as possible, future research should take account with these levels, but also with recent best practices and interaction guidelines of TEP technologies. This ensures that consumers' reaction to these technologies will be more detailed and realistic, making that more insightful reactions will be yielded on the specific implementation of a technology.

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Appendix A: overview of participants

Number	Age	Gender	Duration	Medium
1.	22	Male	1:12:57	Online video call
2.	24	Male	44:37	Online video call
3.	24	Male	1:08:02	Online video call
4.	25	Male	49:53	Online video call
5.	23	Male	56:49	Real-life conversation
6.	24	Male	58:59	Real-life conversation
7.	23	Female	1:02:55	Phone call
8.	22	Female	1:07:58	Phone call
9.	24	Female	54:18	Online video call
10.	25	Female	44:29	Online video call
11.	73	Male	50:41	Phone call
12.	68	Male	50:18	Real-life conversation
13.	88	Female	1:02:19	Real-life conversation
14.	73	Male	59:27	Real-life conversation
15.	81	Female	59:03	Real-life conversation

Appendix B: thematic maps

Theme 1: Consumer-object assemblages

Theme	Sub-theme	Axial code	Open code
Consumer-object assemblages	Power-response equilibrium: individuals' sense of control	I must have control over the implemented technologies	<p>I do not want the technologies to distract me</p> <p>The technologies should not send intrusive and useless recommendations</p> <p>A technology should not do things without my consent and knowing</p> <p>I want to adapt the type and frequency of the shown information to my needs</p>
		I must have control over my own behaviour	<p>I want to think independently</p> <p>I must have control over my own decisions</p> <p>I want to do shopping my own way and not be directed</p> <p>I must decide who can access my data</p>

Theme 2: Technology readiness

Theme	Sub-theme	Axial code	Open code
Technology readiness	TR motivator: innovativeness, and Privacy trade-off: personal innovativeness	I have no desire to go along with this development	<p>I have no desire to learn how a technology works</p> <p>I am sceptical about the true value of a technology</p> <p>I would rather have people assisting me than a technology assisting me</p>
		I am negative about this development	<p>The shopping experience will become more lonely and less tangible due to these technologies</p> <p>I fear having no influence on this development</p>
	TR inhibitor: discomfort	Having no control over my own actions feels not nice	<p>I do not like it when technologies force me to do something</p> <p>Not having control deteriorates my shopping experience</p> <p>You should not be completely dependent on a technology</p>
		I experience an information overload	There are too many screens around me to pay attention to

			I have no pleasant shopping experience due to spending too much time with the handheld scanner
	TR inhibitor: insecurity, and Privacy trade-off: privacy risks of information disclosure	I fear that the supermarket will not be fair in applying these technologies	<p>I do not believe that the recommended products are cheaper and healthier</p> <p>I fear losing my data and getting worthless recommendations</p> <p>I fear spending too much money due to the recommendations</p> <p>I fear that the technologies will process my data without permission</p>
		I fear that a third party will have access to my data	<p>I fear that my data will be used unethically by a third party</p> <p>I fear that my stored data may be hacked</p>
		Companies' statements about privacy are empty words	<p>There is no way to check whether privacy statements made by companies are the truth</p> <p>Only letting one company tell their story is not transparent</p>

		I fear that others will harass me if they get to know my name	<p>I fear that others will stalk me if they find out my name</p> <p>I fear that others will gossip about me if they see what I buy</p>
	Moderator: hedonic and utilitarian technology usage	I come to the supermarket to do grocery shopping and not for anything else	<p>I come to do some shopping and therefore I will not read any privacy texts</p> <p>I come to do some shopping and therefore I will not read any texts on benefits of these technologies</p> <p>I come to the supermarket to do some shopping and not to play games</p> <p>Inform me about privacy and the benefits of these technologies at my leisure at home</p>

Theme 3: Consumer awareness

Theme	Sub-theme	Axial code	Open code
Consumer awareness	Privacy trade-off: perceived benefits of information disclosure	These technologies are good because the supermarket benefits from them which ultimately benefits consumers as well	<p>These technologies encourage the supermarket to make more money</p> <p>These technologies encourage more targeted product sales</p> <p>These technologies encourage supermarkets to optimize their product range</p> <p>These technologies encourage the supermarket to make improvements based on the collected data</p>
		Recommending (healthy) recipes I don't come up with myself	<p>Recommending recipes with recommended products saves brainpower</p> <p>Recommending healthy recipes makes shopping easier</p>
	Moderator: voluntariness	Use must be voluntary	I want to have the choice to stop using the technology

Theme 4: Privacy concerns

Theme	Sub-theme	Axial code	Open code
Privacy concerns	Privacy trade-off: privacy invasion experience	I fear that the supermarket is not fair in sharing information	<p>I do not believe that the supermarket will be honest about collecting and processing my data</p> <p>I think that the supermarket is withholding information about me without my knowledge</p> <p>I fear that that my data will be used for other purposes</p> <p>I think that the supermarket will try to circumvent privacy legislation</p>
		It doesn't feel nice that the supermarket wants to know everything about me	<p>I do not want to have all kinds of sensors around me, because then I feel like I'm being watched</p> <p>I distrust technologies when they show recommendations that make me realise they know more about me than I thought</p> <p>It is weird that the supermarket suddenly knows everything about you because of these technologies</p>

	Power-response equilibrium: data sensitivity	The handheld scanner is private	Showing info on a handheld scanner is more private and therefore good
		I do not like it when TV screens show my name	I do not like my data being displayed so openly Anonymise my data
		The supermarket may know certain personal information	The supermarket may know general data that other companies also know I see a logical connection between my purchase history and recommendations The supermarket may know what I eat
		The supermarket should not know certain personal information	I do not want others to find out my name I experience data about my behaviour as too personal to share The supermarket is not allowed to know everything about me, but only to some extent
	Power-response equilibrium: data congruence	I do not always see a logical connection between my data and a potential benefit	I see no logical connection between face data and a possible benefit I see no logical connection between knowing my name and a possible benefit

		I will use these technologies only if I can benefit from them	I will not use the technologies if they have little value Value is created if the requested data has a function
Power-response equilibrium: company policy		Substantiate how new features of a technology work	I want to know the purpose of the data collection Use a sign, screen, or email to inform me about the new features of a technology Customers should voluntarily be informed about functionalities of the technology
		The supermarket must inform me transparently about my privacy	The supermarket must transparently demonstrate how a recommendation was created I want to have the option to see at a detailed level what datapoints are collected I want to know what will happen to my data by a technology The supermarket should be transparent about which sensors and technologies are used The supermarket should be transparent about what can and cannot

			<p>be done with my data</p> <p>The supermarket should make a mini contract with me about my privacy</p> <p>Supermarkets should not make information about privacy too long so that people will not read it</p>
		I want an external party to inspect the supermarket	<p>A quality mark gives me confidence</p> <p>A quality mark saves me time researching</p> <p>An external party must verify that the requested data is legitimate</p> <p>The external party must be of high quality and independent</p> <p>A quality mark does not always say something</p>
	Retailance: societal awareness	I do not believe in legislation	I am sceptical about how legislation can protect me in practice
		I understand that the supermarket is implementing these technologies to gain a benefit for itself	I understand that the supermarket wants to make a profit by implementing these technologies

Theme 5: Benefits and pitfalls of TEP technologies in the Netherlands

Theme	Sub-theme	Axial code	Open code
Benefits and pitfalls of TEP technologies in the Netherlands	Do's and don't's	Show personalised content by adapting to my eating and life pattern	<p>Personalising prevents me from seeing useless recommendations</p> <p>The technology needs to personalise its content to my eating pattern to save brainpower</p> <p>I want to indicate that I eat vegan</p> <p>The technology needs to know what I am allergic to</p> <p>The handheld scanner should adapt its content to customers' shopping duration</p> <p>Showing shopping lists and walking routes saves thinking</p>
		Consumers must be in control	<p>Consumers need to be in control of their own behaviour and the actions of technologies</p> <p>Technologies should always ask for consumers' consent before enacting actions</p> <p>Use must be voluntarily</p> <p>Substantiate the goal of the data collection procedure</p>

			Both supermarkets and consumers should benefit from technology implementation
	Privacy trade-off: covert implementation	My data must stay between me and the supermarket	<p>Privacy breach means not having control over what someone else can share about me</p> <p>Privacy breach for me is that my data no longer stays between me and the supermarket</p>
		I want to remain anonymous while shopping	<p>I do not want everything and everyone watching while shopping</p> <p>Privacy breach for me is that I can no longer remain anonymous</p>

Appendix C: Interview questions

Introduction

Do you use electronic devices while grocery shopping, such as hand scanners?

Why (not)?

Do you use the loyalty programmes of the supermarkets you visit (think of AH bonuskaart / Jumbo Extra's / Lidl Plus / Air Miles)?

Why (not)?

Now: read the two scenarios

Consumer-object assemblages

Complementary master-servant relationship + Unstable relationship
+ Power-response equilibrium: individuals' sense of **control**

1) What is your first reaction to these two scenarios?

2) Do you feel that the implemented technologies empower you while shopping groceries?

Why (not)?

3) Do you think that supermarket consumers should have more power over their data than the implemented technologies themselves?

Why (not)?

Technology readiness and consumer awareness and Privacy concerns

TR motivator: **innovativeness** + TR motivator: **optimism** + TR inhibitor: **discomfort** +

TR inhibitor: **insecurity** + Privacy trade-off: **personal innovativeness**

+ Moderator: **hedonic (fun)** and **utilitarian (useful)** technology usage + Mediator: TAM

usefulness + Mediator: TAM **ease of use**

(4) [TO SUMMARISE] What do you think about smart supermarkets implementing new technologies such as facial recognition cameras, sensors, etc., to track consumers' behaviour?)

Retailance: **individual awareness**

+ Privacy trade-off: **privacy invasion experience** + Power-response equilibrium: **data sensitivity** + Power-response equilibrium: **data congruence**

5) What do you think about these technologies regarding privacy concerns?

6) What is privacy invasion for you?

7) Do you experience differences in privacy concerns between these new technologies?

Why (not)?

Power-response equilibrium: **company policy**

+ Retailance: **societal awareness**

8) Do you think that regulations (like GDPR) can protect you when something is wrong?

Why (not)?

9) How would you like to be informed by the supermarket on the benefits, risks, and need of sharing your personal data with them?

Mediator: QVS **quality** + Mediator: QVS **value** + Mediator: QVS **satisfaction**

+ Privacy trade-off: perceived **benefits** of information disclosure + Privacy trade-off: perceived **value** of information disclosure + Privacy trade-off: privacy **risks** of information disclosure

+ Privacy trade-off: **coupon proneness** + Moderator: **voluntariness**

10) When do you think that it is worth to share your personal data with the supermarket to get the benefits of these technologies?

Benefits and pitfalls of TEP technologies in the Netherlands

Privacy trade-off: **covert** implementation (automatically provide content) + Privacy trade-off: **overt** implementation (provide content when making a specific request)

11) What do you think about the future of smart supermarkets who implement personalisation technologies?

12) How would you like to see these technologies implemented?

13) How would you **not** like to see these technologies implemented?

Ending

Is there anything else that you want to say about the implementation of personalisation technologies in supermarkets?

Thank you for your participation.

Appendix D: Operationalisation of relevant constructs

Concept	Variables from theoretical framework and accompanying questions
Consumer-object assemblages	<p>Complementary master–servant relationship + Unstable relationship + Power-response equilibrium: individuals' sense of control</p> <p>2) (Self-expansion (whole-part)) Do you feel that the implemented technologies empower you while shopping groceries? Why (not)?</p> <p>3) (Self-extension (part-whole)) Do you think that supermarket consumers should have more power over their data than the implemented technologies themselves? Why (not)?</p>
Technology readiness (TR) and consumer awareness	<p>TR motivator: innovativeness + TR motivator: optimism + TR inhibitor: discomfort + TR inhibitor: insecurity + Moderator: hedonic and utilitarian technology usage + Mediator: TAM usefulness + Mediator: TAM ease of use + Privacy trade-off: personal innovativeness</p> <p>4) [TO SUMMARISE] What do you think about smart supermarkets implementing new technologies such as facial recognition cameras, sensors, etc., to track consumers' behaviour?</p> <p>Mediator: QVS quality + Mediator: QVS value + Mediator: QVS satisfaction +</p>

	<p>Privacy trade-off: perceived benefits of information disclosure + Privacy trade-off: perceived value of information disclosure + Privacy trade-off: privacy risks of information disclosure + Privacy trade-off: coupon proneness + Moderator: voluntariness</p> <p>10) When do you think that it is worth to share your personal data with the supermarket to get the benefits of these technologies?</p>
<p>Privacy concerns</p>	<p>Retailance: individual awareness + Privacy trade-off: privacy invasion experience + Power-response equilibrium: data sensitivity + Power-response equilibrium: data congruence</p> <p>5) What do you think about these technologies regarding privacy concerns?</p> <p>6) What is privacy invasion for you?</p> <p>7) Do you experience differences in privacy concerns between these new technologies? Why (not)?</p> <p>Power-response equilibrium: company policy + Retailance: societal awareness</p> <p>8) Do you think that regulations (like GDPR) can protect you when something is wrong? Why (not)?</p> <p>9) How would you like to be informed by the supermarket on the benefits and</p>

	risks of sharing your personal data with them?
Benefits and pitfalls of TEP technologies in the Netherlands	<p>11) What do you think about the future of smart supermarkets who implement personalisation technologies?</p> <p>Privacy trade-off: covert implementation + Privacy trade-off: overt implementation</p> <p>12) How would you like to see these technologies implemented?</p> <p>13) How would you not like to see these technologies implemented?</p>

Appendix E: Logging of the used Generative AI Tools in Thesis

DeepL and Google Translate:

- Used to get inspiration for translating Dutch interview quotes to British English.
- Used to check the spelling and sentence structure of certain sentences I wrote in British English.
- Used to get inspiration for paraphrasing certain words in articles I read.
- **NEVER** used to copy translated sentences directly into my thesis.

Quilbot:

- Used to get inspiration for paraphrasing sentences in articles I read.
- Used to get inspiration for paraphrasing certain words in articles I read.
- **NEVER** used to copy paraphrased sentences directly into my thesis.

ChatGPT:

- Used to devise my thesis title.