



**LUNDS**  
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*Department of Service Management and Service Studies*

**Can one-click save the planet?**

**The impact of consumers' use of smartphone applications on sustainable food purchasing practice**

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### *Abstract*

Reducing the ecological footprint and achieving environmental sustainability is regarded as one of the main goals of the world in recent decades. To achieve these goals, some practices in people's life should be changed. As an essential part of human needs, food consumption is one of the practices that significantly impact environmental sustainability. In the last few decades, modern technologies, especially, digital devices and apps are presented as practical tools to achieve sustainable development by changing practices. As one of the raising concerns regarding environmental sustainability is about consumers' food purchasing. Consumers can contribute to reach UN Sustainable Development Goal 12 ("Responsible Consumption and Production") by changing their food purchasing practice sustainable. This study aims to understand how consumers' use of smartphone applications changes consumers' food purchasing practices in terms of environmental sustainability by using the qualitative research based on the ground theory. The influence of three food apps ("Karma," "Too Good To Go," "ICA") is studied with the help of empirical data from 15 semi-structured interviews. Practice theory and empirical data gained from the interviews show that consumers' use of these applications makes changes in material, competence, meaning dimensions of consumers' food purchasing practice. It also shows that digitalization contributes to achieving sustainable food purchasing, namely purchasing sustainable food and non-purchasing practice. By using a smartphone app as a material, consumers can gain new knowledge and competencies in relation sustainability. These knowledge and techniques help consumers to accept sustainability as a new meaning in food purchasing practice. These changes make consumers to contribute sustainability by purchasing sustainable food, also avoiding unnecessary food purchasing that is a big step to achieve SDG12.

Keywords: Sustainable purchasing, sustainable consumption, sustainable food, non-purchasing, practice theory, grounded theory, material, competence, meaning.

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# 1. Introduction

This research investigates the effects of digitalization on food purchasing practices. It sheds light on the impact of consumer usage of smartphone food applications on sustainable food purchasing practice. Although all three pillars of sustainability (economic, social, and environmental) can be affected by the use of digitalization, this study investigates the smartphone apps' influence on consumers' food purchasing practice from an environmental sustainability perspective.

## *1.1 Background*

Food is regarded as a fundamental human need (Fonte, 2013) and one of the most purchased products (Országhová & Petreková). Hartmann-Boyce et al. (2018) present food purchasing as one of the critical components of food consumption. Moreover, it is regarded as a precursor of food consumption (ibid). As a complex phenomenon, purchasing serves to satisfy consumer's needs by searching, using, disposing of products, ideas, and services (Schiffman & Kanuk, 2004). In this context, purchasing should be perceived as choosing and buying the food. Food price, food availability, income can affect consumers' purchasing practices (Sufyan et al., 2019). Although purchasing is mainly related to personal needs, environmental concerns have been gaining importance in recent years (Laureti & Benedetti, 2018). According to Laureti and Benedetti (2017), environmentally friendly and sustainable food purchasing can positively impact environmental sustainability. This kind of food purchasing considers avoiding higher-impact products. Therefore, consumers can contribute to the planet by purchasing sustainable products (ibid). Due to this reason, the last two decades witnessed changing purchasing practices towards environmentally-friendly practices (Hartmann-Boyce et al., 2018). Consumers who behave environmentally friendly and consider the environmental consequences of their practices are sustainable consumers (Wróblewski & Dacko-Pikiewicz, 2018). Their positive approach to sustainability has a powerful impact on sustainable purchase practice (Joshi & Rahman, 2019). Likely, Røpke (2009) mentions that consumers can contribute sustainability to a high degree by changing their purchasing practice. Nevertheless, even though sustainability is becoming one of the main concerns of consumers' practices, they are not responsible enough for their consumption practices (Shove et al., 2012). Welch and Warde (2015) explain this contradiction by drawing attention to not being informed about the resources. When consumers do not consume the resource per se, their reflexivity on consumption is decreasing (ibid).

Food consumption is one three most influential fields in Europe in terms of sustainability alongside transportation and home heating (Guinée et al., 2006). In general, food-related

practices are purchasing, eating, cooking, according to Hedin et al. (2019). Reisch et al. (2013) draw attention to those practices when explaining the environmental impacts of food consumption. According to the UN, people waste one-third of all produced food every year. This food is estimated at &1 trillion. Also, the world population is predicted to reach 9.8 billion in 2050 and 11.2 billion in 2100. In this case, the world will need 70% more food, and it will also affect climate change, energy, and water supply through natural source depletion (UN, 2021a). This statistic should encourage consumers to take sustainability into account while purchasing food. In order to reduce the environmental effects of food consumption, sustainable food consumption must be ensured. Moreover, UN Sustainable Development Goals put some responsibility on consumers to make the world a better place to live. The “Sustainable Consumption and Production” goal (SDG12) makes the consumer find new solutions to reach this goal.

Modern digital technologies could be accepted as one of the most potent tools for solving these sustainability issues (energy and water depletion, climate change, etc.). For example, Atkinson (2013) shows the impact of digitalization and sustainable smartphone apps on boycotter's choices. Boycotting is regarded as choosing a product for its environmental, political, or ethical characteristics. Digital devices and apps allow consumers to get information about the products and purchase a sustainable product by comparing them (ibid). Thus, consumers can choose or avoid certain products deliberately because of those products' environmental or ethical characteristics. Also, consumers can get a chance to have helpful information about the production, transportation, ecological footprint of certain products with the help of digitalization through smartphone applications, interactive websites, QR (Quick Response) codes, and other useful technical functions (Fuentes & Sörum, 2019). Digital solutions help consumers by providing information regarding the sustainable product when they need to have proper knowledge about the product and make a sustainable purchase (Nghiem & Carrasco, 2016). Some Smartphone Applications such as Green Guide and Shopgun could be the relevant example in this regard (Fuentes & Sörum, 2019). The former makes some databases available for consumers. In doing so, environmental information can be found easily. The latter builds the bridge between consumers and "advisors" such as the Swedish Food Administration, Fairtrade, and other organizations (ibid). In general, these apps encourage consumers to choose green products which have low environmental impacts. However, sustainable consumption does not consist of only green consumption. Decreasing consumption is more important than green consumption for many modern environmentalists (Reich & Soule, 2016). Thus, if some apps

encourage consumers to purchase more sustainable food, some others make consumers avoid purchasing.

## ***1.2 Knowledge Gap and Problematization***

Purchasing practice is influenced by digitalization, and smartphone devices (apps, websites, QR codes, Mobile phone games) can alter the nature of this practice (Sörum & Fuentes, 2017). Even if all food system actors (producers, distributors, retailers, consumers, etc.) are agreed upon that a consumption practice is influenced by digitalization, it is challenging for the consumers to understand how to reconfigure their consumption practice in a sustainable way (Connolly & Prothero, 2008). Some applications are useful to purchase more sustainable food; others are an effective tool to avoid overconsumption. As Collins and Evans (2017) mention, "consuming less" is an idea that can determine sustainable purchasing practice. Although Guinée et al. (2006) mention a significant influence of food consumption on sustainability, however, consumers are not well-informed in this regard (Reisch et al., 2013). It is not easy for consumers to perceive how they can ensure sustainable food purchasing using smartphone applications (Carrington, Neville, & Whitwell, 2010).

As a whole concept, the relation between food consumption and digitalization has been investigated from different perspectives. Fuentes and Sörum (2019) focus on the "Green Guide" app, which provides consumers with helpful information that helps to purchase sustainable products. This app motivates a consumer to purchase ethically, which takes the good of other humans and non-humans who even are absent (ibid). Atkinson (2013) mentions the role of QR codes in sustainable consumption. Consumers can purchase environmentally friendly products by getting information about the products (ibid). Besides, Fuentes and Svingstedt (2017) have investigated the influence of smartphones on young adults' shopping practice. By applying practice theory, changes in shopping practice (browsing, purchasing, etc.) has been explored. Even if changes in different elements of practice (material, competence, and meaning) have been touched upon, the link between smartphone and shopping practice has not been investigated in terms of sustainability in that research (ibid). Another research carried by Harvey et al. (2020) discusses food sharing/redistribution and food waste reduction by analyzing the "OLIO" food sharing app. This research is mainly focused on technology-assisted food sharing practices. Another study about digitalization and sustainable food consumption has explored 15 researches (Hedin et al., 2019). But 12 studies out of 15 have investigated the food waste aspect of sustainability. Reconfiguration of households' food consumption with the help of meal-box schemes has been explored by Fuentes and Samsioe (2020). The role of digitalization in the

changing food consumption practices has been presented. According to Fuentes and Samsioe (2020), meal-box schemes make consumers' food consumption more convenient. Also, it encourages consumers to add new variations to their daily food practice. Even If these mentioned researches focus on the link between food consumption and digitalization, there is not enough study regarding food purchasing practices. Fuentes and Svingstedt (2017) investigated the impact of smartphones on shopping practice by using practice theory. Mobile phone is presented as a technological element (material) which can make shopping more convenient because consumers always every time takes the phone with them. Reading the blogs, comparison of the products is shown as competencies (competence) that gained with the help of the smartphone. In terms of meaningfulness of shopping practice, mobile phone shifts individual shopping activity to social activity. Consumers interpret this change as a new meaning of shopping practice (meaning) as a contribution of the phone (ibid). Atkinson (2013) presents digitalization as a solution to purchase more sustainable food but she does not focus on non-purchasing as an element of sustainable consumption. As an environmentally-friendly practice, non-purchasing practice considers avoiding purchase (Mataracı and Kurtuluş, 2020). Since non-purchasing practice is accepted as one of the essential components of sustainable consumption (ibid), studies on sustainable purchasing should also cover this phenomenon.

As food purchasing is regarded as one of the essential antecedents of food consumption (Hartmann-Boyce et al., 2018), it is worth exploring in detail. Although previous studies have studied the fields mentioned earlier attentively, the triangle of purchasing practice, digitalization and sustainability has not given enough attention. Also, the previous researches have mainly focused on whether sustainable food consumption or non-purchasing. In order to fill these knowledge gaps, consumers' views on the impact of smartphone apps in terms of sustainability need to be analyzed thoroughly. In this study, both sides of food purchasing (non-purchasing and purchasing sustainable food) will be discussed. Although digitalization covers the use of various digital technologies, this study analyzes the impact of smartphone applications as widely accepted modern technology. A high number of users around the world makes the exploring of smartphone apps socially relevant. Another important point that makes this topic socially relevant is a growing sustainability concern such as ecological footprint, natural resource depletion, etc.

The impact of two anti-food waste applications (“Karma” and “Too Good To Go”) and one purchasing app (“ICA”) on sustainable food purchasing will be investigated from consumers' perspectives. If “Too Good To Go” is used to purchase unsold food at a low price from the restaurants, “Karma” is available to do the same both in restaurants and groceries. Even

though these two apps are mainly related to restaurants, this current research focuses on their effect on in-store food purchasing. Also, the “ICA’ app is used to buy food from “ICA” supermarket. The use of three different applications with different functionalities will help authors to present a broad view on the effects of digitalization on food purchasing practice.

### ***1.3 Aim and Research Question***

In response to this background, this research aims to explore the impacts of consumers’ use of digitalization on their food purchasing practice in terms of sustainability. Since food consumption is usually investigated as a whole phenomenon, it leaves room for investigating food purchasing practice as a key antecedent of food consumption. To understand the impact of smartphone apps on food purchasing practice in terms of sustainability, the following research question should be answered by consumers.

***How does consumers’ use of smartphone apps make their in-store food purchasing practice sustainable?***

By answering this question, the changes in food purchasing practice with the help of smartphone applications will be more apparent. From a theoretical perspective, this research aims to explore the impacts of digitalization on food purchasing practice from two different sides of sustainable consumption, namely non-purchasing and purchasing sustainable food. Unlike the previous research, this study aims to better understand the purchasing practice as an independent phenomenon.

Also, growing concern on food consumption and environmental scarcity makes this study socially relevant. Increased use of food-related smartphone apps shows that consumers are ambitious to contribute sustainability at the individual level. To do it, their practice undergoes some changes in terms of environmentally-friendliness. This study aims to understand the role of consumers’ food purchasing practices and the importance of digitalization in ensuring sustainability. Thus, this research aims to encourage consumers to contribute sustainability with the leverage of digitalization due to a new outlook regarding food purchasing.

Along with the approaches mentioned above, this thesis aims to contribute to smartphone app design, too. Furthermore, since the consumer’s perspective is investigated in this study, app designers can get useful feedback that can motivate them to upgrade the digital products. Therefore, those digital devices and apps can facilitate the process of reaching sustainability.

## ***1.4 Structure of the thesis***

This research is structured in the following way. The notion of practice theory, sustainable food purchasing (and consumption), digitalization, also the connection between the practice theory and food purchasing practice will be discussed in the Literature Review Chapter. According to the academic convention, the methodology chapter contains the research paradigm and approach, research strategy, and methods and materials. In the subsequent chapter, analysis and findings will show the research results with the help of grounded theory. In the last chapter, the research question of the study will be answered based on the empirical data. After the conclusion, the theoretical and managerial contributions of the research will be presented. Consequently, the limitations of this study will help to suggest further research topics which this study could not touch upon thoroughly.

## **2. Literature Review**

The literature review chapter introduces the discussion of the previous research in relation to sustainable food consumption, sustainable purchasing, and digitalization. Also, practice theory is presented as a theoretical framework. The explanation of the notion of practice theory is followed by the part about the applicability of this theory in food purchasing practice.

### ***2.1 Sustainable Food Consumption***

Consumption is a process where agents appreciate and appropriate goods, services, performances, etc., regardless these agents purchase them or not (Warde, 2005). After some years, the acquisition is added as a 3rd element by Warde (2014), and he perceives these three elements as the underlying dimensions of consumption. Evans (2019) gives a broad meaning to the concept of consumption and accepts almost every action in which the resource is utilized as consumption. Graeber (2011) shows his concern for the general explanation of consumption that any product out of the market is accepted as a consumption form. Also, consumption can be perceived as a complex of ownership, usage, wasting, and destroying for its etymology (ibid). Warde's approach to the relationship between practices and consumption strengthens this argument. According to Warde (2005), consumption does not happen by and for itself, but it emerges from practices. He also avoids limiting the notion of consumption with just purchasing and using up products, instead interprets consumption as a component of every social practice. Likely, Heyman (2004) refrains explaining the meaning of consumption as a final act – eating food, instead focuses on other activities before the last consumption. Devaney and Davies (2017) in their turn, accept acquisition, storage and preparation, and food waste management as the

undeniable parts of food consumption. All these parts of consumption significantly influence climate change, biodiversity loss, environmental degradation, water scarcity, etc., and these influences have not to be underestimated (Raheem, Shishaev, & Dikovitsky, 2019). The emergence of the modern environmental movement in Europe paved a new way to understand consumption (Connolly & Prothero, 2008). To minimize the negative environmental consequences of consumption, sustainable consumption phenomena have been added to global policy agendas, especially after the Rio Earth Summit in 1992 (Evans, 2019). However, current consumption is not regarded as sustainable consumption (Reisch, Eberle, & Lorek, 2013). Consumption practices have been recognized as unsustainable in both the political arena and academia after the 1990s (Durning, 1992).

Taking Warde's (2005) argument on the link between consumption and practices into account, one of the primary everyday practices – food consumption – can not stay unnoticed, mainly because of its significant environmental impact. The food system actors have to take the current conjecture - demographic change and population growth - into consideration and create and improve effective solutions to ensure more sustainable food consumption. Although the "Sustainable Consumption" phenomenon does not have a long history, according to Evans (2019), it has a special place in social science. Even if the exact meaning of sustainable food consumption is not defined yet (Reisch et al., 2013), all actors try to prevent possible environmental impacts at different levels. At the global level, the United Nations mobilizes its power to reach Sustainable Development Goals, containing "Responsible Consumption and Production." Also, companies must contribute to environmental sustainability by producing, transporting, packaging sustainably. Consumers are one of the key actors that can influence sustainability by purchasing and consuming sustainably. (Røpke 2009) points out the importance of the changes of practices to ensure sustainable consumption.

Moreover, food consumption and consumer choice are regarded as daily routines. Fuentes (2014) draws attention to the complexities which are too hard to manage only by human actors. The contradiction between personal goals and sustainable practice is presented as the complexity of consumers' daily life practices (Fuentes, 2014). Moreover, the clash between "want" and "need" exacerbates this problem. Sometimes, consumers purchase what they want rather than what they need. To overcome this complexity, consumers should decide between their goals and sustainable consumption (ibid). Unfortunately, their positive attitude towards sustainability not always results in sustainable consumption (Mataracı & Kurtuluş, 2020). Ironically, even if consumers tend to prefer sustainable practices to their wills, sometimes lack of information about the product may keep those complexities unsolved.

## ***2.2 Sustainable Purchasing and Digitalization***

Since food consumption has a significant impact on sustainability, purchasing practice has its own share as part of this consumption. As Warde (2005) mentions, purchasing is an integral part of food consumption. Purchasing can be perceived as satisfying consumers' needs through selection, purchase, usage, and disposal. (Schiffman & Kanuk, 2004). For the purpose of this current study, search, selection, and buy (purchase) are focused in detail.

Rumpala (2011) draws attention to the increasing role of consumers in the purchasing process. Since they can influence the environment with their preferences, consumers should not be underestimated as passive actors (Rumpala, 2011). Evans et al. (2017) mention the transform from "passive consumer" to "active consumer" specifically. All food chain actors (producers, retailers, consumers, etc.) have a unique role in the consumption process, and action can fail without the presence of one of them (Cochoy et al., 2017). However, the future of sustainable food systems is up to consumer behavior in some regards (Fonte, 2013). By purchasing sustainably, they can influence the environment through their practices. Interestingly, they first must have the power for these choices, and then their choices must be right (Kilbourne, 2004). As Schiffman & Kanuk (2004) mentioned, input, process, and output are the stages of consumer decision-making. Consumers make a purchasing decisions based on their cognitive and emotional state. The product and its price affect the purchasing decision, too. Also, friends, advertisers, family influence consumers' purchasing. In the process stage, consumers search for information about the product and compare the alternatives. However, a lack of information about the products can make consumers purchase according to the reputation (ibid). Thus, sustainability can be underestimated when purchasing because of the reputation of the product. In the last stage (Output), consumers evaluate their purchasing, and according to the result of this evaluation, they accept or refuse it as a behavior (ibid). However, "consuming less" is a more important idea than "consuming differently" for sustainability (Evans et al., 2017). Non-purchasing behavior is part of environmentally-friendly behavior as well. If some consumers try to avoid purchasing because of economic reasons, environmental concerns also influence this practice at a high degree (Mataracı & Kurtuluş, 2020).

For carrying out purchasing practice in a sustainable way, consumers use the multifaceted features of digitalization. Digital artifacts can reshape consumers' purchasing practice. As value co-creators, consumers (human actors) and digital devices/applications (non-human actors) construct markets and also influence consumer consumption patterns, at the same time purchasing practice (Fuentes & Svingstedt, 2017; Hansson, 2017). For example, consumers do not have to visit physical stores or sit in front of the computer at home. Instead, they can

consume anytime, anywhere by using smartphones (Fuentes & Svingstedt, 2017). By the leverage of digital devices and applications, consumers can promote sustainability effectively. They can compare and choose more sustainable food and get information regarding food consumption and its environmental effect through digital applications. This usage creates a new social shopping practice (Fuentes, Bäckström, & Svingstedt, 2017). Smartphone applications affect the information exchange between consumers as well. They can share their "eco-nerd" identity and encourage others to change their practices in a more sustainable way (Sörum & Fuentes, 2017). Besides this, some smartphone applications are designed to inspire consumers to organize and control their behavior as a game. According to Deterding et al. (2011), by using game elements in non-game settings, users can be motivated. These gamification features are regarded as an effective tool to enable sustainable consumption and encourage sustainable practices (Nguyen, 2020).

As mentioned before, purchasing practice has already been investigated from different perspectives (Fonte, 2013; Országhová & Petreková; Lin & Niu). For instance, Fonte (2013) explores the influence of consumers' sustainability values and beliefs on their purchasing behavior in Italy. She believes that norms and beliefs can reshape practice. Analysis of changing meaning is one of the central parts of this research, too. There is a strong dependence between purchasing intention and purchasing practice (Lin & Niu, 2018). Also, the importance of environmental knowledge in purchasing practice is mentioned specifically (ibid). Social norms and environmental consciousness promotes environmentally-friendly purchasing intention. Lin and Niu (2018) claim that companies should consider consumers' environmental concerns when they produce products.

Consumers' education level and their purchasing practice are also investigated by Országhová & Petrekova (2020). Surprisingly, their result shows no correlation between consumers' education and purchasing frequency, although they defend that companies should learn consumers' opinions regarding products in grocery stores. However, Lin and Niu (2018) have different results that can show the positive correlation between knowledge and sustainable purchasing practice. Joshi and Rahman (2019) focus on the psychological factors of sustainable purchasing practice. Consumers' perception of the marketplace, their spirituality, and environmental responsibility are the main objects of that research. Consumers' food purchasing practice is also affected by smartphone dependency (Wang, 2016). This dependency can change and reconfigure consumers' purchasing practices (ibid).

### ***2.3 Theoretical outline on Practice theory***

Practice theory is considered one of the most appropriate approaches in the field of sustainable consumption study nowadays (Røpke, 2009). The applicability of this approach can be high-yielding in social science, where the main focus is on sustainable consumption (ibid). According to Warde (2005) consumption process is lead with the help of practices, and all practices can be accepted as the driving force of changes. Since these changes are moving forward hand in hand with purchasing practice, practice theory can be the relevant theoretical outline in order to illuminate changing practices in food purchasing. Therefore, in this chapter, as a theoretical framework, practice theory will guide authors to answer how the use of digitalization makes consumers' food purchasing practice sustainable.

In order to understand the philosophy behind the practice in comparison with other cultural theories, the difference between 'homo economicus' and the 'homo sociologicus' should be mentioned. If the former one shows the wants and purposes at the individual level, the latter notion is a complex of personal interests (Reckwitz, 2002). However, Giddens (1979) sees the practice as a result of individual tendency, too.

These kinds of contradictory opinions encourage authors to look at the following thoughts in detail. When analyzing the understanding of practice theory, Reckwitz's (2002) views on the phenomena should not be ignored. Spaargaren et al. (2016) reinforce this argument while claiming that Reckwitz's (2002) definition of practice is the most referred definition of practice. According to Reckwitz (2002), practice is "a routinized type of behavior which consist of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge" (p. 249). If someone is learning new practices, he/she needs to be a body in a certain way, not only about using the body. More importantly, these movements should contain interrelated complexity and should not be underestimated any part. As a carrier of practice, individuals can do many uncoordinated practices (ibid). It is crucial to keep in mind that these different practices can affect each other in different ways. In doing so, the initial intention and final result may be different. This "rebound effect" is one of the main challenges of implementation of the practices. Moreover, even if a practice changes because of its specific components, it can not be easily affected by one sole aspect (Sahakian & Wilhite, 2014).

In addition, practices are organized actions. As multiplex activities, practices are maintained and lengthened temporally (Schatzki, 2012). In this regard, Reckwitz (2002) confirms the

abovementioned idea when he sees the practice as a nexus of bodily and mental activities. Interestingly, mental and emotional actions are interpreted within the structure of bodily activities. Understanding, knowing how and desiring are the mental elements of the practice. With the help of all these activities, we can move our bodies, handle objects, treat people describe things, and perceive mankind (ibid).

Also, objects are accepted as one of the main components of many practices. Reckwitz (2002) points out the essential role of objects and their use in daily life. In this case, the acts are not limited to only bodily movements, but desiring, knowing how also become parts of the process. Also, as one of the critical components of practices, knowledge helps practice carriers to perceive things and humans, in general, the world better. Practices contain intellectual activities such as writing, reading, etc. as well. (Reckwitz, 2002). According to Reckwitz (2002), all elements of routines (moving the body, understanding, desiring, using things, etc.) are practices. More importantly, these activities do not contradict. (Loscher, Splitter, & Seidl, 2019). The strong connection between body/mind and things pave the way for the emergence of social phenomena. As a complex phenomenon, a practice usually refrains isolation (Reckwitz, 2002). A straightforward practice can contain many other interconnected practices per se. Since they do not have any "demarcation line," the imbrication of practices is one possibility (ibid).

Besides that, the intertwined practices consolidate human activities and social phenomena as a part of sole social reality (Schatzki, 2002). Being human can be equal to being a body that can make bodily movements such as showing the feeling and sensation (Lammi, 2018). However, Reckwitz (2002) claims that these feelings and emotions are not possessed by individuals. Practices have these emotions and feelings.

In addition, Schatzki (2012) perceives the practice as a combination of sayings and doings. According to him, practice is an open-ended phenomenon that comprises countless activities. Tasks and projects can be relevant examples to these acts that are irregular and unique (ibid). Although all practice theories admit the crucial role of the material dimension of practice, Schatzki (2012) draws a line between human and non-human activities (Spaargaren et al., 2016). Since capability, knowledgeability and intelligibility belong to a human, the human agency should be perceived as the main change-maker in practice (ibid). Because of the dynamism between practice and practitioner, both phenomena can have an impact on each other (Fuentes & Svingstedt, 2017). By doing so, they may redefine themselves again (ibid).

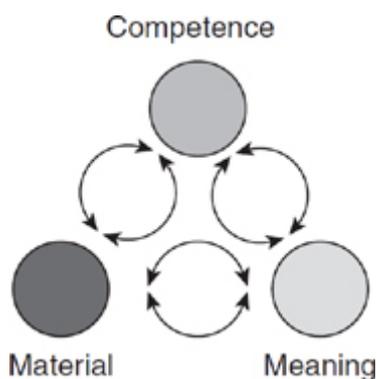
In order to understand the reasons for the behavioral change of a person, practice theory needs to be applied to the individual (Halkier, Katz-Gerro, & Martens, 2011). The body, social and material world can define the reproduction level of habits (Sahakian & Wilhite, 2014). Also, the

practice has presented as a combination of images (symbols, meanings), skills (procedures and competence), and stuff (technology and material) that coordinated by skillful practitioners (Shove & Pantzar, 2005).

Regarding food purchasing practice, bodily, mental, and material perspectives of practice will be covered. In order to do it, analysis of all the following core elements of practice are crucial (Shove et al., 2012).

1. Material (e.g., bodies, things, technologies, and tangible physical entities) is a material element that is used during any practice (Fuentes & Svingstedt, 2017).
2. Competence (e.g., skills, know-how, techniques) is perceived as a cognitive ability to have a practice (ibid).
3. Meaning (e.g., symbolic meanings, ideas, and aspirations) is interpreted as a "social and symbolic significance of participation at any one moment" (Shove et al., 2012).

Practices can come to light, continue and disappear when the connection between the elements of practices is ensured (Shove et al., 2012). It can be divided in order to analyze the elements in detail. But during the process of practices (e.g., food purchasing, food consumption), these three elements (materials, competence, and meanings) are incorporated by consumers (ibid). In practice, all these elements are dependent on each other, and they are interrelated. Shove et al. (2012) indicates the amalgamation of these elements in the following figure.



*Table 1: Interconnection of elements of practice*

This interlinkage helps these dimensions to reconfigure each other (ibid).

As the components of practice, material, competence, and meaning can also be termed as equipment, skills, images (Røpke, 2009). Individually and collectively, these elements can change the practice of individuals or/and groups of people (Schatzki, 2002). As talked about the

agent before, human agents can merge the elements to perform practice with the help of a non-human agent (Røpke, 2009). Mainly, forms of bodily activities, forms of mental activities, "things" and their use, background knowledge in the form of understanding, know-how, states of emotion, and motivational knowledge are interconnected - constitute practice (Reckwitz, 2002). At this point, the boundary of the theory will be drawn within the components of these three elements; material (or equipment), competence or (skill), meaning or (imagine) (Reckwitz, 2002; Røpke, 2009).

*Material* - includes objects, equipment, and bodies or parts of the body that help perform the practice (Røpke, 2009). According to Røpke (2009), objects can be specific or non-specific, and practitioners may need particular skills to use them. According to Fuentes and Svingstedt (2017), smartphone apps are the object which is also an element of a non-human actor (digitalization). In addition, the smartphone is the equipment that is specified (Røpke, 2009). Therefore, the practice of using an object (smartphone apps) or element (smartphone) with the help of part of the body (required skill and bodily site for emotions) in consumers' daily routine can influence the other daily practices (e.g., sustainable food consumption/purchasing practice) (Røpke, 2009; Schatzki, 2002).

*Competence* - includes skill and knowledge which is required to perform the practice (Reckwitz, 2002). It can also be referred to as a cognitive ability that is essential to perform a routinized habit (Fuentes & Svingstedt, 2017). For practice theory, this knowledge is a form of understanding, feelings, and know-how that interlinks objects or materials with human agents to perform the practice (Reckwitz, 2002). Every practice requires know-how of knowledge; thus, sustainable food purchasing practice using smartphone apps demands a certain knowledge of performing the practice. To be more specific, the knowledge and understanding of how smartphone apps are working will be considered as a competence of the purchasing practice (Fuentes & Svingstedt, 2017).

*Meaning* - refers to decoding the sense of activity (Røpke, 2009). In order to decode the sense of the activity of social practice with the help of materials is important (ibid). Understanding the practice-related belief, emotions, and purpose of the practice is the focal point of meaning (Reckwitz, 2002; Røpke, 2009). By saying so, it indicates that the practitioner's positive emotion of believing something healthy - to do something sustainable will be the interpretation of the sustainable food purchasing practice (Røpke, 2009). In order to understand the meaning of the practice, the patterns of individuals' use of materials in their daily practice should be perceived. Even if all these elements have a specific definition, food purchasing practice needs to be analyzed as a whole concept.

Thus, one of the essential parts of practice theory is 'Change', which is why the routinized behavior of individuals and groups is improvised and revised (Reckwitz, 2002; Schatzki, 2002). "Change" in social practice is responsible for a change in social life where different agents play significant roles (Schatzki, 2002). In this context, human and non-human agents (e.g., digital devices, smartphone apps, websites) are believed to be the engine that drives the change of social practice (Røpke, 2009). This change in practices can be defined in terms of material, competence, and meaning, which are core elements of practice according to Shove et al. (2012). Therefore, rearrangement and reorganization of these elements can determine the change in practice (Schatzki, 2002). Here rearrangement and reorganization of elements refer to using the elements differently than before (Schatzki, 2002). To understand how rearrangement and reorganization of elements materialize change in practice and how non-human agents (e.g., smartphone apps) can change food purchasing practice, theory of practice is used as a theoretical framework. Therefore, this current research studies how digitalization (e.g., smartphone food apps) promotes sustainable food purchasing practice. As mentioned above, the interlinked between these elements can change the practice of an entity or a group (Fuentes & Svingstedt, 2017; Reckwitz, 2002; Røpke, 2009). Therefore, the rearrangement and reorganization of these elements in purchasing practice may emerge new practice, shape the old practice or add some modification to social practice (Schatzki, 2002; Shove et al., 2012). By understanding the changes in different elements of food purchasing practice, a bigger picture of changes in this practice will be clear.

### **3. Methodology**

This chapter starts with the ontology and epistemology of the research. Then the research approach is followed by a qualitative research strategy. Next, the data obtained through semi-structured interviews are analyzed with the help of grounded theory. After introducing data collection, materials, and analysis process, ethical consideration and research quality are presented. In the end, the limitations and challenges of this methodology are shown.

#### ***3.1 Research paradigm and approach***

Ontology and epistemology are regarded as two philosophical belief systems that reveal the nature of the phenomenon. Since food purchasing is mainly constructed by human and social interaction, constructionist ontology is used to know the nature of social reality, as mentioned by May (2011). This research paradigm can show how consumers develop food purchasing practice.

As an epistemological position, interpretivist research philosophy allows that the meanings of the findings are interpreted and formulated by researchers (Bryman, 2016). In this study, there is no objective knowledge that the researchers can scientifically prove. Here one of the main tools is the mind of researchers. It helps to generalize empirical data, interpret and find the answer to the research question (Bryman, 2016). Authors interpret interviewees' perceptions regarding food purchasing and the use of smartphone apps. Therefore, it allows us to grasp the subjective understanding of apps' impact on sustainable food purchasing (ibid). This method may help to reveal the hidden meanings and motivations of consumers' food purchasing practice.

As the predetermined hypothesis is not used to find out the answer to the research question, an inductive approach is chosen for this study (Bryman, 2016). An inductive characteristic of the research allows the researcher to make a theory with the help of data obtained from interviews or observations. Thus, the theory is generated as an outcome of data analysis in an inductive research approach (ibid). As seen from the research question, any theory is not constructed. Instead, data from interviews will build up a theory. Analysis of the empirical data may generate new perspectives regarding the influence of digitalization on sustainable food purchasing. In the context of this research, the dependency between consumers' use of sustainable food applications and food purchasing practice is investigated. By conducting the inductive method, interviewees' influence of food purchasing practice through the apps will be explained.

### **3.2 Qualitative research strategy**

Since the current research aims to understand the influence of smartphone apps on sustainable food purchasing practice, different interpretations of consumers will help answer the research question. The qualitative research strategy can be more appropriate in this regard. As a social phenomenon, the link between sustainable food purchasing practice and the smartphone app is perceived differently. With the help of the qualitative research strategy, consumers' outlook regarding their sustainable purchasing practice will be shown. People have different perspectives from different viewpoints for the same phenomenon. Flick (2018) interprets this statement as a part of pluralization. Pluralization of life means that everyone has a different experience of life. There is no single theory that can describe the experience and feelings of people (ibid). Different perspectives on the role of smartphone apps in food purchasing practice can be accepted as a pluralization of consumers' life. The qualitative research analyzes the respondents' words to understand how they feel, think, and act towards a specific phenomenon (Bryman, 2016).

### **3.3 Grounded theory as a research design**

Since the research is not based on any predefined hypothesis and creates a new interpretative understanding, data collection and analysis are conducted according to grounded theory methodology. Although there is no exact definition of grounded theory, it shifts abstract notions from data to the theory. The grounded theory facilitates getting meanings from the data (Charmaz, 2014). For this reason, the grounded theory is an appropriate research design for the inductive approach, too (Bryman, 2016). According to the requirement of grounded theory, at the very beginning, a clear research question has been defined (Flick, 2018). It has been reformulated few times to ensure relevance between the focus of the study and methods/materials (ibid).

Corbin & Strauss (2014) interpret grounded theory as a systematic qualitative research methodology. This method helps the researcher collect and analyze data effectively in qualitative research (ibid). This methodology covers planning, data collection, data analysis, and theory development (Vollstedt & Rezat, 2019). The planning of data collection, organizing semi-structured interviews, analyzing empirical data, and conclusion of the study are arranged based on the grounded theory. The various elements of changes in food purchasing practice are explained based on data gained through interviews. Shared and different understanding of app use, also food purchasing can be analyzed and interpreted with the help of grounded theory. It is an appropriate method to understand the actions and processes resulting from the systematic analysis of data. Besides, suppose the relationship between digitalization and sustainable food purchasing practice is not investigated deeply, and some essential ideas are missing. In that case, grounded theory can be the relevant methodology to develop the theory (ibid). The theories can be developed due to interviewees' answers, not only with other authors' studies in grounded theory (Corbin & Strauss, 2014). The richness of empirical data can be affected by the level of interaction between participants and researchers. Charmaz (2008) believes that this interaction contributes to the research. She shows this moment as a social constructionist approach in grounded theory. She claims that this interaction helps to produce data and generate meaning (ibid). This study discovers how interviewees assert different meanings to sustainability and food purchasing practice by using smartphone apps and getting new competencies.

### ***3.4 Data collection, sampling and material***

Before starting the research process, a pilot test has been conducted to identify the appropriate qualitative method for data collection. As a preliminary study, it allows researchers to test several methods in order to find the most suitable one (Bryman, 2016). Digital observation

(netnography) was tested for this study. However, after analyzing some data on social media (Facebook and Instagram) and the official webpages of the apps ("Karma", "Too Good To Go", "ICA"), it has been seen that consumers tend to express their attitudes towards smartphone apps in terms of functionalities rather than apps' influence to their purchasing practice. Obviously, this kind of data is not connected to the focus of this study and can not be helpful to answer the research question regarding the changes in food purchasing practice. The pilot study showed that the interview could help authors to understand the impact of digitalization on consumers' food purchasing practice from their perspective.

According to (May, 2011), relevant interviewees are essential for the interview. Moreover, subjective theoretical understanding is only possible when the researcher finds relevant interviewees (Flick, 2018). Therefore, the selection of interviewees was made carefully. The main criteria were the usage of the food apps ("Karma," "Too Good To Go," "ICA"). The interview population is the people who are using these food apps. A purposeful sampling strategy was followed in this study (ibid). According to purposeful sampling, the sample for the study is the people who lived in Sweden and using these apps. These apps were chosen because their functionalities are different, and they can allow understanding the topic from different perspectives. Also, all of these apps are widely used in Sweden. As well-known and actively used applications in Sweden, these are relevant to the aim of the research. Therefore, the main reason for choosing these apps is that these apps cover various aspects of food purchasing (e.g., sustainable food purchasing, non-purchasing, etc.).

"Karma" anti-food waste app has founded as a Swedish startup in Stockholm. The official website of "Karma," one of the anti-food waste apps, shows that 1.3 billion tons of food is wasted every year. Reducing food waste is presented as the main philosophy behind the "Karma" (karma. life, 2021). Consumers can buy surplus food from restaurants and groceries through this app at a low price. They can choose the food in the app and need to pick it up within certain hours (e.g., between 09.00 – 20.00). This food rescue application helps retailers sell their food instead of waste them (karma, life 2021a).



"Too Good To Go" has almost the same functionalities. The main difference is that this food rescue app can only be used to buy food from restaurants. Both applications share some information regarding food consumption and environmental sustainability (togoodtogo, 2021a). To answer the research question, the impacts of the use of these applications on consumers' in-store food purchasing will be analyzed.



The third application is "ICA," which allows doing online shopping, food search, also self-scanning of the products (ica, 2021). If consumers can use the first two functions regardless of

their place, the scanning function is only helpful when they are in store. They can get information about the product and can compare them. In addition, getting information about the ingredients, transportation, and packaging helps consumers choose more sustainable food.



The interviewees were recruited with the help of social media (Facebook and Instagram). A lack of food app users made authors use the snowball sampling technique to find those interviewees (May, 2011). Despite this challenge, the researchers could recruit 15 interviewees. Although interviewee's occupation was not a criterion for this study, we should mention that 12 interviewees were students. The authors anticipate that the interpretation of sustainable food purchasing can be different for students and non-students. Also, this phenomenon could be meant differently for different household size consumers. According to Sufyan et al. (2019), purchasing behavior is affected by family. Considering this statement, different sizes of households might share different perspectives regarding food purchasing practice. Hence, both single and married (with/without children) interviewees were recruited for the interviews. 5 interviewees out of 15 were married.

### ***3.5 Semi-structured Interview***

The purpose of this paper is to understand how smartphone applications make consumers' food purchasing practice sustainable. The possible changes in different elements of the practice will be expressed by consumers. In order to know consumers' points of view on this particular topic, an interview used as a method. An interview is an appropriate way to understand people's beliefs, feelings, emotions, attitudes (May, 2011). As a form of an interview, a semi-structured interview leaves room for further thoughts and interpretations. Closed and fixed-choice questions may restrict sharing alternative understandings regarding these phenomena (Bryman, 2016).

According to Flick (2018), open questions based on a specific topic can contribute to understanding the subjective theory of the interviewees. Here subjective theory denotes the perceived knowledge of an individual regarding a particular case, which can be expressed naturally through impulsively responding semi-structured interview questionnaire (Flick, 2018). Thus, the effect of digitalization on food purchasing practice is open to consumers' interpretation in this semi-structured interview.

For being sure about the quality of the interview, the pilot interview was conducted before the actual interview by adopting as many qualifications as possible (Bryman, 2016). As the interviews were conducted online, the voices should be loud and clear. The pilot interview has listened twice in order to identify the challenges. During the pilot interview, interviewers spoke in a low voice, creating some problems during the transcription. Gained experience from the pilot interview helped authors to understand the shortcomings and overcome them as interviewers that could contribute to the actual interviews. Also, The Interview Guide (Appendix 1) was improved after the pilot interview to better understand consumers' perspective regarding sustainable food purchasing.

Due to the current COVID-19 pandemic situation, all interviews were conducted through Zoom software. Because of online interviews, the place of interviews was not decided. However, interviewees were kindly asked to join the interview from a quiet and private place in order to respond naturally and spontaneously, as also advised by Bryman (2016). Besides, the time was fixed according to the interviewees' preferences. Moreover, the quality of the internet connection was checked to avoid any technical problem about computer recording quality that problem may arise while transcribing (Bryman, 2016; May, 2011).

The research topic, the purpose of the research, and the aim of the interview were mentioned at the beginning of the interview. Then, the interviewee's consent to participate in the interview is confirmed. They were also informed that how their participation would contribute to this research. Moreover, clear explanations of the complicated terms (e.g., Practice, Food Purchasing Practice, Sustainability, and Sustainable Food Purchasing Practice) which are related to the focus of the research were presented to them beforehand as a handout (Appendix 2). It helped interviewees to understand the meanings of the notions and answer the questions properly. Also, it prevented potential incomprehensibility and waste of time because of misunderstandings during the interviews. After mentioning ethical considerations in the research, permission for recording was asked. Besides, in an interactive interview, the direction of the conversations

could be changed slightly. Therefore, considering the likelihood of the changing order during the interview, the authors tried to follow the predefined questions (May, 2011).

The duration of the interview was approximately one and half hours. Both authors were present during the interview. After getting a piece of brief information about the interviewee, the main questions were asked. If the predefined questions were standard and could be asked by any of the authors, they participated in all interviews for a better quality of follow-up questions. Predefined questions were primarily about the general understanding of some overarching topics (e.g., food purchasing, use of smartphone apps to ensure sustainable purchasing). Follow-up questions were mainly focused on the detailed information about some specific themes (e.g., the use of transportation for going to the store, the choice between plastic and paper bag, etc.). One of the authors led the interview, and the other took notes and asked follow-up questions that might be important for understanding interviewees' perceptions. Even the predefined questions were the same for all interviewees; some of their answers made us ask further follow-up questions. Those questions were different for different interviewees. For instance, during the interview with married interviewees, some follow-up questions were about their family members' role in food purchasing. Moreover, students were talking about their gained knowledge about sustainability at the university. However, both predefined and follow-up questions aimed to obtain as much as possible detailed data which was related to the focus of the study. More informative interviews help analyze much information to find differences, similarities, and shared meaning to answer the research question.

The following form describes the brief information about interview and interviewees.

Name	City	Occupation	Household	Name of the App	Date	Duration
Interviewee 1	Helsingborg	Civil servant	3	“ICA”	21-03-2021	67 minutes
Interviewee 2	Malmö	Student	1	“Karma”	24-03-2021	73 minutes
Interviewee 3	Lund	Student	1	“To Good To Go”	26-03-2021	65 minutes

Interviewee 4	Lund	Student	1	“Karma”	27-03-2021	78 minutes
Interviewee 5	Lund	IT engineer	4	“ICA”	28-03-2021	82 minutes
Interviewee 6	Lund	Psychological therapist	3	“To Good To Go”	03-04-2021	94 minutes
Interviewee 7	Lund	Student	1	“To Good To Go”	05-04-2121	62 minutes
Interviewee 8	Linköping	Student	1	“ICA”	05-04-2021	71 minutes
Interviewee 9	Malmö	PhD	2	“Karma”	06-04-2021	51 minutes
Interviewee 10	Helsingborg	Cashier	3	“ICA”	08-04-2021	56 minutes
Interviewee 11	Lund	Student	1	“Karma”	21-04-2021	72 minutes
Interviewee 12	Lund	Student	1	“Karma”	24-04-2021	54 minutes
Interviewee 13	Malmö	Caretaker	3	“Too Good To Go”	25-04-2021	65 minutes
Interviewee 14	Linköping	Student	1	“Karma”	28-04-2021	71 minutes
Interviewee 15	Helsingborg	Student	1	“Karma”	02-05-2021	65 minutes

*Table 2: List of interviewees*

### ***3.6 Data Analysis Process***

Sampling and analyzing data are accepted as the two most vital components of grounded theory (Flick, 2018). The data analysis process can be divided into two main parts. In the first part, the transcription of the recorded data is done. In the following part, the grounded theory is used to analyze the transcript data. This method helps to explore different elements (meaning, competence, and material) of practice separately and then to make a connection between them by using similarities and shared meanings. Interrelated characteristics of the components of practice can be explained in this way more clearly. Consequently, new theories are formed at the end of the coding and categorization process (Charmaz, 2014).

All interviews were recorded using "Zoom" recording. After recording the interview, those files were saved on the interviewers' laptops. The recorded interview helps authors explore the whole situation deeply and find the missed viewpoints during the interview (Bryman, 2016). Even if some questions were predefined and easy to remember by reading from the screen (or paper), the follow-up questions could be forgotten sometimes as missed points. After the interviews, all recordings were transcribed to the text. These transcriptions help to understand the differences and similarities between the views of different individuals and identify the key themes that will be considered for the analysis part (May, 2011). The essential points (such as usage of the digital apps, understanding of sustainable food purchasing, changing purchasing behavior, etc.) in each interview transcription were chosen, highlighted, and analyzed. Although one-hour transcription needs five to six hours of manual transcribing time (Bryman, 2016), online verbatim transcription took roughly 15 minutes for each individual interview through Otter software. While transcribing, clarity of the audio was ensured. In order to avoid the misunderstanding of interviewee's views, the recordings were listened to as much as it becomes clear. Even if this software helped to reduce the time-consuming workload, the transcriptions still need manual corrections, primarily because of mispronunciations and different accents, where software transcribed some uncommon words (e.g., "Karma," "Too Good To Go," "ICA.") wrong. In order to make sure that any vital part of the interview was not missed, the recordings were listened to again after the transcription (Bryman, 2016). Then, the copies of the transcriptions were sent to interviewees for their comments and feedback (May, 2011).

Each transcription is roughly 45-50 pages. Reading the whole transcripts is very important to grasp the ideas. 734-page transcriptions were re-read line by line and one by one. As a part of analyzing, coding is the primary process of grounded theory (Flick, 2018). It is an iterative process (Charmaz, 2014) that authors run back and forth between the first and last coding steps.

Coding in grounded theory encourages the researcher to find invisible perspectives in Interviewee's speech (Charmaz, 2014). Authors also coded relevant points that repeated many times, surprised or connected with previous research, etc.

Charmaz (2014) presents three main stages of coding in qualitative research:

- a. Initial coding – in this stage, the essential points of interviews were named. All the consumers' feelings or thoughts related to the study focus (food purchasing, consumption, sustainable food apps, etc.) should be highlighted in the initial coding process.
- b. Focused coding – in this step, the data which is the most used and related to the research was kept. These notions were talked about many times and by almost every interviewee. This group of data is regarded as dominant data (ibid). According to the practice elements, interviewees' thoughts regarding food purchasing practice were divided into three categories (meaning, material, and competence). These parts were highlighted with green, blue, and pink colors, respectively. Some other indirectly related points (e.g., healthy food, food waste management, etc.) were marked yellow. Since grounded theory requires going back and forth to compare and modify data, this way of the beginning is convenient to systematically analyze.
- c. Theoretical coding – at the last step, the connections between categories and subcategories should be linked. This kind of relationship between similar ideas can emerge new theory.

In the beginning, line-by-line coding was used to analyze the transcriptions. After coding two interviews, the patterns (e.g., frequency, similarities, and differences) were clearer, and then paragraph by paragraph coding method was implemented. For instance, if the interviewee answers the question about the meaning of food purchasing, the authors did not read and highlighted every single line at the beginning of the analysis. The whole paragraph was highlighted green ("meaning"). Of course, in the following steps, all sentences were analyzed carefully again and again. Thus, data was categorized and looked for the connections between those categories. Interestingly, different categories were merged along with the processes.

The following table shows the main categories and subcategories to analyze data. Then, all these categories were splitted into two subcategories, as shown in Table 2.

Giving new <i>meaning</i> to food purchasing	Gaining <i>competence</i> with the help of app	Using the <i>material</i> in a sake of sustainability
Taking sustainability into consideration as a new idea	Mastering new skills through the apps	Leveraging technology/functionalities of the app
Satisfying aspirations while purchasing food sustainably	Understanding various aspects of sustainable food purchasing	Removing unsustainable materials / adding sustainable tools

*Table 3: Coding system for the interviews*

If the categories allow authors to see the whole picture, subcategories made the changes in understanding the elements more evident. It also contributes to finding the similarities between different views regarding the aspects of practice. These findings may facilitate answering the research question and generating a new idea in the field.

The whole data analysis process was accompanied by memoing (Charmaz, 2014). Memoing can be accepted as keeping a record during the process. It also includes detailed notes during the interview (ibid). Most of them were about the relationship between interviewees' answers and previous literature. Besides, some answers could generate new ideas. Memos also help to follow the sequence during the coding process.

### ***3.7 Ethical consideration***

Ethical consideration is one of the essential issues for qualitative research (Flick, 2018). Considering the importance of interviewee's privacy, the interviews were transcribed anonymously. The essence of the anonymity and confidentiality of the interviewees were taken into account (Bryman, 2016). Therefore, the names and personal information of the interviewees were not written in the transcription. Instead, their names were coded as Interviewee 1- Interviewee 15 (Interviewee number). The interviewees were informed about recording and taking consent before the interview to avoid lack of informed consent (Bryman, 2016).

Moreover, six principles of social science research ethics were followed (American sociological association, 2021).

- 1) Professional competence - Appropriate approaches, personal attribution were maintained in order to maintain professional competencies. For example, the proper approach (qualitative research, grounded theory method, and semi-structured interview) was used as the pillars of the research design, which has been broadly explained in this Chapter. Besides, during the interviews, authors used their personal attribution by supporting each other to prevent misleading the interviewee. Misleading the interviewees is one of the drawbacks of any study (Bryman, 2016). Directing the interview to any unrelated topic or going far from the food purchasing practice theme can be considered misleading in this regard. Interviewers helped each other when the conversation with the interviewee went in an unrelated direction by asking the questions from the interview guideline.
- 2) Integrity – Honesty, respectfulness and fairness were key elements in this research. For example, the interviews were transcribed word by word. Any part of the interview was not changed or manipulated.
- 3) Professional and scientific responsibility - The authors' views and approach were not imposed during and after the interview process in order to maintain professional and scientific responsibility. Nothing was written from the authors' perceptions and experience. The help of previous works of literature was taken, which were relevant for this study to support the data obtained from the interviews.
- 4) Respect for people's rights, dignity and diversity - The interviewees were not chosen by their age, gender, origin, ethnicity as authors respect to their dignity, and diversity. Mainly their use of smartphone applications was considered as a criterion.
- 5) Social responsibility - The contribution to society by encouraging sustainable food purchasing practices is aimed. By reading this study, readers can get an idea of how to contribute to the environment by using the food apps.
- 6) Human rights - The authors try to promote human rights to all people in this research. It mainly contains consumers' practices, choices and behaviors.

### ***3.8 Research Quality***

Research quality can affect the quality of result that determines how successful authors support the research aim. Interviewer training can increase reliability. In order to increase the reliability of the interviews, the authors prepared themselves as an interviewer by conducting a pilot interview with one of their close friends (ibid). After conducting this pilot interview, the clarity of the questions and general evaluation of the interview were discussed between the interviewee

and interviewers. The interview guide was adjusted based on the experience gained from the pilot interview and the discussion with the interviewee. According to Flick (2018), reliability can also be increased by adjusting the questions after the test or first interview. It was also done because some of the questions were too broad for the interview to understand and answer. That is why those groups of questions were reformulated and made more concrete with some related follow-up questions.

In order to maintain the validity of the research, authors avoid sharing their thoughts that could be biased because of their personal experience. For example, while conducting the interview, they were aware that they presented the question clearly and concretely, interpreted the answers using grounded theory, and perceived the meaning that the interviewees wanted to express without using interviewers' assumption. Therefore, any part of the answers of interviewees was not rejected (Flick, 2018). Moreover, the respondents' answer was not evaluated regardless of whether they are right or wrong (ibid).

However, there are some different criteria to measure research quality, such as transferability, credibility, dependability, confirmability (Flick, 2018). According to Bryman (2016), trustworthiness consists of credibility, dependability, confirmability, and transferability. In this study, some step-in order was followed to ensure credibility. First of all, authors regularly discussed their research topics with their colleagues who are working on similar topics in order to unfold our blind spot (Flick, 2018). Moreover, a copy of the draft result was sent to the interviewees to confirm that any thought was misunderstood or not (Flick, 2018). Also, an auditing approach was followed to fulfill the dependability request of the research as recommended by Bryman (2016). Keeping a proper record of each step in the research process is very important (ibid). For example, detailed notes of the interviews, transcription, and methodological process were taken. However, confirmability refers to set the seal on that authors do not impose their personal experience while analyzing the results (Bryman, 2016). In order to do that, after the analysis, the results of the analysis were written as a draft separately. The purpose is to make the results personal bias-free. Lastly, transferability considers the usefulness of the research for other researchers in the field (Bryman, 2016). In other words, it allows other researchers to transfer and use the result of this in their study. In order to make the research open to other researchers in this field, the authors described the research process in depth in the methodology chapter; so that other researcher can make comments judge on it.

### ***3.9 Limitation and challenge***

When it comes to challenges during the research process, the disadvantages of the current COVID-19 pandemic situation should be mentioned. It was a challenge to find relevant interviewees for the interview within a short thesis period. Lack of human relations due to the pandemic made authors looking for interviewees through social media besides personal networking. Moreover, the physical meetings could not be arranged for the interviews. Another challenging part of the interviews is to take control of the interview (Bryman, 2016). The online mode of interviews exacerbates these difficulties a bit more. Sometimes interviewees and interviewers start to talk simultaneously, and it makes all of them confused.

Also, interpretivism assumes that knowledge can be reached through social constructions (language, meaning, gesture, etc.). The loss of personal interaction weakened the effectiveness of the conversations between interviewees and researchers. However, personal interaction could contribute more to grasp the meanings from gestures and reactions effectively.

There are some challenges regarding the transcription process as well. Since the interviews were transcribed digitally, some words were transcribed wrong because of different accents. In these cases, those parts were listened to again and edited manually.

Even if the current pandemic situation affected this study negatively because of the distance work of authors, it did not have any essential impact on the result of the research.

## **4. Data description and Analysis**

In this part, the impact of three applications ("Karma," "Too Good To Go," and "ICA") on consumers' purchasing practice is investigated. Changes in meaning, competence, and material dimensions of purchasing practice are analyzed in terms of sustainability. By analyzing these phenomena, the aim of the research can be reached that how consumers' use of digitalization makes their food purchasing practice sustainable. The analysis chapter shows how the three before-mentioned smartphone applications change consumers' purchasing practice.

### ***4.1 Using the materials for the sake of sustainability***

In this part, the applications are investigated from a material perspective. Firstly, these apps are the materials per se that can influence consumers' purchasing practice with their functionalities. Secondly, the apps can add/remove some material elements to/from this practice.

#### ***4.1.1 Leveraging technology/functionalities of the app***

The thoughts about the availability of the apps are not the same. Even if it covers the minimal area in Malmö (Interviewee 2), integration to interactive maps facilitates finding the nearest grocery. Furthermore, the user-friendliness of the app is more visible when you compare it with the website of the same company. This characteristic facilitates the use of the app that can encourage consumers to use it more often. Also, more users will use the app if it is easy to use. Backing to Interviewee 3's view that is mentioned before, these apps' contribution depends on the number of users.

*"If the website requires creating a profile, to prove that you are not a robot, for using the app you do not need to over any complicated procedure." (Interviewee 2)*

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However, he adds that the narrow scope of "Karma" deprives users to contribute sustainability more. Interviewee 4 says that it is easy to use "Karma." Even the interface of the app encourages me to become a sustainable consumer.

*"Specifically, short-form contents about the environmental impact of meat consumption make to feel a moral burden on me" (Interviewee 4)*

---

Interviewees also mention the scanning function of the apps ("ICA"). This function can be used when consumers are in the store. If consumers quickly choose and purchase when they make a list through the app before coming to the store, they have to spend some time to know the details about the products while scanning. For instance, Interviewee 1 says:

*"I use the app mostly when I am in the store. I can learn the details about the ingredients of the product by scanning a barcode. It allows me to evaluate and compare the products in terms of sustainability." (Interviewee 1)*

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Interviewee 5 adds that the app suggests him food based on his previous purchasing items. Since he is from a technical background, he focused on the technical characteristics of the app (e.g., "Big Data," digital tracking of consumer behavior and choice, etc.). He claims that this tracking makes the app show him similar sustainable food, which is very convenient.

*"If I purchase or search for sustainable food items, these apps suggest me other items that are sustainable as well. So it also affects my food choice." (Interviewee 5)*

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If Interviewee 8 mainly uses "ICA" to make a list before going to the store, Interviewee 5 prefers to use the scan function inside the store. Therefore, smartphone applications include new

equipment inside the store. This new equipment helps the consumers to compare the products and make the right decision regarding sustainability. Moreover, consumers' choice in the purchasing process is critical because when consumers select and purchase sustainable products, it contributes to the environment (Rumpala, 2011). Equipment denotes any element which is used for its functionality in practice (Reckwitz, 2002). In this case, the app is being used as equipment to perform the practice (Røpke, 2009).

#### ***4.1.2 Removing unsustainable materials / adding sustainable tools***

Consumers can add/remove some tools to/from their purchasing practice according to the features of the apps. Therefore, according to Interviewee 6, even if every app has a specific purpose, it can affect consumers' practice differently.

Though designers express that the philosophy behind "Too Good To Go" is rescuing unsold food and preventing food waste, it contributes to sustainable food consumption and purchasing practice in many ways. These are the invisible outcomes of the usage of the apps.

For instance,

***“If I buy food through “Too Good To Go,” I do not need to buy food from the grocery. Also, I use their food containers, so I do not wash the dishes. It means no electricity, no dishwasher, and no water.” (Interviewee 6)***

---

This statement indicates that by using this application, she does not have to wash kitchen appliances. By doing so, she reduces the use of water and electricity. Also, when she purchases food through the app, she does not need to use a plastic bag harmful to the environment.

Similarly, Interviewee 2 mentioned that he avoids using the bus or car as the restaurant is nearby if he purchases food through the app. It also shows that this application is acting as a tool in the purchasing practice, which reshapes his purchasing activity. To be more exact, he can eliminate some practice he used before purchasing food by using this app.

***“By excluding transportation from the purchasing practice, I believe I am contributing to the environment.” (Interviewee 2)***

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Above mentioned outcomes show that the users are now excluding (plastic bags, bus, car) and including new tools (paper bags, container in which foods are delivered) in their purchasing practice when they use smartphone application. Here digital device with the help of human actor constitutes a new social shopping practice of purchasing food (Fuentes et al., 2017). This changed practice makes consumers consume less (in this case, reducing the use of water and

electricity). Therefore, Evans et al. (2017) argue that consuming less is necessary for sustainable consumption.

At the same time, using new tools makes the purchasing practice different from before. A smartphone is considered as new equipment which is used in purchasing practice. Røpke (2009) presents this new equipment as a material of practice.

According to Warde (2005), consumption occurs when consumers use any specific tool or activity in practice. Besides, purchasing is a vital part of consumption (ibid). Here consumers are using smartphone applications as a tool in order to become more informed and choose more sustainable products. Also, it helps the consumer to avoid over-purchasing and the use of resources (water, electricity, etc.).

#### ***4.2 Gaining competence with the help of the apps***

This part shows how consumers gain new skills and knowledge through the apps. Also, it explains how these competencies serve sustainable food purchasing.

##### ***4.2.1 Mastering new skills through the apps***

If most Interviewees use "Karma" to buy unsold food from restaurants, the app is used by Interviewee 2 to purchase sustainable vegetables. The interviewee buys a "Vegetable basket" that includes organic and sustainable vegetables through the app. This option replaces the in-store choice where the measurement on sustainable parameter of the vegetables was not easy. It wasn't easy to measure how sustainable the vegetables were when he purchased the vegetables from the grocery store. He mentioned,

*"It was tough for me to check where the vegetables come from. Are they organic or not? Mode of transportation etc." (Interviewee 2)*

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Interviewee 2 is a vegan and now he purchases "Vegetable basket" regularly using this app. Interviewee 2 emphasizes that the app guarantees that everything in the "Vegetable basket" is sustainable and chemical free. This new purchasing competence contributes to the carry the practice sustainable.

Giddens (1979) said that practice could be influenced when an individual intends to include the new tendency in the routine. Interviewee 2 adds a smartphone app to purchase a sustainable "Vegetable basket" in his daily routine. The knowledge about this sustainable "Vegetable basket" he gets from the smartphone app.

As mentioned in this statement above, competence is a form of knowledge (in this case, the knowledge about ordering the "Vegetable basket" from the app which can be used with the help

of a human and non-human agent (in this case, the smartphone application) to perform a practice (in this case purchasing sustainable food) (Reckwitz, 2002). Thus, to order the "Vegetable basket," he needs to know the competence of using a smartphone. Here, competence refers to know the usability of the application. The functionalities of the app help Interviewee 2 to gain this competence quickly. For example, he can make his choice with one click that he wants to purchase sustainable vegetables.

Interviewee 8 gains knowledge of how to compare the products through the app. Nutrition and ingredients of the products can be compared with the help of "ICA" app.

*"Before this app, I was able to check the expiry date. It was a waste of time to read the ingredients when I was in a store. Now I can read them when I am listening to music at home." (Interviewee 8)*

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This competence allows him to make a sustainable purchasing decision and make a list in this regard. Making a list makes him avoid overconsumption. Fuentes (2014) shows that consumers can contribute to environmental sustainability by buying what they need instead of what they want.

#### *4.2.2 Understanding various aspects of sustainable food purchasing*

Another interesting point that is spotted that smartphone applications make consumers more knowledgeable about their needs. Also, the importance of sustainable food consumption and the tools for this practice is mentioned in some applications. For instance, "Too Good To Go" has started the movement against food waste which contains valuable information regarding "cooking with leftovers," "food supply chain," "food waste quiz," as well (toogoodtogo, 2021b). It also provides some documents (guides) for students and teachers in order to make them more knowledgeable on these topics.

Interviewee 13 gladly expresses the role of this kind of information in shaping her child's behavior.

*"I should thank to "The banana journey" content in "Too Good To Go." After learning about banana's travel, my kid reduced his banana obsession (laughing). But I guess it is not enough. He should learn more. Apparently, a new generation is more responsible for the environment than us."*

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According to Interviewee 13, the level of knowledgeability between the new and old generation makes young people more environmentally friendly. “Too Good To Go” is one of these educative apps that positively influence consumers’ choices in purchasing in terms of sustainability.

Interviewee 15 learns many details about the environmental impacts of different sorts of foods.

*“The difference between beef and fish in terms of environmental effect made me surprised when I get this information from “Karma.” Also, some data about transportation and packaging of the foods are new for me.” (Interviewee 15)*

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She did not say that this awareness made her change her food purchasing behavior entirely, but it affected her choices to a high degree. Although she does not remove the meat from her menu, she can reduce meat purchasing per week.

Interviewee 7 focuses on a different feature of “Too Good To Go.” The app allows him to avoid buying unnecessary food.

*“This smartphone application helps me to buy what exactly I need. For example, if I decide to have a cookie, I can now purchase the cookie from the app. Otherwise, I had to go to the supermarket to purchase the ingredients for the cookie, and I might purchase other ingredients that are not needed. Also, I have watched an advertisement that popped up in this app, where I got to know about how we waste food every day unintentionally.” (Interviewee 7)*

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This statement mentioned above brings a notion that smartphone application helps consumers to understand sustainable purchasing practice. Purchasing the food that one needs is part of sustainable consumption practice (Fuentes, 2017). Reisch et al. (2013) argued that sustainable consumption reduces adverse environmental impacts. Smartphone application helps the consumers to be knowledgeable about how to be a more sustainable consumer by reducing overconsumption. Interestingly, Országhová and Petreková (2020) argued no relation between consumers' knowledge and consumption rate. But here, the interviewees are introducing smartphones in their routine purchasing practice, and consumers now become more competent to purchase the exact amount of product they need. Knowledge and behavior has confirm relationship (Toussaint, Cabanelas, & González-Alvarado, 2021). According to them, consumers do not know the features of the products that much. Being knowledgeable and competent can make consumers know about the product (ibid).

A similar idea was mentioned by Interviewee 8. He said that he is using a smartphone application which is helping him to know about the ingredients of the product. So, before going to the grocery store, he lists his needed items and only buys those from the grocery store. Then, he follows his list of products. As a result, he restricts himself from overconsumption.

This element contributes to consumption avoidance. Because of the global impact of consumption, Reasonable consumption and production are among the seventeen sustainable development goals announced by United Nations (UN, 2021b). It aims to ensure sustainable production and consumption patterns. Reisch et al. (2013) state that reasonable consumption can reduce food waste which affects environmental sustainability. Therefore, this particular smartphone application helps consumers get knowledge about making the list of products and making a decision considering the sustainable aspect.

Competence of practice refers to any knowledge or technique used in practice (Røpke, 2009). In this case, smartphone applications develop the knowledge about the reasonable consumption of food and change the consumers' overconsumption of food purchasing practice into sustainable food purchasing practice. When consumers use the smartphone for purchasing purposes, it reconfigures their purchasing practice (Wang 2016). According to Røpke (2009), a smartphone application is used (as a form of knowledge) in the routine of purchasing practice.

On the other hand, Interviewee 7 said that,

*"Like today because I know I would eat supper from "Too Good To Go." I only took some coffee and some cookies. I don't eat breakfast. So I only took some coffee and cookies for lunch."*

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It indicates that he does not need to cook food or purchase groceries for that day when he purchases food using the smartphone application. It can be regarded as a new technique in purchasing practice. This technique helps him to save overconsumption and, as a result, food waste.

According to Røpke (2009), the competence of practice refers to skills that collectively or individually change the practice of individuals. In the statement mentioned above, this skill is acquired by the knowledge gained by the smartphone app, which makes the user concerned about food wastage. As a result, he controls his food purchasing. Consequently, he is using new skills in the practice of purchasing food. According to Reckwitz (2002), when new skills (competence) are introduced in practice, it changes the previous practice. Here competence (new

skills gained from the knowledge of smartphones) transforms the food purchasing practice into sustainable food purchasing practice.

On a similar note, Interviewee 3 mentioned that,

*“Well, it's a way not to waste anything. There's such a big food waste and resource that is wasted from restaurants and normal shops. But it's also, I think, because of what many friends used to do, like dumpster diving. So for me, this is basically like an alternative to dumpster diving to get affordable, cheap, and not wasting anything. It also make me not to buy extra food from the store.”*

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This passage emphasizes the notion of educating people in a meaningful way. Before being familiar with this app, he looked at dumpster diving as one of the most effective ways to save surplus food and save the environment. Interestingly, dumpster diving is a trend that school-going students often go for rescuing items (i.e., food) from the containers.

A smartphone application can educate people to contribute to sustainability in a more logical, legal, and sustainable way. For example, the smartphone app helps the consumers be knowledgeable, and they can avoid dumpster diving instead purchase the food at a low price. According to Røpke (2009), this education regarding the specific issue can contribute to the improvement of knowledge (competence) of individuals and introduce in the practice of purchasing food using the particular smartphone app ("Too Good To Go") in a more sustainable way.

Indeed, educating functions of the apps should not be underestimated. Interviewee 7 gets some notifications regarding sustainable purchasing, food waste, and other related topics. This kind of information encourages him to learn more about those subjects. For instance, ocean pollution videos gained importance for Interviewee 7 after seeing similar details on the homepage of "Too Good To Go."

#### ***4.3 Changing meaning in food purchasing practice***

Although the interviewees' food purchasing frequency, also food choices are not the same, all of them perceive this practice as an inseparable part of human life. When it comes to the meaning of the purchasing, the research showed that interviewees interpret it differently. This part of the research shows how the new ideas are coming to light and add new meaning to the purchasing practice with the leverage of the apps.

### 4.3.1 Taking sustainability into consideration as a new idea

When the question about the definition of "sustainable consumer" was asked, most interviewees present two periods in their life regarding sustainable consumption and purchasing.

1. Before using these apps – unsustainable consumer
2. After using these apps – sustainable consumer

9 interviewees out of 15 do not claim that they are 100 % sustainable consumers, but they try to become as environmentally friendly as possible. By doing so, consumers try to gain new identities such as "sustainable consumer" or "green identity" (Fuentes, 2014). Moreover, they tend to share this identity to motivate others to become sustainable consumers (Sörum & Fuentes, 2017). According to Interviewee 8, digitalization brings "sustainability" as a new meaning to food purchasing. While For Interviewee 3 sustainable purchasing mainly means avoiding food waste, for Interviewee 8 it is the ingredients, packaging, and transportation of the products. For example, although Interviewee 3 uses "Too Good To Go" to rescue unsold food and prevent food waste, yet he does not pay enough attention to the information regarding food packaging or transportation when purchasing food. The interview data reveals that the users of "Karma" and "Too Good To Go" food waste apps see a link between these apps and their current non-purchasing practice. They claim that when they buy food through these apps, they do not need to buy much stuff from groceries. As Interviewee 6 puts it sometimes consumers need to buy a package of product, but only very little part of that product is needed to be used as an ingredient. The cooked meal from "Too Good To Go" it is an excellent way to avoid those type of unnecessary purchasing. This reduced consumption is regarded as an environmentally friendly practice (Mataracı & Kurtuluş, 2020).

Interview data also shows that sustainability is becoming one of the main parts of meaning with food purchasing apps. Interviewee 4 compares her attitude toward food purchasing before and after the app in terms of environmental sustainability. Mataracı and Kurtuluş (2020) also mention the difficulties of transforming environmentally-friendly attitudes into action. For instance, Interviewee 3 shows his economic condition as the main obstacle to purchasing environmentally friendly. Sustainable food is more expensive for him.

*"I contribute to sustainability by buying food from "Too Good To Go". Also because I can buy it at lower price. But I do not buy organic food as it is more expensive." (Interviewee 3)*

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Also, even if Interviewee 4 is aware of the negative impact of meat consumption on the environment, she still purchases and eats meat. However, Interviewee 4 believes that digitalization encourages taking action based on this positive attitude towards environmental sustainability. According to her, food purchasing is one of the simplest practices when she lived in Peru and without any food-related smartphone apps. Since she did not take environmental sustainability into account, she mainly focused on the price and quality of the product. After starting to use “Karma,” sustainability is being accepted as one of the main criteria for purchasing food.

*“I am more conscious about being sustainable. Because in Peru, I did not care about where the things came from, packaging, etc. Now it is more than just the food. It is like the package, and there is fair trade and everything that is behind. I never considered that before. But now I think I am becoming a little bit more serious.” (Interviewee 4)*

---

The interviewee expressed that after using the "Karma" app, her mindset regarding food purchasing has changed. The app's interface is full of information about food waste facts, food recovery, sustainable food consumption, etc. This kind of information makes consumers search about those phenomena thoroughly. Interviewee 4's search for more information regarding these mentioned phenomena show that new meaning of purchasing practice can help to gain new competencies (e.g., acquiring new knowledge about sustainability)

Interviewee 8 expresses how digitalization re-forms the society and environment, too. Digitalization influences people's routine (Országhová & Petreková). Therefore, the whole society is affected by digitalization. These kinds of applications and users around him affect him psychologically. Joshi and Rahman (2019) present perceived consumer effectiveness as an important psychological factor affecting sustainable purchasing behavior.

*“I have not lived in an environmental-friendly society before. We have not thought about sustainability when we purchase food. But here in Sweden, society and digital devices make me think about purchasing sustainable.” (Interviewee 8)*

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He becomes more aware of sustainability challenges with the help of digital devices. It is remarkable that the app shows the sustainability challenges in the food industry and also solutions through the app.

Interviewee 11 draws attention to the awareness, too. He sadly admitted that he had not used “Karma” or similar food apps when he was in France. However, when he compared environmental responsibility in Sweden and France, he mentioned an effective role of digital

applications. He believes that more knowledgeable consumers could be more environmentally friendly consumers.

*“Karma” is getting popular in France in the last few years. It is pretty new and only available in certain cities, not everywhere. But I hope it will expand and make people purchase more sustainably.” (Interviewee 11)*

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Interviewee 7 mentions the same meaning to sustainable food purchasing through similar apps – "Too Good To Go" and compares two periods – before and after using the app - nicely.

*"Whilst I am saving food, so to win for the environment, or to win for sustainable but also to win for myself. After being informed about sustainability with the help of the app, I prefer to buy; excuse me for saying, "Naked tomatoes" without any plastic package. And I have my sustainable bag for shopping." (Interviewee 7).*

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Also, Interviewee 10 sees environmental responsibility as an obsession in the purchasing practice. Joshi and Rahman (2019) present environmental responsibility as a crucial psychological factor in purchasing decisions. According to Interviewee 10, “ICA” shapes her mind to make the environmentally-friendliness of the product priority in her purchasing decisions.

#### ***4.3.2 Satisfying aspirations while purchasing sustainable***

Aspiration is regarded as a component of the meaning dimension of practice (Shove et al., 2012). Achieving become sustainable consumer is the primary aspiration in this sense. The ambition of achieving sustainable purchasing should be regarded as an aspiration in this context.

Although the crucial purpose of "Karma" and "Too Good To Go" is to prevent food waste, they encourage consumers to purchase sustainably. These apps are accepted as an alternative to buying food from groceries by most interviewees (Interviewee 2, 4, 6, 7).

*"If I start considering buying ready food through the app, I do not need to buy food from groceries. It helps both my budget and the environment. I would love to become sustainable consumer, but sometimes I can not because of my limited student budget." (Interviewee 4)*

---

She says that when she has food from "Karma," she does not buy anything from the grocery store. Interviewee 7 defends the same idea. He said that he order food one day before. Thus he does not buy any food from a grocery on that day. Since the food from "Too Good To Go" is

ready to eat, consumers do not need to buy ingredients for cooking. Avoiding surplus purchasing is an achievement for consumers in this regard.

Since the interviewees are primarily students, the price of the product has a special meaning for them. Mataracı and Kurtuluş (2020) present economic benefit as one of the leading indicators that shape sustainable purchasing behavior.

*"I know it is good to buy organic eggs, but especially in Coop, it can be a bit expensive. So it depends on my budget" (Interviewee 7)*

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According to Interviewee 3, purchasing sustainable food is a luxury sometimes. When it does not affect his student budget negatively, he prefers to buy sustainable food. Otherwise, sustainable food purchasing is not his priority. Happily, the food from "Too Good To Go" is much cheaper than its actual price. This factor motivates Interviewee 3 to use this app more. He also mentioned several environmental problems and claimed that consumers' may positively affect environmental sustainability using sustainable food apps. However, it primarily depends on the number of users for him.

*"If many consumers use the sustainable food apps, it would contribute to the environment." (Interviewee 3)*

---

Interviewee 4 does not share the same view as Interviewee 3. She stresses:

*"I am not that much sustainable consumer because I eat meat. But I feel that I can contribute to sustainability while using "Karma" on an individual level. And it makes me happy and motivates me to behave as a sustainable consumer."*

---

This food salvage app allows her to save food and her money, also reduces her food purchasing at the same time. Promoting sustainability and economize her student budget in parallel increases this happiness. As Reckwitz (2002) suggests, feelings and emotions have a special place in the meaning of practice.

Feeling of joy because of sustainable behavior is mentioned by Interviewee 9, too. As a "Karma" user, he saves food and avoids overconsumption, and it makes him happy. This feeling can be perceived as a part of spirituality presented as one of the critical psychological determinants of sustainable purchasing (Joshi & Rahman, 2019).

*"I feel very good because I feel that I can contribute to the environment. My contribution might be little, but I think I am doing something positive. It feels great to use these kinds of apps." (Interviewee 9)*

---

Gamification features in “Karma” adds meaning to food purchasing through the app. For instance, the gift cards from “Karma” make Interviewee 12 very cheerful.

*“When I buy something, I can get a gift card. They send the activation code to my email address. I just need to activate the code within 90 days and use this card in Karma shops or restaurants. As a student, getting something free is a very nice feeling.” (Interviewee 12)*

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Thus, “Karma” can be perceived as a gamified application. Users can get “giveaway gift cards” through the app at a much lower price. After activating the card, consumers can buy food from any “Karma” stores or restaurants. Food purchasing is a non-game context of consumers’ practice per se. However, adding “giveaway gift cards” as a game element motivates consumers to use this app more often (Deterding et al., 2011).

Interviewee 14 wants to support local restaurants and grocery shops. So he is happy that this gamification feature gives a chance to consumers to get and use their gift cards in local places.

*“Especially, during the pandemic, local shops encountered some difficulties. Therefore, giveaway method can be effective to encourage people to go to local shops and restaurants.” (Interviewee 14)*

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Interviewee 10 expresses that she feels satisfied when choosing more sustainable food by using “ICA”.

*"Even if I cannot find sustainable food, I try to choose substitutable one which is less unsustainable in compare. Interestingly, it makes me feel great" (Interviewee 10)*

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“ICA” is an appropriate smartphone app for the mentioned purpose when it comes to selecting and purchasing food. Interviewee 8 claims that without this app, he cannot compare the characteristics of the food in terms of sustainability. Before using the app, he only looked for information about an expired date in the store. He did not have a chance to know about the product before coming to the store. Now the meaning of food purchasing is slightly different for this consumer. If he looks for expire date in the store, he can get many other information about the product even before coming to the store.

*"I usually make a list before going shopping. For this list, I check and compare the foods in the app. I prefer to add more sustainable food to my list. It makes me feel more responsible for the environment and the hero." (Interviewee 8)*

---

Ingredients and processing are the essential factors in this sense. “ICA” allows him to compare these factors of the products and choose a more sustainable one. Adding sustainable food to the list shows sustainable purchasing intention. Intention to purchase sustainable has a positive impact on sustainable purchasing behavior (Mataracı & Kurtuluş, 2020).

The crucial function of the app is to compare the products. It helps to add sustainable food to the list while making a list. Thus, sustainable purchasing intention is defined. When Interviewee 8 buys more environmental-friendly food, he feels like a hero.

Interviewee 6 does not want to pass the world as an unsustainable place to the next generation. Instead, she believes that sustainable purchase behavior can help to make the world a better place.

*"I have heard about "Too Good To Go" few years ago. I have thought it is just for lazy people who do not want to cook. Now I have been using it more than 8 months and it affects me positively. I feel that I am saving the planet." (Interviewee 6)*

---

She tries to be a more sustainable consumer, but sometimes sustainable food purchasing can be a challenge due to the high cost. This case weakens the correlation between sustainable purchasing intention and sustainable purchasing behavior ( Mataracı and Kurtuluş, 2020). She also mentioned the role of her family members in her purchasing practice.

*"We are three people in our family. My husband and daughter are not always happy with the ready food from "Too Good To Go. If my husband prefers to eat Azerbaijani national meals, my daughter loves to eat a meatball. Therefore, I should cook different meals for them. If I am single, I would definitely buy the food from "Too Good To Go" almost every day."*

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As Sufyan et al. (2019) stress the family and household size influence purchasing practice. Thus, the meaning of food purchasing practice can be changed by family members.

In a nutshell, interview data shows that feeling of joy while carrying sustainable purchasing practices motivates consumers to keep their environmentally friendly identity despite the negative effect like the limited budget. This identity strengthens the bridge between consumers and sustainability.

## **5. Discussion and conclusion**

This chapter aims to discuss the results of the analysis of obtained data. In doing so, the changes in different elements (material, competence and meaning) of practice are presented separately. Then, the authors will be able to answer the research question that how consumers' use of digitalization makes their food purchasing practice sustainable. By connecting the divided elements of practice properly, this question will be answered. Also, the theoretical and practical contribution of the research will be discussed in this chapter. It may guide practitioners and managers to take the results of this study into account when they work in this area.

### ***5.1 Material***

The material aspect of the usage of the applications emerges in two forms.

1. Firstly, the apps themselves should be perceived as material per se. Their availability, technical characteristics, user-friendliness can be analyzed in this regard. Availability and accessibility of the apps help to reach more people who can contribute to sustainability. Technical features and functionalities of the apps allow users to leverage these apps according to their purchasing intention. App designers should take consumers' purchasing practice into account when they create the apps. As a part of technical characteristics, user-friendliness is also essential for consumers. This feature makes consumers refrain from using the apps. Easy-to-use apps have more chances to be used frequently rather than complicated ones.
2. Secondly, tangible things can be added/removed to/from consumers' purchasing practice. Empirical data indicates that this aspect of the material is the least changed part in practice. For example, even if interviewees say that they prefer paper bags to plastic bags after using these apps, their use of transportation does not change that much. As citizens of Sweden, interviewees in this study use bicycles or walking even without using these apps. However, interview data shows that these apps ("Karma" and "Too Good To Go") make consumers reduce resource consumption (e.g., water and electricity) which can be perceived as an indirect result of sustainable food purchasing.

### ***5.2 Competence***

1. The data analysis from the interviews shows that smartphone apps contribute to acquiring new skills and learning new techniques. Technical skills learned by consumers help them to compare, choose or order sustainable food. Moreover, they can scan the products to get information about the ingredients, supply chain, etc. Using an interactive map for

purchasing unsold food through "Karma" and "Too Good To Go" is also a relevant sample of acquired competence.

2. Ensure sustainable purchasing by being a knowledgeable consumer is another bright side of gaining competence. Consumers start to search and read about sustainability, ecological footprint, and related topics after getting some basic information from the apps. Educative contents of the apps serve to increase knowledgeability. As a result, consumers' susceptibility toward sustainability is increasing. Consumers learn about different aspects of sustainability and sustainable food purchasing through the apps, and this knowledge strengthens their sustainable consumer identity. Easily available and accessible information on apps helps the consumer gain sustainability knowledge, promoting sustainable food purchasing competence. This result is very close to Lin and Niu's (2018) 's view of sustainability knowledge and sustainable food purchasing link. The use of apps has also contributed to avoiding purchasing (non-purchasing), which is an essential part of sustainable purchasing (Mataracı & Kurtuluş, 2020).

### **5.3 Meaning**

The data analysis of interviews revealed two major changes in food purchasing practice meaning element.

1. Digitalization and the use of smartphone apps expand the meaning scope of food purchasing in terms of sustainability. Before using the app, the purchasing had the meaning of buying products to consume, while after using the apps, consumers were actively linking sustainability phenomenon to their purchasing practice. This link actively chose more sustainable food to reduce the impact on the environment and consider avoiding unnecessary purchasing. Thus, the new meaning attached to the purchasing practice also contributes to coping with the overconsumption.
2. The second dimension of the meaning is about the feeling of joy when behaving as a sustainable consumer. Suppose the "ICA" app allows the consumer to compare and choose more sustainable food. If these kinds of functionalities make the consumer make the right choice and make him/her happy, it contributes to achieving his/her aspiration regarding sustainable purchase. Game elements of the apps motivate to reach their aspiration, too. According to Shove et al. (2012), aspiration is one of the components of the meaning. Making their purchasing practice meaningful in terms of sustainability, consumers can claim to be sustainable consumers. As a result, they ascribe sustainability to their food purchasing practice as a new meaning.

Even though the elements are analyzed and discussed individually, this was done to shed light on different aspects in detail. These three elements are not functioning inseparably from each other, and practice is performed only by making the link among those (Reckwitz, 2002). Due to this reason, when one element is changed, it alters the other elements as well. The user-friendliness of the app with easily accessible information at hand (material) makes the consumer become more knowledgeable and aware (competence), which in turn trigs to add sustainability as expended meaning (meaning) to the purchasing. The following example can explain the interconnection between the elements in food purchasing. When a consumer gets knowledge about sustainability from the app (competence), this phenomenon is being a new meaning of practice for him/her (meaning). In consequence, this meaning makes him/her avoid using a plastic bag (material).

As mentioned before, different apps can contribute to sustainable food purchasing differently. In this current research, two of the three smartphone apps studied - “Karma” and “Too Good To Go” - reduce food purchasing and make consumers avoid overconsumption. These behaviors serve the non-purchasing dimension of sustainable food purchasing. Moreover, the third app, “ICA” allows consumers to compare and choose more sustainable food, contributing to another form of sustainable food purchasing – buying environmentally friendly products as mentioned by Mataracı and Kurtuluş (2020).

To conclude, empirical data and analysis show that digitalization makes consumers turn their purchasing practice into sustainable purchasing. The following map visualizes the results and the answer to the research question on how digitalization, specifically smartphone applications, changes consumers’ food purchasing practices and makes it more sustainable. The use of smartphone apps makes the consumers have both sides of sustainable purchasing: purchasing sustainable food and non-purchasing.

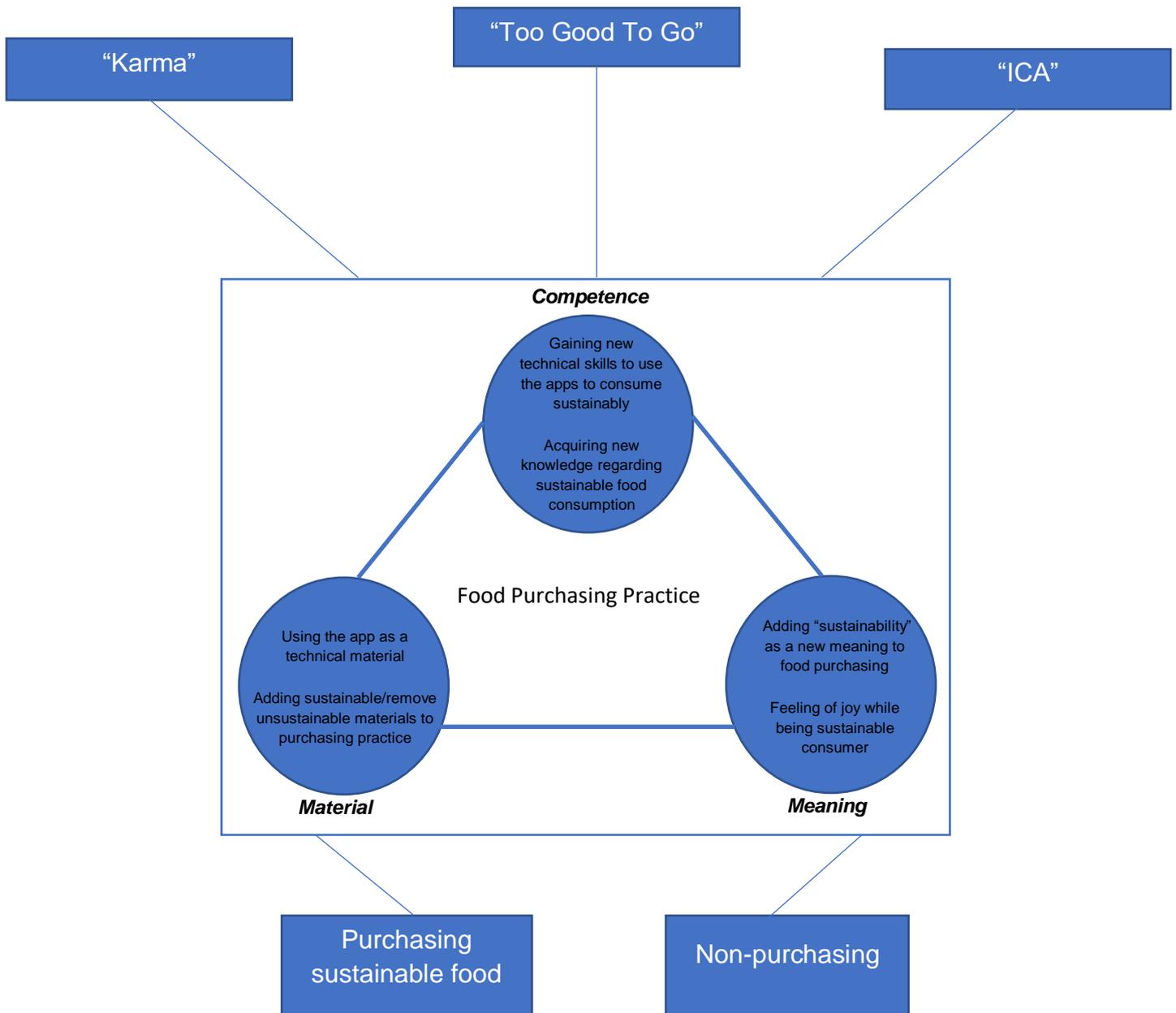


Figure 1: Visualization of the result

As seen from the map, all three elements can influence each other. The interlinkage between these elements makes them affect each other. This research shows that the change in the material aspect (smartphone app) can make a consumer gain new competence. Consequently, this newly acquired competence motivates a consumer to ascribe new meaning to the purchasing practice.(sustainability). According to the characteristics of this dependency, even if one of its elements undergoes the change, the practice can change eventually. This current research shows that food-related smartphone applications promote sustainability by changing consumers' food purchasing practice.

## ***6. Contributions***

In this chapter, the contributions of the research and its theoretical and managerial implications are shown. This study can be useful for researchers in this field, also various actors such as producers, retailers, consumers, app designers.

### ***6.1 Theoretical implications***

As previous research (Fuentes and Samsioe, 2020; Hedin et al., 2019, Reisch et al., 2013) in sustainable consumption mainly focus on consumption holistically, the theoretical implication of this research is stressing purchasing as an inseparable and crucial part of consumption. The positive influence of digitalization on food consumption has been investigated thoroughly (Reisch et al., 2013, Connolly & Prothero, 2008). However, this research focuses on one single element of food consumption to understand it in detail. By doing so, the impact of digitalization on food purchasing can be understood as a phenomenon. The research shows how smartphone apps make food purchasing more sustainable that can result in sustainable consumption. The analysis of meaning, material, and competence elements of the practice helps clearly to spot and perceive the changes, while the link among those elements shows the bigger picture on how purchasing practice itself changes and alters with the digitalization. Therefore, this research focuses not only on the changes in food purchasing in general but also on how this practice is turning to the sustainable one.

The study also contributes to the practice theory in the theoretical sphere and shows its applicability in food purchasing. Thus, it claims that other parts of food consumption can also be investigated independently with the help of practice theory, as this theory and its elements help to cover the hidden and unnoticed aspects of every single practice.

### ***6.2 Managerial implications***

Users' expectations and views on these apps can give app designers new ideas to improve the apps. For example, educative content and game elements could be added to the apps to motivate more users to purchase sustainably. Besides, retailers and producers can understand the consumers' views on the products and their concerns on sustainability. Since each app has specific functionalities regarding sustainable purchasing, this current research gives a new idea to app designers to combine different perspectives (e.g., non-purchasing and sustainable food) in one app.

### ***6.3 Societal relevance***

To reduce the ecological footprint, SDG12 must be ensured at a societal level. The goal can be reached if all parties – consumers, producers, and other food chain actors act together and reduce their impact on the environment, as Cochoy et al. (2017) suggested. As seen from the empirical data analysis results, digitalization, specifically food-related smartphone applications, makes people contribute to the environment effectively. In addition, consumers get more knowledge on the food purchasing apps and sustainability, which may influence their ecological footprint. In this regard, the study shows the positive effect of digitalization on food purchasing practice in terms of sustainability.

### ***7. Limitations and further research***

None of the research can be ideal, and all of those are carried within some boundaries that can be accepted as the limitations of the particular research. Along with contributions, this research has some limitations, too.

1. As mentioned in the Research Design chapter, the current pandemic situation lowered the quality of the research. Significantly, the online mode of interviews causes a lack of interaction. Since social interaction is one of the vital features of qualitative research, this shortage can be interpreted as a limitation.
2. Although there may exist many sustainable food apps, only three pretty popular apps in Sweden were discussed in this research. The same app may function differently in different geographical locations, or another app may have another contribution in Sweden. However, it is important to state that the research aimed not to make a generalization but contribute to the understanding of how smartphone apps, in general, make the food purchasing practice sustainable.
3. All the empirical data was generated from consumers' interviews since the research aims to understand the changes in food purchasing practice from consumers' perspectives. App designers' and retailers' views on this topic could present new perspectives.
4. Digitalization and smartphone apps have an impact on all three pillars of sustainability. For instance, "Karma" and "Too Good To Go" are not beneficial only for consumers. Also, retailers get some profit from this app when they sell unsold food. Therefore, especially during the current pandemic situation, it worth investigating the impact of digitalization, namely smartphone applications, on economic and social sustainability. However, while talking about sustainability; sole environmental sustainability is taken into consideration in this study.

Taking these limitations into account, the research in this field can be further developed. According to the characteristics of the apps, each of them can be investigated separately. By knowing the influence of digital devices and apps on sustainable food purchasing, consumers can contribute to environmental sustainability more. Also, empirical data of the research consists of users' views. App designers/developers and retailers can be involved in the discussions, too. Therefore, investigating the link between sustainable food purchasing and digitalization contribute to achieving SDG12 faster.

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## **Appendix 1**

### **Thematic Interview Guide:**

- Demonstrating the subject of our thesis in front of our interviewee.  
(Impact of smartphone apps on sustainable food purchasing practice)
- Inform the respondent about the ethical consideration and ask for permission to record the interview on a digital device.
- Explain difficult terminology of this paper which may arise during the interview questionnaire. For example; Practice, Consumption practice, purchasing decision, Sustainable food purchasing practice. (We have sent the handout prior to the interview date so that the interviewee can prepare themselves for the interview).

### **Interview Questionnaire:**

#### Introductory Questions:

- Could you please introduce yourself briefly?

### **Main Questions:**

#### **Food purchase practice without using smartphone apps**

1. Could you please explain your regular food purchasing activity?
2. How do you organize/plan your grocery shopping?
3. Do you follow your purchasing plan?
4. How often do you purchase food?
5. Which factors may define this frequency?
6. Do you look for information about the certain food?
  - If yes, what kind of information you need to get?
  - How do you get that information?
  - How that information can change your mind regarding food purchasing?
7. What other factors you take into consideration when you select the food?

### **Smartphone applications**

8. Which app do you use for food purchasing?
9. Could you please give some explanation on this app?
10. How do you use the app in grocery store setting?
11. What kind of activities you engaged by using the app?
12. How the app helps you to purchase food inside the store?
13. How the app helps you to purchase food outside the store?
14. How often do you purchase food with the app?
15. Why do you purchase food from the app?
16. How the app help you to find needed information about the food?
17. How the app affects your food choice?
18. Do you buy the same item from grocery which you buy using the smartphone app?

### **Effects of smartphone applications on food purchasing practice in terms of meaning, material and competence**

19. What kinds of equipment/tools (trolley, transportation etc.) do you use for your regular purchasing?
20. Is there any difference (e.g., searching for product information, choosing product purchasing decision, in store movement, outside the physical store activities) when you purchase food with this app?
21. How this application affects your physical activity inside and outside the physical store?
22. How the use of this app influences your understanding of purchasing?
23. How buying food with this app makes you feel?
24. What is the purpose of this app in your understanding?
25. What is your purpose to use this app?
26. How the purpose of the apps and your purpose of using the app same?
27. If not, then why your purpose of using the app is different than the purpose of the app?

### **Sustainable food purchasing practice**

28. How important is sustainability for you?
29. How can you explain the understanding of “sustainable consumer”?
30. Are you sustainable consumer?
31. How this smartphone application promotes sustainability in your opinion?
32. In which ways it promotes sustainability?
33. Does it help you to behave as a sustainable consumer?

34. How do you feel when you purchase with this app?

This is end of our interview. Thank you for your participation.

## Appendix 2

Explanation of some words (terms) which will be asked about in the interview:

### *1. Practice*

The repeated way of doing a specific something.

For example, if someone exercises for a particular hour every day, it is his/her daily life practice. However, if he/she conducts the same type of exercise every day using the equipment, it could be called daily exercise practice.

### *2. Consumption*

When consumer spends money to acquire a service or product, it can be called consumption. So, for example, if someone spends money in order to buy some grocery items from a super shop, it can be denoted as consumption.

### *3. Consumption Practice*

Based on the definition mentioned above, we can say that consumption practice is the practice that someone initiates to acquire something by spending money. In other words, consuming the product in a repetitive and identifiable way can be defined as consumption practice. So, for example, if someone pays the bill of the grocery items from the super shop using the self-service device, it can be called his/her consumption practice.

### *4. Purchasing decision*

It denotes the consumer's thought process. In this process, the consumer identifies his/her need for the product, selects the product from alternative options, and buys that specific brand.

### *5. Sustainable food purchasing practice*

When a consumer contributes to the environment in his/her food purchasing practice, it can be considered sustainable food purchasing practice. For example, if consumers purchase food by checking the expiry date and so that he/she can use the product before it expires, then he/she is contributing to the environment. By doing so, he/she is reducing food waste.