Green Digital Nudging and channel relationships

Simone Aiolfi [1], Davide Pellegrini [2], Silvia Bellini [3], Sabrina Latusi [4]

[1] Assistant Professor, Department of Economics and Business Management, University of Parma, Via J.F. Kennedy 6 – Parma – 43125, e-mail: simone.aiolfi@unipr.it (corresponding author and presenter)

[2] Associate Professor, Department of Economics and Business Management, University of Parma, Via J.F. Kennedy 6 – Parma - 43125, Phone number: +390521032011, e-mail: davide.pellegrini@unipr.it

[3] Associate Professor, Department of Economics and Business Management, University of Parma, Via J.F. Kennedy 6 – Parma - 43125, Phone number: +390521032416, e-mail: silvia.bellini@unipr.it

[4] Associate Professor, Department of Economics and Business Management, University of Parma, Via J.F. Kennedy 6 – Parma – 43125, e-mail: sabrina.latusi@unipr.it

Abstract

The promotion of responsible behavior is one of the main areas of nudging and, more recently, digital nudging. Technologies can enable new forms of horizontal and vertical relationships in a pre-competitive context where negotiating perspectives are overcome by a collective benefit that can generate reputational effects. In this case, the role of Institutions is indispensable, especially in the FMCG sector where there is high intrabrand-competition. Starting from these considerations, the paper explores the potential organizational architectures in the topic of sustainable digital nudging through a critical review of the main national and international initiatives.

Keywords: *sustainability*, *nudging*, *digital*, *coopetition*, *organizational models*, *intrabrand competition*

Introduction

The many issues in the globalized world have made the term 'sustainability' one of the key concepts of the 21st century (Schaefer and Crane 2005) leading to a deep reflection on how to promote more sustainable behaviors (Buerke et al. 2017). Several authors (Sheth et al. 2011) considered individuals' responsible behavior as a powerful driver for sustainable development. Despite growing sustainability awareness, however, few consumers opt for more sustainable behavior, especially if they have to sustain higher prices or accept reduced performance (Olson 2013). In this context, the promotion of sustainable behaviors has become one of the main application domains of nudging and, in particular, digital nudging (Bergram et al. 2022). Digital technology can enable new KPIs and activate new forms of customization and socialization that promote sustainable behavior facilitated by the ubiquity and flexibility inherent in digital devices. Although contributions to digital nudging have increased, Bergram et al. (2022) highlight the lack of research on certain types of thrusts, behavior, channels, and devices. Above all, there is a lack of studies on the actors capable of taking an active role in this field. Also on the subject of nudging, digital transformation requires consideration of the relationship between organizational solutions within individual actors and vertical or horizontal relationships (Pellegrini et al. 2021). This paper explores the possible organizational architectures in the field of sustainable digital nudging, raising a new question concerning the understanding of the links between different organizational solutions. At the same time, the work contributes to the literature on vertical and horizontal relationships in an emerging application context such as nudging.

Theoretical background

Nudging

Nudging is defined as "*any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives*" (Thaler and Sunstein 2008; Barker et al. 2021). Starting from the dual process theories of Kahneman (2011), the authors focused on the individual's decision-making process and why some choices may appear irrational (Mele et al. 2021). This reflects what is theorized by the contributions of behavioral economics (Vuong et al. 2018) regarding limited rationality (Simon 1957) and the predisposition of individuals to reduce effort: it is estimated, that 95% of daily decisions are not the result of a rational process, but rather that of a situational stimulus resulting from the activation of the automatic mind (Bargh et al. 2001; Caraban et al. 2019). In these circumstances, individuals apply so-called heuristics or mental shortcuts that support decision-making by reducing the effort required for information processing (Shah and Oppenheimer 2008; Caraban et al. 2019). Here, that nudge fits into this double process proposing itself as a heuristic able to help individuals improve their decisions. It is precisely the decision-making context that constitutes the architecture of choice that plays a crucial role in the alteration of *"people's behavior in a predictable way*", because *"what is chosen often depends on how the choice is presented*" (Mele et al. 2021).

Nudging and Sustainability

Despite the growing interest in environmental issues (White et al. 2019; Garske et al. 2020; Barker et al. 2021), there is a large discrepancy between intentions and behavior (Brand and Augustin 2021). Through nudging, companies change the architecture of choice (Trewern et al. 2021) to push consumers toward more sustainable purchasing choices (Gonçalves et al., 2021; Trewern et al. 2021). Literature on this issue is growing, as emerges from the work of Trewern et al. (2021) and the revision of Mirbabaie et al. (2022) which demonstrates the potential of social norms to positively influence sustainable behaviors (Chakravarty and Mishra 2019). Nudges are, therefore, considered a useful tool to promote sustainable behavior within society, and, despite some limitations, their scope and effectiveness seem to exceed those of traditional marketing techniques, whether they are implemented individually or are part of a complementary strategy (Gonçalves et al. 2021).

Digital Nudging

Since the decision-making process has been enriched with digital touchpoints, several authors have started to transfer the concept of nudging from the offline context to the online one giving rise to what is called digital nudging (Weinmann et al. 2016; Mirsch et al. 2018; Jesse and Jannach 2021; Mele et al. 2021). Digital nudging is defined as "*an attempt to influence decision-making, judgment, or behavior in a predictable way by counteracting the cognitive boundaries, biases, routines, and habits that hinder individuals from acting to their own benefit in the digital sphere. Digital nudging does not forbid or add any rational choice option, change incentives significantly, or provide rational argumentation*". (Mirsch et al. 2018). Even in the digital context, therefore, the nudge is effective when it modifies the architecture of the choice (Schneider et al. 2018). Unlike physical environments, the implementation of nudging in digital environments can be performed at relatively low costs (Schneider et al., 2018). New digital technologies allow monitoring and analysis in real-time of the behavior of users, as well as customizing the interface to optimize the effectiveness of digital pushes and to collect, especially through mobile apps, a large amount of users' information and the context of choice. Although research is at the beginning, interesting contributions emerge on how digital can alter individual behavior and stimulate the co-creation of value through artificial intelligence tools that can integrate with websites, mobile apps, cloud services, and the Internet of Things (Mele et al. 2021).

Digital nudging and sustainability

While there is a wide literature on the effectiveness of nudging in the physical context (Hummel and Maedche 2019; Trewern et al., 2021; Mirbabaie et al., 2022), the effectiveness of the digital push for sustainable consumer decisions has been largely unexplored (Henkel et al., 2019; Auf der Landwehr et al., 2021). Among prior research that has shown how digital nudging can lead to considerable changes in individuals' decisions (Hummel and Maedche, 2019) resulting in a suitable tool to increase the sustainability of consumer decisions, we find the contributions of Bammert et al. (2020) concerning the promotion of more environmentally conscious consumer behaviors within business contexts, the work by Henkel et al. (2019) related to the end user, the work by Lehner et al. (2016) in the governmental context and the one by Lembcke et al. (2019) concerning the ethical issues raised by the implementation of digital nudging mechanisms.

Michels et al. (2022) recently demonstrated how digital push is effective in stimulating consumer decisions toward more sustainable choices in online settings, highlighting their potential in making the digital economy increasingly sustainable. In our opinion, at least three reasons support the potential of digital nudging for sustainability. Firstly, many sustainability choices are not easy to implement because incentives are not aligned: often, in fact, the benefits of individual sustainable behavior, as well as costs, fall not only on the individual but on the community. This misalignment reduces the effectiveness of traditional informational interventions that underestimate the limits of the cognitive system. In this context, digital technology can enable new forms of relations between businesses and citizens, as well as the socialization of results, thus encouraging a rapprochement between individual and collective objectives. Secondly, many choices in terms of sustainability have an 'intertemporal' nature, that is, they involve a cost/sacrifice today for a future benefit. For this reason, traditional marketing levers are ineffective because they clash with willpower that is not inexhaustible. The nudging can therefore be supported by digital through the development of innovative calls to action that can overshadow the uncertainty of the benefit in favor of forms of emotional gratification and values. Finally, the choice of sustainability could be hindered by the fact that immediate feedback on the goodness of the action is not always received and the results are uncertain and difficult to measure. In this context, digital can express its potential through forms of measurement and traceability, aimed at reassuring the individual by providing immediate and recurrent feedback (Mele et al., 2021).

Objectives and Research question

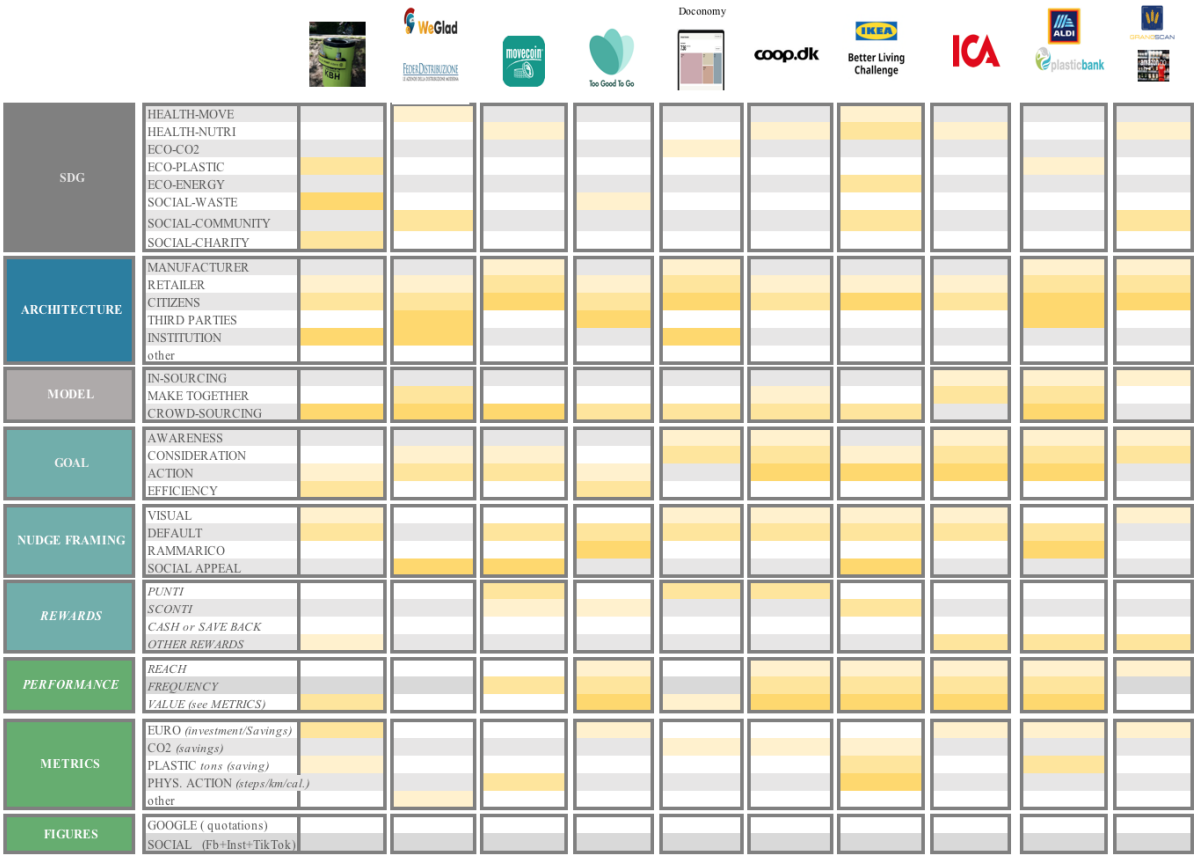
Thanks to their characteristics (Shapiro and Varian 1999), digital technologies allow new forms of measurement and traceability, activating unprecedented dynamics of customization and socialization that promote sustainable behaviors, facilitated by the ubiquity and flexibility inherent in digital devices. Digital also encourages market democratization, because it promotes the development of low-cost processes by reducing entry barriers for small/medium-sized enterprises (Maslach 2016). This opens up a space to welcome new operators and create solutions to promote sustainability in a measurable context and, for this, is suitable for achieving both effectiveness and efficiency. The relevance of this topic is confirmed by the recent literature which calls to study the impact of digitalization in terms of non-financial results, such as the creation of shared value for stakeholders interested in the activities of the company. The most investigate topic emerging from the recent bibliometric analysis of the impact of digitalization on organizational models (Caputo et al. 2021) concerns the role of technological innovation in the creation of value for the enterprise in terms of *coopetion and* competition. While digitalization allows the company to increase its competitive advantage (Ferreira et al. 2019), on the other hand, promotes synergies and knowledge sharing, including between actors in the same market, intensifying *coopetition phenomena* (Bogers et al. 2016; Ricciardi et al.

2016). Our research aims to deepen the link between digital and sustainability, to understand to what extent digital can generate new business models based on the principles of nudging in a pre-competitive way. In this way, the consumer, stimulated by new measurement and incentive systems, takes a proactive role. From the above considerations, in this paper, we focus on organizational architectures and we aim to investigate if and how digital can enable sustainability through new organizational architectures. Specifically, our five research questions arise:
RQ1 - Are there opportunities for vertical collaboration between manufacturers and retailers in designing digital nudges to promote sustainable behavior on the demand side?
RQ2 - Are there opportunities for horizontal collaboration (among brands or retailers)?
RQ3 - Should the state play an active role?
RQ4 - Can the citizen play an active role?
RQ5 - What role can institutions, associations, or, other actors play?
Finally, can new organizational architectures be outlined to support sustainability?

Methodology

To answer the five proposed research questions, a systematic review was carried out of the various sustainability initiatives which led to the selection of 83 case histories. Below is an example of the case history for each research question. The novelty and lack of knowledge about digital nudging for sustainable practices led to the selection of an empirical, case study research design, an approach used several times by marketing researchers (Yin, 2014; Brewis and Strønen, 2021). According to Yin (2014) and Brewis Strønen (2021) case study design allows exploration of the contemporary digital transformation and technology applications in a real-world context. The initiatives surveyed relate to the period 2019-2022 and have been identified through the analysis of corporate websites, sustainability reports, social media and corporate accounts, app stores and online search engines. Specifically, we categorized all the initiatives according to specific dimensions related to sustainability and digital nudging (i.e., SDG, architecture, model, goal, nudge framing, rewards, performance and metrics). See Figure 1 for an example. The selected cases see the citizen driven to action by digital nudging initiatives. This preliminary analysis allows us to start some initial considerations on the subject of competitive implications and to lay the foundations for the continuation of the research that will concern the clustering of the 83 initiatives on the identified criteria (architectures, call to action, metrics).

Figure 1 – Categorization of the initiatives – An example



Source: our elaboration

Analysis of results and discussion

RQ 1 - Vertical collaboration between manufacturers and retailers

The first case analyzed is called *Vivismart*, a playful-educational path on proper nutrition promoted by two manufacturers (Barilla and Danone) and one retailer (Coop Italia). Companies have jointly designed interactive learning modules for schools using digital games. In this case, the elements of novelty refer to the type of architecture underlying. The idea that two industrial companies with complementary products team up with a large 'customer' to do food education shows that for once the competitive dimension typical of the agri-food chains leaves room for forms of collaboration inspired by objectives non-commercial.

RQ 2 – Vertical collaboration among retailers

The second case analyzed is called *Re-Muoviamole*: a digital call-to-action promoted by a Trade Association where six grocery retailers in turn use a third party, the start-up Weglad, to ask citizens to report obstacles to the road for disabled people and then indirectly pressure the City and/or the Region for the removal of the same. The architecture behind this project is very articulated. *Passive nudges* are not only citizens but also local institutions against which the citizen becomes active in nudging.

RQ3 – Role of the State

The third case is called *Pantholdere*. In Copenhagen, the state has for several years been encouraging a vacuum system to return and has recently installed baskets to place those containers (such as glass bottles, plastic, or cans). Retailers return a deposit to the person

carrying the blanks; citizens are urged to use the Pantholdere because digital communication from local institutions signals that people in need can go to the Pantholdere, pick up the empties and take them to supermarkets to get the deposit.

RQ4 – Role of the citizen

The idea that it is the company that asks for the citizen's collaboration has led to original experimentation also in the area of employer branding. In this case, it is the collaborators of an enterprise who are called to identify themselves in common action. This is the case, for example, with the *WeCity* project, in which Coop Italia rewards its employees who reach the workplace on foot or by bicycle. This example opens up a vast array of digital solutions created precisely to nourish the sense of belonging in a working community.

RQ5 – Role of the institutions and third parties

This is the case of *Doconomy*, an app promoted by a Swedish company and integrated by many banks in their digital touch points. This app allows you to track the CO2 of purchases made with electronic systems and then provides the citizen with a check-up of their emissions. The solution is based on scientifically validated measurement indices (Aland Index) and lends itself to gamification systems to reward sustainable behavior. Following this example, Coop Denmark integrates the solution with the information collected with their loyalty cards on shopper behavior, providing the same information very detailed on the sustainability of purchases made.

From the 83 case histories analysis, we can identify the possible existence of new prevalent architectures. A first architecture can be defined as an "**in-sourcing model":** a company is organized to make a digital call-to-action, to take care of the communication in the key of digital nudging, and manage in-house the entire process. This model is responsible for about 20% of the case history analyzed.

A second architecture can be defined as the **"made together model":** a company designs a call-to-action that cannot take shape without the active collaboration of the recipient, who in most cases are citizens but also employees and collaborators. Under this typology the numerous cases of actions generated from the purchase of a product fall: "*if you buy this product we dedicate the 1% of the value in favor of this action ...*". Among the cases surveyed this type of initiative represents about 15%. A third architecture is inspired by a **"crowd-sourcing model":** there is no predefined audience except the crowd, without whose collective action the system does not take off. This is a model that we find in the cases cited of *Re-muoviamole* (case history 2) and *Pantholdere* (case history 3). In the 83 case history census, the crowd-sourcing model appears to be the most widespread and promising and exceeds 60% of the registered initiatives.

Conclusions, implications and future research directions

The 83 case history analyzed confirms that thanks to digital nudging new architectures of sustainable value can take shape. The first consideration refers to the role of the institutions and the State. Without the active role of the Institutions, there is a risk that companies live sustainability as a competitive lever, and therefore the horizontal and vertical collaborations essential to make the system efficient are lost. The second consideration refers to the different models of call-to-action and the widespread presence of crowdsourcing models that seem to show a very high diffusion potential. The third point relates to the subject of measurement. If the objectives of digital nudging were only reputational, one could be satisfied with metrics related to awareness and consideration, but when they become desirable action objectives, the performance of digital nudging must be able to be measured. Case histories document that this challenge is achievable because digital enables new measures of the sustainable behavior of

citizens and businesses and therefore new metrics of the success of call-to-action. The challenges of future research can focus on this third aspect to enrich the results with a rigorous analysis of the performance of individual initiatives.

References

Auf der Landwehr, M., Trott, M., & von Viebahn, C. (2021). Consumers choice? Fostering sustainability in grocery deliveries through digital nudging.

Bammert, S., König, U. M., Roeglinger, M., & Wruck, T. (2020). Exploring potentials of digital nudging for business processes. *Business Process Management Journal*, 26(6), 1329-1347.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: nonconscious activation and pursuit of behavioral goals. *Journal of personality and social psychology*, 81(6), 1014.

Barker, H., Shaw, P. J., Richards, B., Clegg, Z., & Smith, D. (2021). What Nudge Techniques Work for Food Waste Behaviour Change at the Consumer Level? A Systematic Review. *Sustainability*, 13(19), 11099

Bergram, K., Djokovic, M., Bezençon, V., & Holzer, A. (2022, April). The Digital Landscape of Nudging: A Systematic Literature Review of Empirical Research on Digital Nudges. In *CHI Conference on Human Factors in Computing Systems* (pp. 1-16).

Bogers, M., Hadar, R., & Bilberg, A. (2016). Additive manufacturing for consumer-centric business models: Implications for supply chains in consumer goods manufacturing. *Technological Forecasting and Social Change*, 102, 225–239.

Brand, J. L., & Augustin, S. (2021). Can We Sustain Sustainability? A Critical Synthesis of Pertinent Literature. *Sustainability*, 13(22), 12753.

Brewis, C., & Strønen, F. (2021). Digital Transformation in FMCG and Automotive Industries–Emergence of Digital Innovation Capabilities. In 22nd European Conference on Knowledge Management, ECKM 2021 (pp. 104-111). Academic Conferences International Limited.

Buerke, A., Straatmann, T., Lin-Hi, N., & Müller, K. (2017). Consumer awareness and sustainability-focused value orientation as motivating factors of responsible consumer behavior. *Review of Managerial Science*, 11(4), 959-991.

Caputo, A., Pizzi, S., Pellegrini, M. M., & Dabić, M. (2021). Digitalization and business models: Where are we going? A science map of the field. *Journal of business research*, 123, 489-501.

Caraban, A., Karapanos, E., Gonçalves, D., & Campos, P. (2019, May). 23 ways to nudge: A review of technology-mediated nudging in human-computer interaction. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-15).

Chakravarty, S., & Mishra, R. (2019). Using social norms to reduce paper waste: Results from a field experiment in the Indian Information Technology sector. *Ecological Economics*, 164, 106356.

Ferreira, J. J. M., Fernandes, C. I., & Ferreira, F. A. F. (2019). To be or not to be digital, that is the question: Firm innovation and performance. *Journal of Business Research*, 101, 583–590.

Garske, B., Heyl, K., Ekardt, F., Weber, L. M., & Gradzka, W. (2020). Challenges of food waste governance: An assessment of European legislation on food waste and recommendations for improvement by economic instruments. *Land*, 9(7), 231.

Gonçalves, D., Coelho, P., Martinez, L. F., & Monteiro, P. (2021). Nudging consumers toward healthier food choices: A field study on the effect of social norms. *Sustainability*, 13(4), 1660.

Henkel, C., Seidler, A. R., Kranz, J., & Fiedler, M. (2019). How to Nudge Pro-Environmental behaviour: an Experimental Study. In Proceedings of the 27th European Conference on Information Systems, 2019.

Hummel, D., & Maedche, A. (2019). How effective is nudging? A quantitative review on the effect sizes and limits of empirical nudging studies. *Journal of Behavioral and Experimental Economics*, 80, 47-58.

Jesse, M., & Jannach, D. (2021). Digital nudging with recommender systems: Survey and future directions. *Computers in Human Behavior Reports*, 3, 100052.

Kahneman, D. (2011). Thinking, Fast and Slow; Farrar, Straus and Giroux: New York, NY, USA, 2011.

Lehner, M., Mont, O., & Heiskanen, E. (2016). Nudging–A promising tool for sustainable consumption behaviour?. *Journal of Cleaner Production*, 134, 166-177.

Lembcke, T. B., Engelbrecht, N., Brendel, A. B., & Kolbe, L. (2019). To nudge or not to nudge: ethical considerations of digital nudging based on its behavioral economics roots.

Maslach, D. (2016). Change and persistence with failed technological innovation. *Strategic Management Journal*, 37(4), 714–723.

Mele, C., Spena, T. R., Kaartemo, V., & Marzullo, M. L. (2021). Smart nudging: How cognitive technologies enable choice architectures for value co-creation. *Journal of Business Research*, 129, 949-960.

Michels, L., Ochmann, J., Günther, S. A., Laumer, S., & Tiefenbeck, V. (2022). Empowering consumers to make environmentally sustainable online shopping decisions: A digital nudging approach.

Mirbabaie, M., Marx, J., & Germies, J. (2022). Conscious Commerce--Digital Nudging and Sustainable E-commerce Purchase Decisions.

Mirsch, T., Lehrer, C., & Jung, R. (2018). Making digital nudging applicable: The digital nudge design method. In Proceedings of the 39th international conference on information systems (ICIS). Association for Information Systems. AIS Electronic Library (AISeL).

Olson, E. L. (2013). It's not easy being green: the effects of attribute tradeoffs on green product preference and choice. *Journal of the Academy of Marketing Science*, 41(2), 171-184.

Pellegrini D., Aiolfi S., Bellini S. (2021), L'impatto della trasformazione digitale sui modelli organizzativi nelle filiere del largo consumo, Proceedings SIM Conference 2021.

Ricciardi, F., Zardini, A., & Rossignoli, C. (2016). Organizational dynamism and adaptive business model innovation: The triple paradox configuration. *Journal of Business Research*, 69(11), 5487–5493.

Schaefer, A., & Crane, A. (2005). Addressing sustainability and consumption. *Journal of macromarketing*, 25(1), 76-92.

Schneider, C., Weinmann, M., & Vom Brocke, J. (2018). Digital nudging: guiding online user choices through interface design. *Communications of the ACM*, 61(7), 67-73.

Shah, A. K., & Oppenheimer, D. M. (2008). Heuristics made easy: an effort-reduction framework. *Psychological bulletin*, 134(2), 207.

Shapiro, C., Varian, H. R., & Carl, S. (1998). *Information rules: A strategic guide to the network economy*. Harvard Business Press.

Sheth, J. N., Sethia, N. K., & Srinivas, S. (2011). Mindful consumption: a customer-centric approach to sustainability. *Journal of the academy of marketing science*, 39(1), 21-39.

Simon, H. A. (1957). *Models of man; social and rational*. Oxford, England: Wiley.

Thaler, R. H., & Sunstein, C. R. (2008). Nudge: Improving Decisions About Health, Wealth and Happiness Yale University Press: New Haven & London.

Trewern, J., Chenoweth, J., Christie, I., Keller, E., & Halevy, S. (2021). Are UK retailers well placed to deliver 'less and better'meat and dairy to consumers?. *Sustainable Production and Consumption*, 28, 154-163.

Vuong, Q. H., Ho, T. M., Nguyen, H. K., & Vuong, T. T. (2018). Healthcare consumers' sensitivity to costs: A reflection on behavioural economics from an emerging market. *Palgrave Communications*, 4(1), 1-10.

Weinmann, M., Schneider, C., & Brocke, J. V. (2016). Digital nudging. *Business & Information Systems Engineering*, 58(6), 433-436.

White, K., Habib, R., & Hardisty, D. J. (2019). How to SHIFT consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing*, 83(3), 22-49.

Yin, R. K. (2014) Case Study Research: Design and Methods (Applied Social Research Methods). Sage publications Thousand Oaks, CA.