Poster title	**Greener, healthier, smarter:** **Creating informative value using mobile apps** **in consumer food (purchasing) choices**
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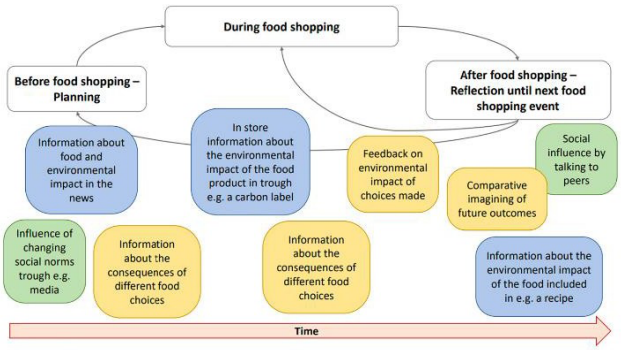
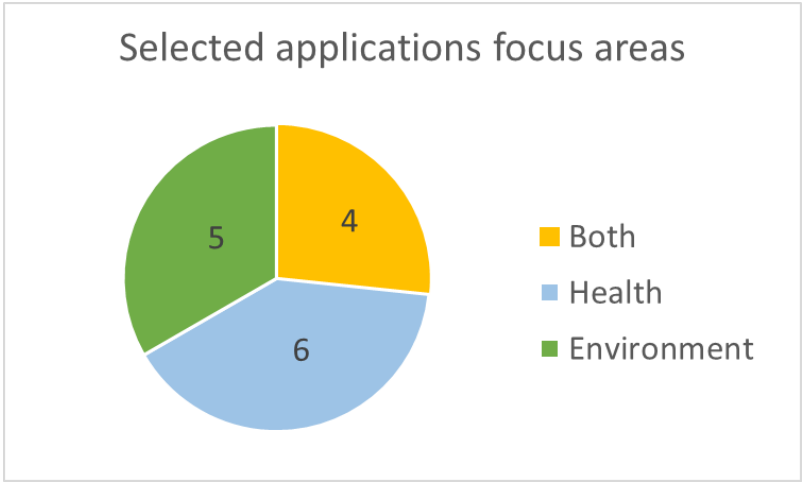
Poster Reference Track – **B***	Theme 8 (Global climate change, environmental protection, overconsumption and sustainability. Environment and health)
Aims and objectives	Switching to more sustainable and healthy food choices is a key point that contemporary society is called upon to improve. Communicating how much nutrition and sustainability are important for both human health and protection of the environment is not always enough to change individuals' behaviour. Similarly, moving to healthier and more sustainable food in consumers' daily routines is more than just a question of making better fine-grained choices in the supermarket (Clear et al., 2015). For this reason, we think that the most delicate phase in the process starts at the moment of buying food. In fact, the way we eat is often a reflection of what we have in the fridge. Our aim is to raise awareness of healthy eating and sustainability "out the plate", i.e. when consumers purchase a food product. Some authors (Nogueira et al. 2021; Ran et al. 2022) showed that information can play a pivotal role in supporting behaviour change towards more environmentally sustainable food consumption. Indeed, information can be a powerful behaviour change technique (BCT) if tailored to customers' full shopping journey, including planning, executing, and reflecting on their food shopping.  **Fig. 3.** Consumer journey and interaction with information. Blue boxes represent BCTs primarily relating to capability, green boxes represent BCTs primarily relating to opportunity, yellow boxes represent BCTs primarily relating to motivation. An increasing number of digital interventions and pervasive technologies have been created to influence consumer behaviour in their diet choices, frequently focused on information and nudging (Hedin et al., 2019). However, their usefulness and success are poorly understood. Fuentes and Sörum (2019) emphasised that smartphone app developers often lack a thorough understanding of the intended users and other contextual factors that matter to the functionality of their programme.

	Given the complexity of creating smartphone applications that have the desired outcome (Fuentes et al., 2021; Fuentes, 2019), we draw on these elements to pose the following research question: **Can the information available in mobile apps currently on the market effectively enable healthy and sustainable food purchasing choices?** Starting from the health-environment link, we thus aim to investigate what follows: • Is there any mobile app in the market that meet such information needs for consumers? If so, which are? • What information do they convey and how?
Target group / focus	Persons who usually do the household food shopping
Focus on the project / Research	**Aim of the project**: With our project we aim to change consumers' purchasing habits, by making them more aware of the impact that their food choices have on their individual health, on the general lifestyle of their family, as well as on the environment and society. This idea was prompted by the urgency of the grand challenges faced by the world population: from the overloading of the global health system, emphasised by the pandemic even more, to the natural resources consumption and global climate change. **Novelty of the work**: the originality of the project is related to the fact that the health issue and the environmental and social ones are treated at the same time, with an all-encompassing and simultaneous approach, through the use of apps, to raise awareness about these complicated topics. The following key points illustrates even more what stands out as an innovative element of our research: • The **health** aspect is treated in its upstream phases during the planning of the purchasing process. The idea is to stimulate the "healthy choices thinking" even before that actual preparation of the meals. What we aim to foster is to learn how to eat healthy, providing more awareness regarding food literacy and increasing consumer knowledge in a way that is accessible, easy to understand and less time consuming as possible. • The **environmental** and **social** aspects are also treated upstream during the purchasing process, making consumers aware of the impact of the food they choose to buy regarding multiple aspects like: packaging components, use of pesticides, short supply chain but also workers live hoods. Also, a focus on the downstream phases of the process is performed, related in particular to waste reduction.

	• **Use of apps**. We chose to focus on apps use, because they turn out to be the most suitable tool for our project. Actually, the main reason is related to the fact that they are easy to use (Coughlin et al. 2015) because they are supported by our everyday mobile technology devices, and so easy to be brought physically where the purchasing process is performed.
Method / approach	Since our main goal was to investigate the role of APPs in the choice and purchasing of food that could be considered good both for human health and the preservation of the natural environment, we first performed a research on SCOPUS in order to find any relevant study on the topic. We used the following keywords: ((TITLE-ABS-KEY (food OR nutrition OR diet) AND TITLE-ABS-KEY (purchas* OR buy* OR shop*) AND TITLE-ABS-KEY (health*) AND TITLE-ABS-KEY (sustainab* OR green) AND TITLE-ABS-KEY (consumer* OR user* OR costumer*) AND TITLE-ABS-KEY (app* OR application*) OR TITLE-ABS-KEY (mobile OR "smart phone*" OR smartphone* OR phone*))) AND ((app* OR application*)) AND (mobile OR "smart phone*" OR smartphone* OR phone*) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j")) We found only a few articles that were addressing the topic. On the other hand, we conducted an accurate mapping of the existing applications for mobile phone that apply to our goal through a web search. We investigated scientific papers, articles, blogs and App Stores using the following keywords in both Italian and English language: “application”, “app”, “healthy diet”, “sustainable food”, “healthy/sustainable food purchases”. The mapping of the mobile phone applications has been conducted by two independent researchers using a standard template that takes into account: - The country and year of developing; - The producers, partners and scientific committee; - The language; - The cost; - The description; - The main drivers and limits; - The target; - The behaviour the app aims to implement. We limited our research to the applications that were available in English or Italian and were still active at the time of this study. Thus, we have found 35 potential applications.

	We then narrowed our selection to the applications that meet the specific objective of indicating sustainable or healthy choices and promoting a more sustainable form of food purchasing. For this reason, we eliminated the applications that were about: - Food waste reduction, promoting expiring food or leftovers sharing and exchange between different actors (e.g., ToGoodToGo) - Calories counter and food diary (e.g., Myfitnesspal); - Creating online diets (e.g., Melarossa); - Specific needs as finding restaurants for vegan or indicating proper products for celiacs (e.g., Happycow).
Relevant data and graphs	We ended up with 15 applications for mobile phone that were coherent with the aim of our research. As shown in the following graph (Fig. 1), 40% of the selected applications focus on human health, 33% on eco-friendly products and only 27% address both the topics at the same time.  Figure 1 – **The focus area of the selected application**. In the graph are shown the number of applications found for each of the focus topic. The applications that address the themes of environmental sustainability focus on: • The traceability of food and the presence of certifications; • The provision of food from local sources (e.g., Km 0) and small local farmers (social sustainability); • Unpacked and loose products; • The proper management of food storage and other tips to reduce the food waste (e.g., recipes, shopping lists). The applications that were related only to human health issues, instead, focus on: • The composition of macronutrients and the presence of micronutrients; • The presence of chemical additives, pesticides, contaminants or antibiotics; • The grade of food processing; • Healthy recipes. So, we decided to deepen the information on applications that concern the theme of sustainability under the bigger framework of One Health.

	We defined the following criteria for app selection: • country of production: Italy • year of production: in the last 5 years (2017-2022) • focus: both health and environment • recipient: people who make food purchases • cost: free app • compatibility: both Android and IOS. After the initial mapping, one app was excluded because the fourth criterion was not met. Thus, a total of 3 apps were deepened. The main characteristics of these apps are summarized in the table (*Appendix 1*)
Results / evaluation focusing on the ones that we deepened, we observed that:	Based on the analysed articles, we drew the following results: Information has a strong influence on food purchasing behaviour of customers' full shopping journey. A variety of digital interventions aimed at affecting consumer behaviour have been developed. However, the debate on their success and usefulness is still open.

	Mobile apps could be a helpful tool to synthetise a great amount of information from different fields of research. Through their use, such information become easily accessible to everyone. During the tracking and mapping of the relevant applications for driving the consumers choices towards the purchasing of healthier and greener food products, we noticed that there is a special attention on the themes of food waste and food diary/counting calories. Indeed, we found 8 apps for promoting food waste reduction and 11 apps that work as a food diary to count and record calories intake. Even if these subjects were not properly related to our research question, we found it interesting to report on them. For the selected applications, we noticed that they concern a wide range of topics. Nonetheless, we identified two major trends. In the environmental applications, it is stressed the provisioning from local and biological farms. On the other hand, for the healthy diet applications, we noticed a strong interest on the presence of additives and contaminants and on how to avoid processed food. The common goal of the three selected apps is to inform and raise awareness for people to make better purchasing choices, thus encouraging critical consumption. All the selected apps address consumers to nudge them towards healthy and sustainable food purchasing. Therefore, the aim is to spread awareness not only during the meal's consumption, but also in the previous stages (i.e., during the food purchasing phase). All the three applications work through the scanning of the barcode in order to provide a range of information that address both health and environmental issues. Two apps out of three, also give a score to the products, based on different criteria (e.g., presence of certifications, nutritional profile) and offer valuable alternative options that perform better. Only one app, *Weeshop*, considers the social aspects in the supply chain of the products, while *EDO* also measures the degree of compatibility between person (intolerances/allergies; pregnant woman; fitness conscious person) and products. Instead, *Greenchoice* is the only one that refers clearly to the carbon and water footprint. We should also underline that most of the apps are free, even if they offer a premium service with more and specific features.

Conclusions and recommendations	The increase in the number of apps promoting healthy and sustainable food highlights the growing interest in such issues, in line with the Sustainable Development Goal 12 ("Responsible Consumption and Production"), of PNRR (Recovery and Resilience National Plan), and to give consumers the information they need to make the right choices. By increasing consumer awareness, it will be possible to create value for individuals, communities and the whole society. A point of future research development could be the measurement of the impact of selected mobile apps (e.g., behaviour change, acquisition of more information and awareness); the adaptability of apps to different user targets.
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Name App	Download	Year	Cost	Producers, partners, scientific committee	Goal	Description	Target	Link
Edo - Sai cosa mangi?	> 100.000	2021	Free	Edo Srl + Alma Mater Studiorum University of Bologna	- understanding of food labels and the impact of products on health and the environment -measurement of food and person compatibility / goods comparison	The app helps consumers in reading and understanding food labels to learn more about what they eat and make informed choices. You can scan the bar codes of many products to receive information and suggestions based on your energy needs, the product's impact on the environment and its supply chain. The app also measures the degree of compatibility between person (intolerances/allergies; pregnant woman; fitness conscious person) and product.	• Consumers	https://edoapp.it/
WeeShop - Spesa consapevole	> 10.000	2021	Free	Weeshop Srl + Alma Mater Studiorum University of Bologna	- Directs toward alternative, healthy and sustainable foods - measurement of quality, health, sustainability and social impact of products	The purpose of the app is to educate more consumers about healthy and sustainable food shopping. The app, by comparing different goods, helps in choosing healthy and sustainable products. On the one hand, it provides information about the nutritional values and	• Consumers	https://www.weeshop.it/

						quality of products; on the other hand, it provides information about the sustainability and social impact of products. Plans for the future include the introduction of a customer incentive program, the addition of push notifications, and a playlist feature for selecting items based on tailored recommendations from nutritionists.		
GreenChoice: Healthy Grocery Shopping	> 5.000	2020	Free	GreenChoice + Brandeis University	measurement of: -products healthy (attention to the person's allergies and intolerances) - environmentally friendly (climate, carbon footprint and water footprint) -GreenScore evaluation	The app compares the impact of foods on health and the environment. The purpose of the app is to make it easier for consumers to make aware purchases, save time and money. In fact, GreenChoice allows you to make direct purchases through the app and sets dietary preferences. At the same time, the app provides information regarding the measurement of carbon and water footprint.	• Consumers	https://greenchoicenow.com/

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