IntechOpen

IntechOpen Series
Business, Management and Economics,
Volume 2

A New Era of Consumer Behavior

In and Beyond the Pandemic

Edited by Umut Ayman

A New Era of Consumer Behavior - In and Beyond the Pandemic

Edited by Umut Ayman

Published in London, United Kingdom

A New Era of Consumer Behavior – In and Beyond the Pandemic
http://dx.doi.org/10.5772/intechopen.100829
Edited by Umut Ayman

Contributors
Zinggara Hidayat, Ondřej Roubal, Jia Li, Patrick Fisher, Krishna Moorthy, Te Nian Ci, Aufa Amalina Kamarudin, Normala S. Govindarajo, Loh Chun Ting, Titus Chukwuemezie Okeke, Hiroko Oe, Yasuyuki Yamaoka, Carlos A. Trujillo, Nora Sharkasi, Sankhani Hemachandra, Sien Chen, Glen Farrelly, Houda Trabelsi, Mihail Cocosila, Jeremy Millard, Vincenzo Senatore, Emanuele di Prisco

First published in London, United Kingdom, 2023 by IntechOpen
IntechOpen is the global imprint of INTECHOPEN LIMITED, registered in England and Wales, registration number: 11086078, 5 Princes Gate Court, London, SW7 2QJ, United Kingdom
Printed in Croatia

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Additional hard and PDF copies can be obtained from orders@intechopen.com

A New Era of Consumer Behavior – In and Beyond the Pandemic
Edited by Umut Ayman
p. cm.

This title is part of the Business, Management and Economics Book Series, Volume 2
Topic: Marketing
Series Editor: Taufiq Choudhry
Topic Editor: Hanna Gorska-Warsewicz

Print ISBN 978-1-80356-182-0
Online ISBN 978-1-80356-183-7
eBook (PDF) ISBN 978-1-80356-184-4
ISSN 2753-894X

IntechOpen Book Series

Business, Management and Economics

Volume 2

Aims and Scope of the Series

This series will provide a comprehensive overview of recent research trends in business and management, economics, and marketing. Topics will include asset liability management, financial consequences of the financial crisis and covid-19, financial accounting, mergers and acquisitions, management accounting, SMEs, financial markets, corporate finance and governance, managerial technology and innovation, resource management and sustainable development, social entrepreneurship, corporate responsibility, ethics and accountability, microeconomics, labour economics, macroeconomics, public economics, financial economics, econometrics, direct marketing, creative marketing, internet marketing, market planning and forecasting, brand management, market segmentation and targeting and other topics under business and management. This book series will focus on various aspects of business and management whose in-depth understanding is critical for business and company management to function effectively during this uncertain time of financial crisis, Covid-19 pandemic, and military activity in Europe.

Meet the Series Editor

Prof. Choudhry holds a BSc degree in Economics from the University of Iowa, as well as a Masters and Ph.D. in Applied Economics from Clemson University, USA. In January 2006, he became a Professor of Finance at the University of Southampton Business School. He was previously a Professor of Finance at the University of Bradford Management School. He has over 80 articles published in international finance and economics journals. His research interests and specialties include financial econometrics, financial economics, international economics and finance, housing markets, financial markets, among others.

Meet the Volume Editor

Umut Ayman obtained a Bachelor's degree in business at Eastern Mediterranean University (EMU) and completed an MBA in 1999 and a Ph.D. in communication and media studies in 2015. She is currently an assistant professor and vice-chair in the Public Relations and Advertisement Department, Faculty of Communication, at EMU. Within the EMU Community Involvement Center, Ayman provides pioneering consultancy services for social responsibility projects. She also works on the design of campaign launches for products and services in various sectors, and on A to Z integrated marketing communication models and issues. She has lectured on integrated marketing campaigns and communication, marketing-oriented public relations, marketing communication for social responsibility, branding and brand management, and on senior project courses. She is working as an Assistant Professor and Vice-chair at EMU, Faculty of Communication, Public Relations and Advertisement Department.

Contents

Preface

Understanding consumer behavior is vital for businesses across the world. The COVID-19 pandemic has made tremendous changes not only in consumer behaviors but also in the use of digitalization. *A New Era of Consumer Behavior - In and Beyond the Pandemic* is an edited collection of twelve chapters that categorize and investigate consumer behavior during and beyond the pandemic from various perspectives, covering both theoretical aspects and practical research studies. There are three main sections: "Digital Shifts in Consumer Behavior", "Digitalization of Consumer Behavior in Tourism Sector" and "Consumer Protection and Sustainability".

Umut Ayman
Department of Public Relations and Advertising,
Eastern Mediterranean University,
Famagusta, North Cyprus

Section 1

Digital Shifts in Consumer Behavior

Chapter 1

Consumer Culture and Abundance of Choices: Having More, Feeling Blue

Ondřej Roubal

Abstract

The defining feature of contemporary consumer culture is the escalation of consumption opportunities and the expanding space for choice. An unbridled and unrestricted range of products is part of material prosperity, rising living standards, and emancipation of human freedoms. The growing demands for constant consumer decision-making in an increasingly opaque environment of potential targets of choice exposes consumers to the risk of procrastination, passivity, and resignation, as well as psychological discomfort. The goal here is to contribute to theories of consumer behavior in the context of the psychological experience of choice under the conditions of the accelerated quantity of consumption volumes against the backdrop of the COVID-19 pandemic. While conventional offline shopping was drastically curtailed during the coronavirus crisis, freedom of consumer choice was maintained despite many proclamations to the contrary. I seek to provide support to the claim that freedom of consumer choice was maintained and often amplified during the pandemic in the online virtual environment of digital commerce formats. Freedom of consumer choice has merely been transformed into a horizontal level of application by the relatively rapid and fluid conversion of market activities into the cyberspace of a growing number of e-stores and online supermarkets, unconstrained by the physical space of shelves and counters.

Keywords: abundance, choice, consumer culture, consumer opportunities, decision making, consumer behavior, consumption, COVID-19

1. Introduction

The goal in this chapter is to contribute to theories of consumer behavior in the context of the psychological experience of choice under the conditions of an explosive and expansive sphere of consumption opportunities against the backdrop of the COVID-19 pandemic. During this pandemic, shopping has become much more intensely concentrated in the online virtual environment consisting of digital formats of commercial transactions, and the space of choice for consumers in that online environment has expanded extensively. During the coronavirus crisis, the volume of e-commerce sites offering an assortment of products grew rapidly and their overall activity increased rapidly [1]. Not only did the number of e-shops and

online supermarkets increase, but at the same time the sales offering of individual retailers also grew, no longer limited by the physical space of shelves and counters. "Digital tools enable reduced searching costs and provide instant access to a much wider variety of products and services..." [2]. It is this fact of extending the range of shopping options within the digitized formats of eshops that positively contributed during the COVID-19 pandemic to ensuring the availability of requisite supplies and the possibility of their convenient transport directly to homes, during both personal quarantines and area lockdowns. On the other hand, however, in such a situation of abundant choices, what is known as the *Schwartz paradox of choice* comes into play [3]. Schwartz's basic thesis assumes that an overabundance of choices contributes to a decrease in happiness and reduces customers' motivation to buy. This idea is echoed by other authors. "Not only does offering more options lead to higher costs for the company, larger assortments often lead to lower probability of purchase and decreased satisfaction due to choice overload" [4]. Kinjo and Ebina [5] developed a proprietary mathematical model to calculate the optimal quantity of products offered by retailers in order to maximize sales, depending on the size of customers' invested costs in product selection. These authors confirm the thesis that markets in the real world and in cyberspace should adapt to a moderately sized product offering, which would lead not only to higher sales but also to much more favorable psychological effects on customer behavior. "Other studies show that people actually experience the greatest satisfaction when choosing from intermediate set of choices, not too small and not too big" [6]. More recently, the problem of the paradox of choice has been addressed at the meta-analytic level of interdisciplinary research in the behavioral and social sciences by Zhang and Xu [7]. In the process they arrived at the surprising finding of a high degree of inconsistency in academic results at both the theoretical and empirical levels of research. In doing so, they applied their own mathematical analysis and extensive simulation theories.

COVID-19 significantly reduced the possibilities of conventional offline shopping and limited the volumes of product offerings for some time [2]. However, business transactions moved rapidly to the online environment and supply chains quickly adapted to the indicators of consumer market demand [8]. The temporary problem of lack of product supply due to the reduction of offline shopping was quickly resolved by the rapid conversion to online sales [9]. Thus, COVID-19 did not significantly restrict freedom of consumer choice, but merely triggered its horizontal transformation and shifted its application to the digitalized sphere of shopping. The paradox of choice, originally elaborated by Schwartz [3] and developed in various contexts by a number of other authors [10–12], applied universally even in the era of the coronavirus crisis, inaccurately equated with the drastic reduction of consumer freedom of choice and the associated frustration of customers.

In this context, I will expose and evaluate the more general and apparently universally operating foci of tension and conflict generated in an environment of an increasingly dense network of consumption opportunities, in which the decisions of actors and the outcomes of choices are confronted with negative subjective experiences of regret, anxiety, or disappointment. Last, I will identify and sequentially explain the main sources reducing satisfaction from consumer choices made in an environment of abundant opportunities. I will focus on the circumstances of the influence of information, aspirations, and hedonistic adaptation as potential sources of their psychological discomfort. These are firmly integrated in the sphere of consumer decisions yet, I presume, are only minimally reflected in the everyday activities of consumers.

2. Methods

This chapter presents a theoretical study based on critical reflection on the discourse regarding changing consumer behavior during the COVID-19 pandemic. The method used to achieve the stated objectives consisted of critical literature review, comparative analysis, and meta-analytical evaluation of selected review and empirical studies aimed at understanding changes in consumer culture and consumer behavior. The critical literature review mainly reflects studies with a sociological, behavioral economic, social psychological, psychological, and partly anthropological focus. At the same time, more detailed attention has been devoted to a critical review of sociological studies from 2020 to 2022 referencing current transformations of consumer behavior during the time of the COVID-19 crisis. Relevant scholarly sources were identified using the ProQuest and ProquestEbooks databases. The methodological framework is built on an attempt to create a theoretical platform of arguments, insights, critical perspectives, and opinions, challenging some stereotypically accepted conceptions of consumer decision-making and freedom of consumer choice in the era of the COVID-19 pandemic. This chapter is intended to prompt future scholarly efforts to empirically investigate patterns of consumption behavior internalized during the COVID-19 crisis and the dynamics of their further strengthening or, conversely, weakening in the post-COVID period. The theoretical conclusions that follow can be developed and further verified through experimental studies and quantitative and qualitative research methods.

3. Sociological reflection on the transformation of consumer behavior against the backdrop of the COVID-19 pandemic

Consumption levels fell by around 25% in some European countries (e.g. UK, Spain, Italy, and France) during the coronavirus crisis, while in the USA a 10% drop in consumption was recorded during this period [13]. Over the last 2 years, the COVID-19 pandemic has produced not only dramatic economic but also psychosocial effects, transforming many parameters of consumption behavior and more general lifestyle standards [14]. "Among the consequences of the COVID-19 pandemic, we have seen the closing of shops and other business for months. Consumers have avoided public places, stores, and cultural events, even when such establishments were open. As a result, consumers began to change their purchasing behaviors and habits in a sustainable way" [15].

There is now a relatively rich empirical record from 2020 and 2021 documenting the impact of the COVID-19 pandemic as a source of significant changes in consumer decision-making, shopping patterns, and other characteristics, traits, and manifestations of people's lifestyles. Silva et al. [16] conducted a detailed review of published scientific studies in journals indexed in the WOS and Scopus databases between 2020 and 2021 with the common research topic of changes in consumer behavior and consumption patterns during the COVID-19 pandemic. The study authors identified a total of 416 relevant articles according to the defined selection criteria (87 from 2021 and 329 from 2020). Based on bibliometric, thematic, and content analysis, the authors identified 7 main topical units referencing lifestyle changes related to consumption behavior during the coronavirus crisis: Changes in consumer behavior; Coping with the lockdowns; Information seeking and sharing; Psychological effects; Addictive behavior; Changes in food consumption; Panic buying and hoarding

behavior [16]. Interesting data was also provided by their analysis of the keywords of the studies examined, through which the authors identified three main clusters. In this context of examining the ambivalent nature of proliferation of consumer choices, the following frequently occurring keywords in these clusters are relevant: Consumers; Decision-making; Information-seeking behavior; Stress [16]. In this study, the authors simultaneously addressed the question of other topics and issues that should be explored in greater detail in the context of the effects of the COVID-19 pandemic on changes in consumption behavior. One such key question is the problem of consumer choice and strategies for making purchasing decisions.

An even more extensive theoretical study was conducted by Yin, Yu, and Xu [17] on a robust sample of academic studies published between 1981 and 2021 that report on consumer behavior issues. They analyzed very rich research material, which enabled them to reveal changes in consumption behavior in modern societies over the relatively long time frame of the last decades. The authors point out that the COVID-19 pandemic marked an unexpected, rapid step change in lifestyle and consumption changes. According to their analysis of secondary data, the most significant changes in consumption behavior will occur in the sphere of an increased preference for online shopping or increased interest in healthy foods. They also highlight the importance of the more intensive mix of online and offline commerce, which allows consumers to shop more seamlessly and conveniently from anywhere and at any time. In the context of psychological effects during the coronavirus crisis, other authors confirm the increase in feelings of anxiety and insecurity that stems from online panic shopping and stockpiling, especially of food [18].

A similar meta-analysis was conducted by Smith and Machová [19], who analyzed empirical data from the research agencies Ipsos, KPMG, Roland Berger and Potloc, Salesforce, Worldpay/FIS, and YouGov and reported on actual changes in consumer behavior and attitudes during the COVID-19 pandemic. The authors systematize the analyzed data to identify the main foci of changes in people's lifestyles and daily practices, including consumption behavior, and describe their key attributes [19]. It is confirmed here that the introduction of restrictive measures in the form of home quarantines and blanket lockdowns has produced dramatic social and economic effects in the populations studied, including a fundamental transformation of consumption practices. Consumer activities have shifted massively to virtual environments, with an increased preference for digital shopping via mobile devices and much greater use of online supermarket delivery apps. It has become clear that shoppers have become much more discerning in their product selection and have reorganized their purchasing decision-making strategies in the course of online shopping. It can be assumed that one of the reasons for this change may be that customers are confronted with a concentration of larger volumes of goods and services in the virtual shopping environment. It is here that potentialities complicating the decision-making process and choice have most likely been amplified for the segment of the population that had been accustomed to the conditions of conventional shopping with a more limited range of offerings in the period before the coronavirus crisis.

Šimić and Pap [13] empirically observed changes in consumption behavior during the coronavirus crisis in Croatia within the Generation Z population, whose members are often referred to as "digital natives". Based on a quantitative data analysis conducted on a sample of 422 respondents, they showed that the consumption behavior of Generation Z during the coronavirus crisis led to much more stockpiling and overbuying. At the same time, they typically concentrated their consumption activities ever more frequently online, which became a global trend during the COVID-19

pandemic. And yet there was no correlation between changes in consumption behavior and perceived quality of life, which the study authors explain by the fact that for Generation Z, online shopping was already the norm in the pre-COVID-19 era, and as such the reduction in physical shopping options was not perceived negatively as a factor reducing their quality of life. The findings of an empirical study by Wang and Na [20] conducted during the COVID-19 pandemic in three Chinese cities confirm that panic shopping and hoarding, especially of food, is a significant manifestation of similar crises, triggering growing feelings of insecurity and fear of the future. Hesham, Riadh, and Sihem [15] empirically demonstrate statistical associations between age and gender moderating specific changes in consumption behavior in a sample of 360 respondents in Saudi Arabia. According to their findings, interest in healthy foods increased sharply during the coronavirus crisis, especially among women and the elderly population, who were observed to have higher levels of anxiety and psychological distress during the pandemic. Gupta, Nair, and Radhakrishnan [21] offer similar empirical conclusions by looking at changes in consumption behavior in India. There, the COVID-19 pandemic initiated panic and impulse buying and the need to stockpile food. Veselovská, Závadský, and Bartková [22] conducted a sociological investigation on a representative sample of the Slovak population to identify and explain the main factors influencing changes in consumption behavior during the COVID-19 pandemic. By analyzing empirical data, they reach similar conclusions as other authors [23], that in times of crisis, the rate of consumption increases and the allocation of financial resources to savings or longer-term investments decreases. At the same time, the authors of the Slovak study stressed that hygiene/epidemiological restrictions and the related restriction of social interactions have significantly influenced people's mentality, reorganized daily routines and motivations for action, and, last but not least, modified consumption patterns in terms of a transition to digital shopping formats, which was more evident in the female population than in the male population. A number of other similarly focused empirical and theoretical studies are emerging in the early months of 2022.

4. The ambivalence of freedom of choice

In post-industrial societies, the values of material well-being and rising living standards are closely intertwined with the notion of simultaneously maximizing people's individual freedoms [3]. In other words, existential security and its further strengthening and affirmation in a spiral of increasing abundance should be echoed in parallel at a similarly accelerated and progressive existential level in terms of the emancipation of human freedoms. An integral part of such freedoms is the fulfillment of the premise of a proliferation of choices and decisions in a variety of life situations. It is therefore true that the greater the plurality of choice in each individual decision-making situation, the more intense the personal freedoms people achieve. It should be added that the more freedoms there are, the greater the well-being.

An unbridled offering of products is intended to liberate and emancipate consumers in their ability to make free and authentic choices. In particular, some optimistic scenarios attribute to technological innovation an important function in the creation of abundance in the sense of the ever more voluminous generation of value from fewer resources, but also abundance represented by a more robust selection and variety of options in the areas of everyday consumption, education, and health [24].

There is no doubt that significant expansion of choice as one of the pillars of emancipation of individual freedoms is one of the defining features of the consumer culture of late modern societies. According to Lury [25], it is precisely the trend of accelerated growth in the quantity of types and classes of contemporary goods and the contemporary proliferation of sales and purchasing platforms that forms part of the fundamental parameters of contemporary consumer culture of societal well-being. The expansion of consumption opportunities is fundamentally driven by the increasingly massive conversion of conventional product offerings traditionally determined by the physical context of points of sale, dependent on the personal interactions of sellers and buyers, into the virtual environment of digitized shopping. The online environment of consumer activities is not limited by the space or physical capacity of points of sale and shelves. On the contrary, the virtual shopping environment accelerates the quantitative potential of the assortment of goods on offer and the variability in the selection of types and classes of different products. The digitalization of shopping formats not only contributes to an increase in the quantitative volume of product and service choices, but also to a more creative and personalized shopping experience overall. Thus, consumers are reorganizing their life standards and consumption preferences as a result of the introduction of the technological innovations of digitized shopping [19].

The COVID-19 pandemic has contributed substantially to the speed of these changes, accelerated by the reorganization of consumer shopping patterns and the redefinition of consumption behavior. Everyday life was significantly transformed as a result of widespread lockdowns and home quarantines, as were routine consumer activities. Thus, opportunities for socially interactive individual shopping were reduced, leading to a massive shift of product offerings and sales to online virtual environments [26]. The digitalization of shopping formats has thus directly and indirectly influenced customers' consumption habits and decision-making strategies [27].

As such, the empirically identified and explicitly described causes of changes in consumption behavior thus undoubtedly include the fact of the forced conversion of conventional shopping to the virtual environment, where the confrontation of customers with the abundance of offerings was intensified and had essentially no other alternative. We can also see changes in the decision-making strategies of customers according to a meta-analysis of empirical data from various reputable public opinion research agencies that tracked various parameters of changes in consumer behavior during the COVID-19 pandemic. "Consumer decision-making and behavior change have rapidly adapted based on a range of individual and contextual characteristics" [19]. At the same time, there should also be evidence of higher levels of customer procrastination and even more demanding product selection criteria from shoppers.

In the spirit of rational choice theory, this is an uncomplicated situation, since every concrete decision and choice made is the result of a stable and reliably functioning hierarchy of the social actor's priorities and preferences of a social actor, who rationally applies such a system in every similar situation requiring an act of choice, regardless of the number of options needing to be compared and evaluated with each other as part of the implementation of the choice [28].

According to other behavioral economic studies, the conditions of such shopping are not only potentially more creative, varied, and comfortable, but also much more psychologically complicated and even reduce the level of positive feelings about shopping. Masatlioglu and Suleymanova [29] for example, address questions related to the adequate decision-making strategies of consumers and the dangers of procrastination

or shopping resignation under the conditions of a dense network of product offerings that should psychologically facilitate choice and practically optimize its outcome. After all, consumers are confronted with numerous psychological and cognitively distorting elements of human thought [30]. While consumers seek to maximize their own utility and assume that their choices in acts of decision-making will lead to this maximization, the outcomes of choice often do not produce the expected effects. In fact, the little-considered reality of the ambivalent nature of consumer culture, sometimes referred to and interpreted as the "culture of overchoice" [31], fundamentally casts doubt on optimistic scenarios referencing theses of increasing consumer comfort and growing feelings of freedom, independence, authenticity, and pleasure resulting from accelerating consumer product choices [24], as assumed, for example, by economic theories of rational choice [32]. While acts of decision-making in an environment of growing choices increase the potential to achieve objectively better, i.e., higher quality, more useful, or more advantageous outcomes, they often instead paradoxically awaken feelings of uncertainty, anxiety, internal tension, disappointment, remorse, or regret [33, 34]. The thesis of a relationship between the escalation of the range of options, the growth of demands for continuous decision-making, and the increasing level of consumer dissatisfaction is also considered at a more general level by other authors [35–37].

5. Why less can be more

In the conditions of a performance consumer society, active participation in consumption is an indicator of individual success, prestige, and recognition [38]. The function of consumption is simultaneously to construct and reconstruct identities and to model social roles. It is becoming a source of self-reflection and the formation and sharing of symbolic worlds [39]. The consumer culture of affluent societies is equated with a culture of "many opportunities", providing ever greater volumes of choices and consumption goals in an expanding variety of product offerings. "There are millions of products available on store shelves nowadays" [40]. These conditions then contribute to a conviction that individual freedoms are continually increasing, both in the sphere of the material consumption of shopping itself, and in the dimension of symbolic values and signs, achieved and (re-)defined through different models of consumption behavior.

Consumer culture is characterized by an ambivalent nature. The more diverse and voluminous offering of choices on one hand raises optimistic expectations of expanding individual freedom and independence, while on the other hand it leads to high demands for individual responsibility in making choices and experiencing the outcomes of choices. According to some authors, this very fact leads to negative effects in the form of psychological discomfort, when the degree of inner anxiety and uncertainty and feelings of self-defeat increase as a result of a more complex decision-making process in an environment of many opportunities. Motivations grow stronger to postpone the decision or completely resign from making a choice [41]. On the contrary, similar experiences of negative emotions in the form of remorse and dissatisfaction might not occur in conditions of limited choices. In fact, the outcome of a choice in a situation of limited choices significantly relativizes the feeling of personal responsibility. Each individual decision takes place against a background of minimized consumer choice, and responsibility for the outcome in a context of limited choice can be at least partially shifted to the external circumstances of the system. For

example, until the late 1980s, the range of consumer goods in socialist Czechoslovakia was dramatically reduced as the result of its centrally planned state economy to such an extent that something like the psychological discomfort of consumer choice was almost unknown. In such a world, part of the personal responsibility for choices made was thus transferred to an anonymous system of political, economic, cultural, or social parameters of society. Thus, every disadvantageous decision or bad choice need not be experienced as a personal failure. In contrast, a world of hypertrophy of opportunity delegates this responsibility strictly to individuals, who have to deal with the consequences of their own decisions independently. This has not ceased to be the case even during the COVID-19 pandemic, when freedom of consumer choice was preserved in spite of certain expectations and intensively exercised in the online environment of digital shopping formats. For some types of products in particular, freedom of choice was maintained and, in some cases, even enhanced due to the virtual environment.

Feelings of psychological discomfort under conditions of abundant choice are partially caused by opportunity cost. This is a situation where the satisfaction of each individual decision decreases as the number of options increases. For each individual choice at the same time means the rejection of other opportunities that remain unused and untried. Consumers develop fictions and fantasies, imagining hypothetical situations of alternative choices and comparing these with the outcome of a real choice that may appear disadvantageous or unattractive compared to similar imaginings. For example, the average supermarket today offers around 40,000 different items, but the average household needs on average around 150 products to ensure normal operations [42]. This means that the vast majority of the products offered by the average supermarket pass through the filters of consumer choice, at the cost of increasing opportunity cost. In the COVID-19 era, it is possible to consider some reduction in opportunity cost (and a reduced sense of "feeling of missing out") when consumer choice did not only focus on mainstream consumer products (food, clothing, electronics) but also, for example, on various activities and entertainment requiring social contacts. During the lockdown in particular, the options for paid and unpaid leisure activities were very limited and the space for choice drastically restricted.

In the post-COVID era, we are now witnessing the rapid revitalization of the space of choice in various areas of consumption, which reinforces feelings of individual freedom, yet also implies an increase in transaction costs. According to Mlčoch [43], the decision-making process and each choice made place considerable demands on the time, energy, and cognitive abilities of consumers seeking and comparing information about products, their prices, quality, and countless other characteristics. The increasing transaction costs associated with choice may ultimately lead consumers to resign and definitively refuse to make the planned choice. Vardi [44] illustrates such a situation with the example of Jewish emigrants from the Soviet Union who, after very difficult negotiations with the Soviet authorities, were allowed to emigrate to Israel on a limited basis in the early 1970s. Smaller groups of Soviet emigrants were confronted in Israel with a Western-style economy and a standard of living equivalent to Western welfare standards. According to some memoirs, Jewish emigrants accustomed to the conditions of shopping in the Soviet Union found it difficult to navigate the goods on offer in Israeli supermarkets and often left without making a purchase.

This brings us to the problem where the principle of "more is better" moves actors not toward liberation but rather closer to states of paralysis and passivity. Czech [6] reached conclusions supporting this thesis in the present when studying the

functioning of Swedish pension funds in recent decades. While 70 financial companies in Sweden had offered a total of 465 pension funds in 2000, this increased to 800 in 2006; by 2015, 102 companies were involved in the administration of a total of 843 pension funds in Sweden [6]. The consequence of the increasing options for types of pension savings was a delay in potential buyers pursuing such savings and an overall decline in pension savings contracts. For example, Google, following the recommendation of the results of one of its marketing studies, decided to increase the number of links listed on a single page when a specific password was entered. This move was oriented toward accommodating Google's customers, who had repeatedly expressed in surveys a desire to increase the amount of input when searching for information. When Google tripled the number of links per page, search and information tracking through Google began to plummet [45].

And yet other, namely behavioral economics studies consider this type of paralysis and resignation from making decisions due to being overwhelmed with large volumes of choices to be rather rare [46]. The more significant problem, as they see it, is the implementation of decisions that are not only disadvantageous, but often fatally damaging to the interests of the actors themselves. This is attributed to people's limited attention spans, their easy manipulability, and the underestimation or unintentional disregard of important product parameters, referencing their price or quality. In general, the behavioral economics perspective accepts the thesis that freedom of choice is not a guarantee of an efficient decision-making process, but only the potential to achieve optimized choice outcomes in terms of pursuing one's own goals and priorities. The reason is that the effectiveness of the decision-making process is significantly impaired by the limits of people's cognitive capacities and limited attention. When cognitive resources are depleted and attention is declining, the decision-making process turns into a shallow, intuitive affair, generating many missteps. This is especially true when dealing with information, where increasing volumes of information often do not lead to more efficient solutions and decisions, but rather to suboptimal outcomes and higher overall transaction costs [47].

6. The problem of choice and reduced satisfaction: Information, aspiration, adaptation

At a general level, the behavioral and social sciences confirm the thesis that the proliferation of choices fundamentally complicates acts of decision-making, increases costs for consumers, and leads to an increase in indecision and feelings of dissatisfaction. Yet consumers reject potential and actual reductions in choice and experience them as a threat to their freedom of choice, especially for certain types of products [48]. This was confirmed during the COVID-19 pandemic, when the reduction of offline shopping options triggered a strong psychological response from consumers [2, 26]. As a result, business activities were concentrated in the online virtual shopping environment while more or less maintaining the abundance of product choices that consumer markets demanded. At the same time, due to health concerns, consumer demand grew for non-standard distribution channels for the goods purchased [49].

Let us next attempt to summarize and briefly describe the possible effects that may act as complementary and interrelated forces in the extensive field of consumer choices. Why, then, might we feel worse off in situations "when we have more"?

First of all, this is a problem of information. The easy availability and abundance of information is not only a more general defining feature of a contemporary technologically advanced society [50] and a common attribute of everyday behavior, but also an elementary principle of the functioning of consumer culture, where it is reproduced and confirmed by a globally functioning and operating platform of information flows from producers, sellers, and consumers. Decision-making based on easy and quick access to large volumes of information should, according to all the assumptions of rational choice theory, optimize choice or lead consumers to favorable or desirable choice outcomes in terms of their own expectations and desires. And yet behavioral economists point to the practical problem of people's cognitive limits and their declining ability to gather, organize, compare, and evaluate all available information on different products of interest in a comprehensible way. Thus, more information and escalating choices may not necessarily lead in a linear fashion to greater efficiency in achieving individual goals and making the most advantageous decisions. "However, because of limited attention and cognitive resources, people are not able to use all available information and freedom of choice effectively to achieve their own best interests" [40]. Imagine the amount of information that customers must accumulate, evaluate, and compare in their search for the best possible product choice when, for example, even a single brand of sporting goods in a retailer's catalog represents more than two dozen different individual parameters in an offering of tens and hundreds of other models of a similar product from other brands [33]. Is it even possible to organize and mutually compare hundreds and perhaps thousands of pieces of information from different quality parameters and features among such a wide range of product offerings?

Consumers are sensitive to this fact; as early as at the stage of decision and the making of the choice itself, they may be anticipating the inner turmoil and uncertainty of the final choice. Recall that this anticipation of internal tension due to a lack of options and means to evaluate all the information available to retailers is based on the knowledge that every choice made also implies a decision not to make alternative choices that may be more advantageous overall or that may prove after some time to have been more advantageous. The fact that consumers decide for the best possible option out of the available choices based of the amount of information available to them is thus accompanied by ongoing uncertainty and doubt, which also reduces the subjective feelings of satisfaction in and enjoyment of the product purchased. "However, the increasing personal anxiety and rising transaction costs associated with informing oneself about choices from an ever-larger set of goods on offer can still be 'incorporated' into a standard theory of consumer behavior" [42].

There are, however, at least two other reasons whose functions and meanings are somewhat outside the scope of research attention and are generally neglected even by the "standard" theories of consumer behavior. These are the issues of aspirations and hedonistic adaptation.

We examine the question of aspirations in the form of hopes and expectations of what we want to achieve in the area of consumer welfare. As a rule, these tend to increase in situations of high material security, accompanied by a proliferation of consumption opportunities as an inseparable feature of the rising standard of living in affluent societies. Furthermore, consumer aspirations are systematically and programmatically initiated by a dense network of information flows, images, and messages produced by the advertising industry's media apparatus and by advanced tools of integrated marketing communication, including the use of sophisticated artificial intelligence technologies. In the media-amplified hedonistic orientation of

life, complete with examples and presentations of different variants and models of the attractiveness of lifestyles, the ethos of "a life of unlimited possibilities", "a world without limits", "a life of infinite opportunities" is awakened, which inevitably widens the gap between the reality (what we actually achieve) and the possibility (what we would like to achieve).

Lastly, there is the problem of (hedonistic) adaptation, which is closely related to the effects of increasing aspirations. Hedonistic adaptation, in the case of consumption, is what subsequently weakens the intensity of the initial enjoyment and the pleasure from the goods acquired (we find interesting similarities here with Weber-Fechner's law defining the relationship between psychic stimulus and perceived change—if the intensity of a stimulus grows by a geometric order of magnitude, then the intensity of the sensation grows by an arithmetic order of magnitude).

Behavioral economics here assumes that people are emotionally adaptive, finding support for this claim in Brickman and Campbell's psychological theory of hedonistic adaptation [51]. Thus, achieving a higher degree of consumer well-being may cause a certain fluctuation or deflection in the level of subjective happiness, however this returns to its original level after a certain period of time. Many consider that the achievement of a feeling of happiness lies in notions of fulfillment of aspirations, and yet once the goalposts are passed and these aspirations realized, they are quickly forgotten and cast into the past as unnecessary artifacts of one's own biography. This explains why there is such fervent pursuit of ever higher standards of living in affluent societies, why people endeavor to make their material comfort even more "comfortable" and convenience ever more "convenient". The past is always judged from the perspective of a higher aspirational level, and perhaps we too easily succumb to the illusion of the added value of well-being to a future from which perhaps too much is expected.

Hedonistic adaptation seems to operate at another level as well. Namely, consumers may exhibit a decreased ability to predict the chilling effect of adaptation due to higher expectations, also based on their own belief that their choice will be the "best" choice (depending on their ability to obtain, compare, and evaluate information). This contributes to the optimistic scenario of hoping that the choice will not bring disappointment, but rather longer-term feelings of satisfaction. However, these aspirations mean that the effects of hedonistic adaptation will weigh all the more heavily on this group of consumers. When one considers how quickly the costs associated with seeking the best price for a product are "amortized" over time as a result of hedonistic adaptation, their losses seem all the greater.

7. Conclusion

Consumer culture does not consist solely of a specific type of material culture and does not only express systems of relationships to material values. It represents a world of symbols and signs that transforms material goods into their immaterial meanings, including the creation of identities, sources of self-reflection, and modifications of social roles, including the definition and redefinition of social relationships. Consumer culture is subject to changes of varying intensity, depth, and duration. The most significant transformations of recent decades would include not only the democratization of consumerism, but also the expansion of consumption opportunities and the unprecedented abundance of consumer choices. Consumer

culture is characterized by its ambivalent nature. In the spirit of rational choice theory, the proliferation of choices is a positive and universally useful phenomenon, which also promotes a desired emancipation of individual freedoms. However, from the perspective of behavioral economists and many sociologists and social psychologists, this phenomenon is problematic and highly ambiguous, as it generates social and psychological risks that are unseen and difficult to predict. What was originally a rational and generally accepted requirement for the constant expansion of the space of choice has become an irrational desire with considerable potential to harm all those concerned. In this context, the "more is better" principle is a significant complication for consumers, where it is increasingly difficult to operate without experiencing cognitive dissonance, self-blame, regret, and feelings of self-defeat. Moreover, empirical research during the COVID-19 pandemic has demonstrated the importance to consumers of feelings of safety and security, which will likely be a central theme of the shopping experience in the post-COVID era [22]. At the same time, there are many overlooked arguments to support the claim that the limitation of consumer choice during the COVID-19 crisis occurred only partially and only in the conventional shopping environment. And yet the freedom of consumer choice for certain types of products was maintained and even enhanced in the virtual shopping environment. The psychological discomfort associated with choice in an environment of many opportunities was therefore not eliminated and may have contributed to the overall psychological discomfort and mental distress during the lockdown. However, during the COVID-19 era opportunity cost was decreasing, particularly for paid forms of entertainment and leisure activities involving social contact (concerts, sports matches, etc.).

At present, we have an opportunity to observe many social initiatives, the dematerialization movement, and numerous spontaneous civic manifestations whose appeals have intensified precisely at the time of the COVID-19 pandemic, and in recent weeks in the context of the war in Ukraine, rising inflation, and the scarcity of some strategic raw materials. These call for changes in the politics of lifestyles in the spirit of the principle of "less is more", a transformation of value orientations appealing to ecological and environmental responsibility, solidarity, and accountability, voluntary frugality, life minimalism or alternative hedonism as a return to the roots of the philosophical agenda of Epicureanism, in which hedonism was defined by "modest materialism and tranquility". The rule should be to live a rich life by modest means. In these transformations of life attitudes and value worlds, it is not only the actual patterns of consumption behavior and the motivations for consumption decisions that are fundamentally changing for individuals and groups, but also the deeper layers of their identities, which will seek new sources of affirmation in the environment of consumer culture markets. The question then remains as to what form these sources of identities will take and in what direction they will be further developed in terms of the interactions of markets and consumers, such that markets may retain the direction of "more is better" or all the preconditions of economic prosperity and growth as the condicio sine qua non of their existence, while at the same time offering sufficiently credible sources of social identities to newly emerging alternatives to (counter-) consumerism, intertwined in many ways with its radical reduction and rejection. Thus, it is not only consumers in decision-making and choice implementation situations that find themselves in an ambivalent situation, but also the markets themselves, as well as the accompanying systems of marketing support for consumer culture that respond to current and future lifestyle politics.

Acknowledgements

The result was created with the use of institutional support for long-term conceptual development of research of the University of Finance and Administration.

Author details

Ondřej Roubal
University of Finance and Administration, Prague, Czech Republic

*Address all correspondence to: ondrej.roubal@vsfs.cz

References

[1] Santo PE, Marques AMA. Determinants of the online purchase intention: hedonic motivations, prices, information and trust. Baltic Journal of Management. 2022;**17**:56-71. DOI: 10.1108/BJM-04-2021-0140

[2] Rydell L, Kucera J. Cognitive attitudes, behavioral choices, and purchasing habits during the COVID-19 pandemic. Journal of Self-Governance and Management Economics. 2021;**9**:35-47. DOI: 10.22381/jsme9420213

[3] Schwartz B. The Paradox of Choice: Why more is Less. 1st ed. New York: ECCO; 2004. p. 304

[4] Chernev A. When more is less and less is more: The psychology of managing product assortments. GfK Marketing Intelligence Review. 2011;**3**:8-15. DOI: 10.2478/gfkmir-2014-0051

[5] Keita K, Ebina T. Paradox of choice and consumer nonpurchase behavior. AI & Society. 2015;**30**:291-297. DOI: 10.1007/s00146-014-0546-7

[6] Czech S. Choice overload paradox and public policy design. The case of Swedish pension. Equilibrium. 2016;**11**:559-584. DOI: 10.12775/EQUIL.2016.025

[7] Zhang N, Xu H. Reconciling the paradoxical findings of choice overload through an analytical lens. MIS Quarterly. 2021;**45**:1893-1920. DOI: 10.25300/MISQ/2021/16954

[8] Pera A, Balica R-S. Cognitive, emotional, and behavioral disorders in medical staff treating COVID-19 patients. Psychosociological Issues in Human Resource Management. 2021;**9**:105-118. DOI: 10.22381/pihrm9220218

[9] Hobbs JE. Food supply chains during the COVID-19 pandemic. Canadian Journal of Agricultural Economics. 2020;**68**:171-176. DOI: 10.1111/cjag.12237

[10] Broilo PL, Espartel LB, Basso K. Pre-purchase information search: too many sources to choose. Journal of Research in Interactive Marketing. 2016;**10**:193-211. DOI: 10.1108/JRIM-07-2015-0048

[11] Etkin J, Laran J. Restricting choice freedom reduces post-choice goal disengagement. Journal of the Association for Consumer Research. 2019;**4**:36-46. DOI: 10.1086/701450

[12] Jin H, Lu Z, Huang L, Dou J. Not too much nor too little: Salience bias in mobile plan choices. Telecommunications Policy. 2021;**45**:102071. DOI: 10.1016/j.telpol.2020.102071

[13] Šimić ML, Pap A. Generation Z buying behavior change in the COVID-19 pandemic context. Ekonomski Vjesnik/Econviwes. 2021;**34**:361-370. DOI: 10.51680/ev.34.2.9

[14] Wisetsri W, Vijai C, Agrawal R, Jirayus P. Consumer behaviour during pandemic of COVID-19. Journal of Management Information and Decision Sciences. 2021;**24**:1-10

[15] Hesham F, Riadh H, Sihem NK. What we have learned about the effects of the COVID-19 pandemic on consumer behavior. Sustainability. 2021;**13**:4304. DOI: 10.3390/su13084304

[16] Silva LEN, Gomes Neto MB, Grangeiro R, Nadae J. COVID-19 pandemic: Why does it matter for cosumer research? Brazilian Journal of Marketing. 2021;**20**:253-278. DOI: 10.5585/remark.v20i2.18677

[17] Yin B, Yu Y, Xu X. Recent advances in consumer beahavior theory: Shocks from the COVID-19 pandemic. Behavioral Sciences. 2021;**11**:171. DOI: 10.3390/bs11120171

[18] Prentice C, Quach S, Park T. Antecedents and consequences of panic buying: The case of COVID-19. International Journal of Consumer Studies. 2022;**46**:132-146. DOI: 10.1111/ijcs.12649

[19] Smith A, Machová V. Consumer tastes, sentiments, attitudes, and behaviors related to COVID-19. Analysis and Metaphysics. 2021;**20**:145-158. DOI: 10.22381/am20202110

[20] Wang HH, Na H. Panic buying? Food hoarding during the pandemic period with city lockdown. Journal of Integrative Agriculture. 2020;**19**:2916-2925. DOI: 10.1016/S2095-3119(20)63448-7

[21] Gupta R, Nair K, Radhakrishnan L. Impact of COVID-19 crisis on stocking and impulse buying behaviour of consumers. International Journal of Social Economics. 2021;**48**:1794-1809. DOI: 10.1108/IJSE-03-2021-0163

[22] Veselovská L, Závadský J, Bartková L. Consumer behaviour changes during times of the COVID-19 pandemic: An empirical study on Slovak consumers. EM Economics and Management. 2021;**24**:136-152. DOI: 10.15240/tul/001/2021-2-009

[23] Anderson RM, Heesterbeek H, Klinberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? The Lancet. 2020;**395**:931-934. DOI: 10.1016/S0140-6736(20)30567-5

[24] Brynjolfsson E, McAfee A. Druhý věk strojů: Práce, pokrok a prosperita v éře špičkových technologií. 1st ed. Brno: Jan Melvil Publishing; 2015. p. 296

[25] Lury C. Consumer Culture. 2nd ed. Cambridge, Malden: Polity Press; 2011. p. 245

[26] Akhtar N, Akhtar MN, Usman M, Moazzam A, Siddiqi UI. COVID-19 restrictions and consumers' psychological reactance toward offline shopping freedom restoration. The Service Industries Journal. 2020;**40**:891-913. DOI: 10.1080/02642069.2020.1790535

[27] Woods M, Miklencicova R. Digital epidemiological surveillance, smart telemedicine diagnosis systems, and machine learning—Based real-time data sensing and processing in COVID-19 remote patient monitoring. American Journal of Medical Research. 2021;**8**:65-77. DOI: 10.22381/ajmr8220215

[28] Hedström P, Stern C. Rational choice theory. In: Turner BS, Kyung-Sup C, Epstein CF, Kivisto P, Ryan JM, Outhwaite W, editors. The Wiley-Blackwell Encyclopedia of Social Theory. 1st ed. West Sussex: Wiley-Blackwell; 2017. pp. 1925-1931. DOI: 10.1002/9781118430873.est0305

[29] Masatlioglu Y, Suleymanov E. Decision making within a product network. Economic Theory. 2021;**71**:185-209. DOI: 10.1007/s00199-019-01238-z

[30] Valenčík R. Odvětví produktivních služeb. In: Teorie a praxe. 1st ed. Praha: Vysoká škola finanční a správní, a.s; 2018. p. 98

[31] Bakewell C, Mitchell VW. Generation Y female consumer decision-making styles. International Journal of Retail & Distribution Management. 2003;**31**:95-106. DOI: 10.1108/0959055031046199

[32] Becker GS. Teorie preferencí. 1st ed. Praha: Grada, Liberální institut; 1997. p. 350

[33] Roubal O. Maximizers and satisficers in consumer culture changes. Communication Today. 2018;**9**:38-56

[34] Roubal O. Consumer culture of abundance—Ambivalence of life in an affluent society. In: Marketing Identity–COVID-2.0. Trnava: Faculty of Mass Media Communication, University of Ss. Cyril and Methodius; 2020. pp. 558-566

[35] Inbar Y, Botti S, Hanko K. Decision speed and choice regret: When taste feels like waste. Journal of Experimental Social Psychology. 2011;**47**:533-540. DOI: 10.1016/j.jesp.2011.01.011

[36] Schwartz B, Cheek NN. Choice, freedom, and well-being: considerations for public policy. Behavioural Public Policy. 2017;**1**:106-121. DOI: 10.1017/bpp.2016.4

[37] Wolcott G. Restricting choices: Decision making, the market society, and the forgotten entrepreneur. Journal of Business Ethics. 2019;**156**:293-314. DOI: 10.1007/s10551-017-3560-0

[38] Roubal O. Potíže s identitou—umění sebetvorby a problém uznání. Communication Today. 2011;**2**:26-40

[39] Newholm T, Shaw D. Studying the ethical consumer: A review of research. Journal of Consumer Behaviour. 2007;**6**:253-270. DOI: 10.1002/cb.225

[40] Houdek P, Koblovský P, Štastný D, Vranka M. Consumer decision making in the information age. Society. 2018;**55**:422-429. DOI: 10.1007/s12115-018-0283-5

[41] Iyengar SS, Lepper MR. When choice is demotivating: Can one desire too much of a good thing? Journal of personality and Social Psychology. 2000;**79**:995-1006. DOI: 10.1037//0022-3514.79.6.995

[42] Trout J. Differentiate or die. Forbes [Internet]. 2005. Available from: https://www.forbes.com/2005/12/02/ibm-nordstrom-cocacola-cx_jt_1205trout.html?sh=38b03b2286ee [Accessed: 2022-05-12]

[43] Mlčoch L. Ekonomie štěstí: proč méně může být více. Working papers IES 94. 2005

[44] Vardi MY. The paradox of choice in computing-research conferences. Communications of the ACM. 2021;**64**:5. DOI: 10.1145/3488554

[45] Graves P. Consumerology. In: The Truth about Consumers and the Psychology of Shopping. 2nd ed. London: Nicholas Brealey Publishing; 2013. p. 228

[46] Scheibehenne B, Greifeneder R, Todd PM. Can there ever be too many options? A meta-analytic review of choice overload. Journal of Consumer Research. 2010;**37**:409-425. DOI: 10.1086/651235

[47] Campbell JY, Jackson HE, Madrian BC, Tufano P. Consumer financial protection. Journal of Economic Perspectives. 2011;**25**:91-114. DOI: 10.1257/jep.25.1.91

[48] Argouslidis PC, Skarmeas D, Kühn A, Mavrommatis A. Consumers' reactions to variety reduction in grocery stores: a freedom of choice perspective. European Journal of Marketing. 2018;**52**:1931-1955. DOI: 10.1108/EJM-12-2016-0844

[49] Pantano E, Pizzi G, Scarpi D, Dennis C. Competing during a Pandemic? Retailers' ups and downs during the COVID-19 outbreak. Journal

of Business Research. 2020;**116**:209-213. DOI: 10.1016/j.jbusres.2020.05.036

[50] Leonhard G. Technológia vs. Humanita. 1st ed. Bratislava: Slovenská inovačná a energetická agentura; 2018. p. 360

[51] Brickman P, Campbell D. Hedonic relativism and planning the good society. In: Appley MH, editor. Adaptation-level theory: A symposium. 1st ed. New York: Academic Press; 1971. pp. 287-301

Chapter 2

The Geo-Demographics of European Consumers' Food Behaviour in the New Age of Disruption

Jeremy Millard

Abstract

The COVID-19 pandemic, unlike the 2007–2008 financial crisis, was a supply side shock, now sharply exacerbated by the Ukrainian war. Drawing on relevant sources, this chapter illustrates the resulting impacts on changes in consumers' food behaviour during the first wave of the pandemic, based on a large sample of households from 12 countries spread across Europe. Unlike most previous studies, this analysis takes place at European level revealing large scale general trends. Findings show that the food system, like many other strategic consumer markets, has experienced shortages, panic-buying, hoarding and a focus on products both with longer shelf-lives and that help to reduce stress. However, there have been wildly different outcomes related to socio-demographics, household income and location. As a result, and supported by digital technologies, new spatial dynamics and relationships are emerging that exemplify important lessons for all food system actors, in particular significant shifts towards more local-regional production and supply. This is accompanied by much greater consumer awareness of the importance of food and involvement in its preparation, mediated through geography and the socio-demographic characteristics of household consumption. A strong driver is the increasingly local orientation of work and business transformed by a resurgence of hybrid working.

Keywords: system disruption, consumer behaviour, food systems, socio-demographics, spatial change, digital technology, hybrid working

1. Introduction

1.1 COVID-19 and the war in Ukraine: Economic contraction, a less globalized world and the environmental crisis

In contrast to the 2007–2008 financial crisis characterized by a massive demand slump due to dramatically reduced consumer spending power, COVID-19 hitting Europe in early 2020 has caused a severe supply-side recession. This is itself being turbo-charged by the invasion of Ukraine during 2022, depositing a thick layer of

geo-political tectonic change on top. Underlying all this is the 'mother-of-all' crises that sees our natural environment stretched to near collapse, thereby putting the very survival of our species in peril. All this has disrupted both global and local supply chains as much of the workforce becomes used to virtual, remote and hybrid working, limitations on the movement of people and goods with transport and logistics put under severe pressure, at the same time as demand for many goods and services mushrooms.

The economic contraction caused by the COVID-19 pandemic in 2020–2021 left a heavy health and human toll, shrank the Eurozone economy by a record 12.1% and wiped out more than a decade of expansion during the largest economic shock the world has experienced in decades [1]. A further sharp tightening of the economic screw began in early 2022 with the Russian invasion of Ukraine. The International Monetary Fund (IMF) drastically downgraded its growth forecasts, predicting further global economic fragmentation, rising debt and social unrest [2]. The World Bank stated a "human catastrophe loomed" with an estimated unprecedented 37% rise in food prices, caused by war-related disruption to supplies, pushing millions into poverty, increasing malnutrition, and reducing funding for education and healthcare for the least well-off [3]. By April 2022, more than five million people had fled Ukraine in 2 months, with more likely to follow, exacerbating an international migration emergency that extends from Afghanistan to the Sahel [4]. In drought-hit east Africa, the World Food Programme says 20 million people face starvation during 2022. The war in Ukraine did not create the drought, but the UN warns it could hurt efforts to reduce global heating, thereby triggering further displacement and forced migration [5].

1.2 The new age of disruption: the move towards localization, strategic autonomy and resilience

It is clear that the twenty-first century has ushered in a new age of more or less continuous crisis and disruption and that these are not times for business-as-usual. There is a need to rethink many of our shibboleths, including around sustainable development and resilience, how we re-structure our economies and politics, as well as how we work, play and live on the earth's surface. These are huge changes, intimately inter-related, in which digital technology clearly plays an essential role. It enables people and organisations to work and operate locally whilst connecting globally on a huge scale, but also has downsides that threaten the spread of misinformation.

The deep recessions triggered by these shocks continue to leave lasting scars due to lower investment, an erosion of human capital through lost work and schooling, and the fragmentation of global trade and supply linkages. A longer-term re-evaluation of global value-chains and markets is taking place as the world moves beyond the decades-long period of massive globalization prior to 2020 towards significant de-globalization today. In the context of its 'Great Re-set', the World Economic Forum (WEF) in 2020 saw 'shifting tectonic plates' towards three main spheres of influence (the US, China and the EU), not necessarily leading to isolationism, but certainly entailing some shifts in economic and political power [6]. In the same year, the WEF looked forward to what the post COVID-19 world could look like [7]:

- "Governments will be much more involved in industry. This will especially be the case in critical infrastructure sectors such as utilities, travel, healthcare and food, and will mean increased regulation."

- "The relocalization of global supply chains will counter the previously unstoppable march of globalization. States and large companies will seek to gain more technological sovereignty, reducing dependence on others and improving the resilience of their operations to global shocks."

- "Digital technologies will see a major acceleration in adoption, especially those which enable business activity with less human contact, including e-commerce, virtual networking and robotization."

Since 2020, there has already been significant new onshoring of economic activity and employment with some re-focus back to more domestic markets in new forms of re-localization, also down to regional and city levels. However, the importance of retaining openness, connectivity and cooperation at all levels, including globally, is still recognized. This is likely to be seen especially in relation to 'strategic' manufactured goods, including in food, health and other vital goods, as well as in critical utilities and infrastructures like energy and water. This will increase focus on more domestic and regional sources in order to diversity supply towards greater resilience at times of future shock.

In response to these developments, and to complement the goal of becoming the first climate-neutral continent through its European Green Deal [8], in June 2020 the EU published a review of its trade and investment policy that examined the challenges it will face and how to promote its values and standards [9]. This assesses both how trade policy can contribute to a swift and sustainable socio-economic recovery that helps promote competitiveness in the post-COVID-19 environment, as well as to see how it can assist in building a stronger EU based on the model of 'Open Strategic Autonomy'. This will enable the EU as a bloc to become much more self-sufficient in strategic goods and services, like critical food and health products and strategic industrial goods like micro-chips and batteries. It is also seen as a way of deploying trade policy to reap the benefits of openness for EU businesses, workers and consumers, while protecting them from unfair practices and building up EU resilience to better face future challenges.

1.3 The impact of COVID-19 on European food behaviour

The impact of Covid-19 on European food systems and consumer behaviour has already been subject to several studies, including a household survey covering Denmark, Germany and Slovenia [10]. This showed that. During the first wave of Covid-19, between 15 and 42% of households changed their patterns of food consumption in response to the closure of physical places to eat away from home, mobility restrictions leading to reduced shopping frequency, the perceived health risks of Covid-19, pandemic-induced income losses, and socio-demographic factors including household composition. A German study showed that Covid-19 had a significant impact on consumers' eating habits leading to negative health consequences, especially amongst economically vulnerable groups. The purchase of ready meals and canned food increased, including the consumption of alcohol and confectionery, at the same time as there was a decrease in the consumption of high-quality and more expensive food like vegetables and fruit [11]. Many households lost income during the pandemic and became more likely to grow their own food and to obtain free food in food banks [12]. During 2020, compared to 2019, European food banks redistributed significantly

more food despite numerous social restrictions and other challenges associated with the pandemic [13].

On top of these experiences, the 2022 Ukrainian war saw sharp reductions in exports of energy, food products and artificial fertilisers from both Ukraine and Russia, leading to additional strong calls to move decisively to agricultural independence and increased EU food security. President Macron of France is calling for increased food production and quality, whilst recognising there are challenges of food availability and prices that impact Europe's poorest, as part of a new strategy for "agricultural, industrial and creative independence" [14].

2. Methodology

2.1 Population size and sample

The evidence presented in this chapter is drawn from an empirical study supplemented by an examination of extant sources that have relevance for changes in European consumers' food behaviour during the new age of disruption. **Table 1** shows the samples collected by a quantitative household survey at the start of the first wave of the COVID-19 pandemic (March to July 2020) via national researchers in each of 12 countries spread across Europe using a standard questionnaire.

A survey at this time was deemed ideal given both that the lockdowns and restrictions were implemented very rapidly during March 2020, thus capturing the real time effects of the shock, and because respondents were more likely to remember their very recent food behaviour before the pandemic and make realistic comparisons with their actual behaviour during the pandemic. Rather than attempting to elicit data on difficult to assess absolute levels of food behaviour, the purpose was to capture the

Country	Sampling method	N
Czechia	Combined (representative quotas & convenience)	805
Denmark	Representative quotas	1281
France	Representative quotas	644
Germany	Representative quotas	1020
Greece	Convenience	539
Hungary	Convenience	720
Ireland	Convenience	595
Italy	Convenience	538
Netherlands	Convenience	122
Serbia	Convenience	107
Slovenia	Representative quotas	683
United Kingdom	Convenience	314
Total		7368

Table 1.
Sample of 12 European countries.

relative changes in household behaviour during COVID-19 compared to before the pandemic concerning food provision, preparation and consumption, as well as experiences of pandemic-related illness, regulations and closures. Ancillary information was also collected on household socio-demographics and household location.

Two approaches were used in sampling respondents: market research agency designed quotas using representative gender, age, education and regional distributions; and convenience sampling through social media targeted by the national researchers at all the main population groups in all parts of the country. The potential limitations of this mixed strategy was made necessary because the network of national researchers needed to be established rapidly as the first wave struck, so not all of them were able to quickly secure sufficient funding for representative sampling and data collection by market research agencies. In some countries, such agencies were hired but funding was restricted so the quota sampling and data collection were accompanied by convenience self-selection of respondents to boost the sample. However, most other surveys taken at this time were based only on convenience samples with data analysed at country level so that sample sizes were relatively small. In contrast, this survey's data analysis takes place at the European rather than the national scale thereby ensuring that each variable has relatively large samples with adequate variance so that any bias is kept to a minimum and can justify significant statistical analysis.

In Section 3 of this chapter, some relevant findings arising from a new analysis of the survey data is presented: pandemic-induced changes in food consumption, how food is obtained and prepared, food vulnerability in terms of the use of free food sources and food stress related to anxiety, missed meals and stocking-up food. For each of these topics, the influence of, first, socio-demographic and, second, geographic variables is explored as possible predictors of the food behaviour changes seen. How these variables are defined and constructed is summarised in sub-sections 2.2 and 2.3 below.

2.2 Socio-demographic analysis

Drawing on [15], three of the four most consistently powerful predictors of food behaviour change are the following three socio-demographic variables:

- Household composition, three internationally comparable composite categories derived from the standard Eurostat household composition definitions [16]:
    - households with children aged 0–19
    - single person households
    - households with 2 or more adults and no children.
- The highest education level of any household member, three internationally comparable composite categories derived from the International Standard Classification of Education (ISCED) [17] which is also used by Eurostat:
    - lower secondary: the first stage of secondary education building on primary education and marking the end of compulsory education in Europe

- upper secondary: the second/final stage of secondary education preparing for tertiary education and/or providing skills relevant to employment
- university: tertiary degree-level education

- Income change during COVID-19, two categories derived from the survey questionnaire:
  - Income loss during the pandemic compared to before the pandemic
  - No-income-loss during the pandemic compared to before the pandemic.

2.3 Geographical analysis

The fourth most powerful predictor of food behaviour change is the geographic location of the household measured along two spatial scales. First, sub-national regional differences adapted from ref. [12], and second differences between groups of countries in terms of their national consumption levels adapted from ref. [15].

The sub-national regional differentiation is shown in **Table 2** based on respondents' postcodes taken from the survey questionnaire, and then converted to specific European NUTS-3 regions using conversion data provided by Eurostat [19].

Table 3 shows the percentage of households in each socio-demographic category across the six regional types. For the categories in household composition and educational level this shows that the overall sample is somewhat skewed towards households with two or more adults with no children and with higher levels of education, as is typically the case with such surveys despite some representative sampling. However, as described above, we are not comparing the proportions of socio-demographic categories or of regional types with each other. Instead, the analysis examines the changes in food behaviour within each socio-demographic category and within each regional type, the samples of which are relatively large with adequate variance at European level to justify significant statistical analysis.

Region type	Regional type (as defined by ref. [18])
Metropolitan hierarchy	*Capital city metros*: NUTS level 3 regions where at least 50% of the population live in functional urban areas of at least 250,000 inhabitants.
	Second tier metros: the largest cities in the country excluding the capital.
	Smaller metros: fixed population threshold could not distinguish between second tier and smaller metros (as each country is different), so a natural break in metro population sizes is used in each country.
Urban-rural continuum	*Predominantly urban regions* (NUTS level 3 regions where at least 80% of the population live in urban clusters)
	Intermediate regions (NUTS level 3 regions where between 50 and 80% of the population live in urban clusters)
	Predominantly rural regions (NUTS level 3 regions where at least 50% of the population live in rural grid cells)

Note that the metropolitan hierarchy is a sub-set of the urban-rural continuum which includes all regions.

Table 2.
Regional typologies.

		Capital city (%)	2nd tier metro (%)	Smaller metro (%)	Urban (%)	Inter-mediate (%)	Rural (%)
Household composition	With children	16.9	22.3	27.1	20.5	22.6	25.5
	Single person	23.5	24.5	26.8	24.4	23.1	19.8
	2+ adults	59.7	53.2	46.1	55.1	54.3	54.6
Highest educational level in household	Lower secondary	6.8	8.4	6.4	5.3	8.6	9.0
	Higher secondary	32.9	46.7	37.2	33.8	46.8	46.0
	University	60.3	44.9	56.1	60.9	44.4	45.0
Income change during COVID	Income-loss	41.6	37.6	30.9	41.5	34.1	40.7
	No-income-loss	58.4	62.4	69.1	58.5	65.9	59.3

Data show the percentage of households in each socio-demographic category across the six regional types. All data are statistically significant at the $P < 0.05$ level.

Table 3.
The geography of socio-demographics.

Table 3 shows distinctive socio-demographic differences between the regions, demonstrating a clear spatial sorting of household types within our sample which aligns well with data from ref. [20] some of which are included in the following summary (ignoring the 'urban' type as an approximate average of all metros):

- Capital city metros have the lowest presence of children and the highest educational levels coupled with the largest proportion of income-loss households. They have the highest population densities and the highest mean incomes as part of their still dynamic though more recent slowing economies. They exhibit great socio-demographic heterogeneity with large differences manifesting in an uneven mix of both financially-stretched and very wealthy households.

- Second-tier metros compared with the other metros show the lowest educational levels, an average proportion of income-loss households but the lowest mean incomes. Many are former industrial areas that have been left behind economically with relatively high levels of unemployment, poverty and social exclusion.

- Smaller metros have the next highest educational levels after capitals, the highest presence of families with children and the lowest overall proportion of income-loss households. Generally, they exhibit very robust growing economies with the next highest income levels after capitals and show relatively high socio-demographic homogeneity with low levels of exclusion and poverty.

- Intermediate and rural regions have the lowest educational levels together with second tier metros, the next highest proportion of income loss households just after capitals, and overall the lowest population densities and mean incomes. Together they tend to be characterised by narrow labour market opportunities and poor access to a wide range of services.

The second spatial scale is at the national level and compares two groups of European countries based on their national Actual Individual Consumption (AIC)

Country	Actual Individual Consumption per head in PPPs ($)	Allocation to AIC group	Mean (SD) AIC per head in PPPs ($)
Germany	36,509	High	32, 843 (2871)
Denmark	34,601		
Netherlands	34,103		
United Kingdom	33,866		
France	29,545		
Ireland	28,435		
Italy	25,935	Low	22,376 (3764)
Czechia	25,377		
Slovenia	24,608		
Greece	23,129		
Hungary	20,075		
Serbia	15,132		

Notes: The mean AIC in each group is calculated by weighting each country's contribution to the total by its 2020 population; SD = standard deviation. (For source of data see ref. [21] and, although new calculations have been made to take account of the specific countries used in this chapter and the creation of different groups, for full details of how countries are allocated to groups see ref. [15]).

Table 4.
The two AIC country groups.

using Purchasing Power Parity (PPP) at standardized current prices ($) [21] (see **Table 4**). AIC is the sum of the total value of all household final consumption expenditure and is arguably more relevant to food consumption than per capita income or GDP data [15].

3. Findings

3.1 The socio-demographics of food behaviour change

3.1.1 Food consumption changes

Table 5 presents data on changes in four categories of food consumption:

- Fresh everyday food: fruit, vegetables, bread and dairy products
- Fresh meat and fish
- Processed food: frozen and canned food, ready-made meals
- Comfort food: cake, biscuits, sweets, chocolate and alcohol.

Table 5 reveals dramatic changes in the types of food consumed during the pandemic. All components of fresh food declined, whilst processed food increased in most

Food consumption change		Fresh every-day food (%)	Fresh meat & fish (%)	Processed food (%)	Comfort food (%)
Household composition	With children	−7.1	−8.5[X]	−1.8	10.4
	Single person	−4.6	−7.3[X]	2.3	5.8
	2+ adults	−4.8	−7.4[X]	0.9	6.8
Highest educational level in household	Lower secondary	−5.8	−7.4	−2.3	2.5
	Higher secondary	−4.5	−7.2	−0.1	5.0
	University	−3.7	−5.3	2.0	9.2
Income change during COVID	Income-loss	−7.7	−11.7	2.7	7.8
	No-income-loss	−4.7	−7.1	0.6	5.7

Data show the net percentage of households which increased/decreased their consumption from before to during COVID-19. All data are statistically significant at the $P < 0.05$ level except when marked with [X].

Table 5.
The socio-demographics of food consumption change.

household types, and comfort foods increased dramatically in all. This was probably due to greater opportunities for snacking at home during lockdowns as well as helping to reduce stress. The reduction in fresh food is also likely to be related to supply constraints during COVID-19, given their much shorter shelf lives compared to most non-fresh foods in the context of fewer opportunities to shop. This is also at a time when most households actually increased their overall food intake and the money they spent on food [12].

However, **Table 5** also shows significant differences in household types. Those with children reduced both fresh and processed food intake whilst increasing comfort food consumption more than other households. The presence of children probably boosted the consumption of sweet foods. Households with children also tend to be the largest households with the greatest range of food tastes and needs, so are likely to be the most sensitive to food system shocks. In terms of education, lower secondary level households saw the largest reductions in both fresh and processed foods, as well as the smallest increase in comfort food. Clearly education in this context reflects income levels where saving money during COVID-19 is the priority in terms of the types of food consumed.

Households that lost income during the pandemic, due to losing their job, being laid-off or reduced work activity, changed all types of food consumed much more than no-income-loss households. This study found a significant positive correlation between whether or not households lost income and the PPP per inhabitant of the region in which they live. Thus, it is likely that many income-loss households were also relatively weak financially before COVID-19, which then increased this vulnerability even more. In general, it seems that such households are more sensitive to a shock like COVID-19, and thus need to adapt and change more, whilst non-income-loss households are likely to have much greater resilience to shock with a correspondingly reduced need to change behaviour.

3.1.2 How food is obtained

Table 6 provides data on some aspects of the way households changed how they obtained food from before to during COVID-19. Overall, there was a significant move

Food behaviour change: how obtain food		Local producers (more-less) (%)	Travel distance to shops (more-less) (%)	Home delivery (before-during) (%)
Household composition	With children	11.7	−20.5	11.9
	Single person	−2.4	−14.0	10.3
	2+ adults	0.1	−10.3	12.2
Highest educational level in household	Lower secondary	−3.6	−9.4	5.0
	Higher secondary	4.7	−8.8	7.2
	University	6.9	−17.9	17.0
Income change during COVID	Income-loss	4.0	-16.7^{X}	13.5
	No-income-loss	0.2	-16.1^{X}	7.7

Data show the net percentage of households which increased/decreased their behaviour from before to during COVID-19. All data are statistically significant at the $P < 0.05$ level except when marked with ^{X}.

Table 6.
The socio-demographics of food behaviour change: How obtain food.

to buying from shops that sold locally produced food, such as farmers' markets, cooperative producers and traditional outlets that also sell local food. This is probably due to the increased interest in food, how it is produced and its quality, during COVID-19, coupled with enhanced awareness of health and of how this links to food (see Sections 3.1.4 and 3.1.5). The two exceptions are single persons who tend to be younger and less concerned with health, and the least educated households which may not have the same level of health and food awareness. It is also noteworthy that households with children and with a university education are most likely to switch to local producers during the pandemic. Similarly with income-loss households although here it is perhaps related to their need to adapt most during a shock (as above), and that their appreciation of food increased at this time more than no-income-loss households in a context where the latter were likely already to have a high appreciation so their measured increase would be less (see Section 3.1.4).

Changes in travel distance to shops show a steep reduction in all household types, as would be expected during the lockdowns, closures and restrictions on people's physical movement and social mixing, and perhaps also reflects the move to buying from local producers. The use of more local shops was greatest amongst households with children, which were more likely to need to work from home during COVID-19 when schools were closed, and those with a university education, which were more likely to be able and willing to engage in hybrid work between locations to the extent permitted by regulations. Interestingly, there is no difference related to income change, perhaps because in the context of the pandemic and its restrictions, financial status has little relevance for travel distance to shops.

The home delivery of food, ordered online or by phone during COVID-19, has increased across all types of household. Although differences are not great, those most likely to be at home most of the time during the pandemic (those with children who were not able to attend school, and with two or more adults who are more likely to be much older and retired) used home delivery more than single households which tend to be by far the youngest and mobile. This probably also applies to households that lost income, typically because they lost their job or were put on furlough during lockdown, so were more often at home most of their time. There is also a very clear tendency for

households with a higher level of education to order home delivery, perhaps because (as above) these tend to be able and willing to engage in hybrid work between locations to the extent permitted by regulations.

3.1.3 Food handling and quality

Aspects of food handling and quality are examined in **Table 7**. Apart from a small decrease in using unpackaged foods by households with a lower secondary education, there was a strong switch to this type of food handling during COVID-19. This is loose food for which customers provide their own bag or which is provided separately by the shop. It mainly relates to fresh everyday food, though some shops sharply increased providing other foodstuffs in bulk for customers to bag themselves during the pandemic, such as rice, pasta, cereals and even drinks. Apart from clear environmental benefits with less packaging, the advantage for the customer is the ability to much better check the quality of individual food items and to precisely calibrate the amount of food they need or can afford. This also relates to heightened health concerns during the pandemic as well as to increased interest in food generally (see Section 3.1.4).

Despite this greater interest in health and its relationship with food during COVID-19, there was a general decrease in the consumption of organic food. However, many of the comments made by survey respondents referred to reduced availability due to supply chain issues and related price increases. Interestingly, the only exceptions were households with children, where parents are likely to have even greater health concerns, as well as in households with higher educational levels, where it is likely health and food awareness is greater and that incomes are higher. This perhaps also explains why income-loss households had the greatest decrease in organic food consumption across all types of household.

Dramatic reductions in food waste were seen across all types of household, most tellingly in households with children and with higher education levels. Here, it is probable there was heightened awareness about the environmental and health problems caused by food waste, as well as more motivation not to throw good food away

Food behaviour change: Food handling and quality		**Unpackaged food (more-less) (%)**	**Organic (more-less) (%)**	**Food waste (more-less) (%)**
Household composition	With children	18.0	1.3	−29.8
	Single person	6.3	−4.2	−23.5
	2+ adults	8.3	−3.3	−22.3
Highest educational level in household	Lower secondary	−2.0	−4.8	−19.2
	Higher secondary	5.5	3.2	−22.1
	University	19.0	2.2	−26.0
Income change during COVID	Income-loss	13.0	−5.0	−30.3
	No-income-loss	2.4	−3.0	−21.8

Data show the net percentage of households which increased/decreased their behaviour from before to during COVID-19. All data are statistically significant at the $P < 0.05$ level.

Table 7.
The socio-demographics of food behaviour change: Food handling and quality.

for both economic and ethical reasons. The fact that income-loss households had the greatest reduction in food waste of all household types is likely to relate to their greater financial concerns given that wasted food is also wasted money.

3.1.4 Food preparation and importance

Table 8 shows various aspects of the preparation of food revealing dramatic increases across almost all types of household in meal planning and in the range of food types, ingredients and recipes used in preparing meals. This is also directly reflected in the steep rise of households' understanding of the importance of food.

As would be expected given their generally greater sensitivity to food and health, households with children show the largest increases of any household type across all these variables. When looking at educational level, the higher this is the greater is the interest in food preparation and importance. It may also be relevant to note that households on the lowest level were the only household type that marginally lost interest in any of these issues. The fact that income-loss households increased interest in food preparation and importance more than no-income-loss households probably reflects their greater food sensitivity and more free time due to the increased chance they were confined at home during COVID-19. This must be seen in a context where no-income-lost households already had relatively high food awareness and interest before the pandemic, so the change these households report is not so great.

3.1.5 Food vulnerability

The pandemic led to different types of food vulnerability, and/or exposed pre-existing food challenges, as depicted in **Table 9**. In terms of household composition, the use of free food from food banks or elsewhere is greatest by households with two or more adults which, as noted above, tend to be the oldest and least financially well-off. Households with children were more likely to grow their own food, perhaps due to their need to feed a larger family and activate children not able to attend school.

Food behaviour change: food preparation and importance		Plan meals (more-less) (%)	Range of food types (more-less) (%)	Recipes & ingredients (more-less) (%)	Overall food importance (more-less) (%)
Household composition	With children	50.8	23.6	47.4	44.7
	Single person	32.3	3.5	21.2	27.4
	2+ adults	40.1	9.5	29.4	28.9
Highest educational level in household	Lower secondary	24.3	−1.5	4.1	10.5
	Higher secondary	36.5	11.4	17.7	24.7
	University	49.4	17.6	40.9	43.6
Income change during COVID	Income-loss	50.4	16.0	42.2	40.3
	No-income-loss	36.3	7.4	23.9	22.3

Data show the net percentage of households which increased/decreased their behaviour from before to during COVID-19. All data are statistically significant at the $P < 0.05$ level.

Table 8.
The socio-demographics of food behaviour changes: Food preparation and importance.

Food vulnerability		Often use food banks (during) (%)	Once week or more free meals (during) (%)	Often grow own food (during) (%)	High COVID risk anxiety (during) (%)
Household composition	With children	1.6	0.8	21.6	27.2
	Single person	1.9	0.7	9.5	19.3
	2+ adults	2.9	1.3	16.7	24.7
Highest educational level in household	Lower secondary	6.4	2.9	10.0	23.6[X]
	Higher secondary	6.3	2.1	17.5	27.3[X]
	University	2.5	0.9	16.1	25.9[X]
Income change during COVID	Income-loss	2.0	1.0	23.5	30.1
	No-income-loss	1.2	0.4	12.3	21.4

Data show the percentage of households experiencing food vulnerability during COVID-19. All data are statistically significant at the $P < 0.05$ level except when marked with [X].

Table 9.
The socio-demographics of food vulnerability.

In **Table 9**, note, that the rates of both free food use and growing own food, although greater during the first wave of COVID-19, when this survey was undertaken, by respectively 27% and 12% compared to before the pandemic, also grew substantially after the first wave. On average, European food banks redistributed 68% more food in the whole of 2020 than in 2019 [13].

Educational level also seems to be related to the use of free food with the lowest level having the highest usage, although they grew their own food less. There are clear differences between households that lost income during the pandemic and those that did not, with the former much more likely to use free food and grow own food, almost certainly due to their greater financial vulnerability.

In the context of food vulnerability, it is useful to look at households' COVID anxiety, i.e. whether any household member felt anxious about infection. **Table 9** shows that both households with children and those with two or more adults, typically those with respectively much younger and much older people, had the greatest anxiety. No clear pattern is visible in terms of education but one can be seen in households' income change with those that lost income having significantly more levels of COVID anxiety than those that did not.

3.1.6 Food stress

Table 10 provides data on food stress and shows that, like food vulnerability and for probably similar reasons, both households with children and with two or more adults had the greatest anxiety regarding acquiring food during COVID-19. These were also the households that stocked-up most and had greater special dietary needs, both of which are more likely as there are more persons than in single households.

In terms of education, and although the data for anxiety about acquiring food is inconclusive, a similar pattern of more missed meals at lower levels with fewer at higher levels is very clear. The data also show that food stocking-up increases with higher educational levels, which perhaps reflects the ability to do so related to typically larger incomes and more opportunity. Special dietary needs also increase with

Food stress		Some anxiety acquiring food (during) (%)	Some meals missed (during) (%)	Stock-up on food (during) (%)	Special dietary needs (during) (%)
Household composition	With children	24.7	7.0	43.7	18.1
	Single person	18.5	9.9	30.7	14.6
	2+ adults	23.6	11.6	33.8	19.0
Highest educational level in household	Lower secondary	20.2[X]	13.9	16.7	12.8
	Higher secondary	22.3[X]	10.4	30.0	18.1
	University	22.3[X]	8.5	42.4	19.4
Income change during COVID	Income-loss	29.7	12.4	46.7	23.2
	No-income-loss	16.5	6.9	26.7	13.0

Data show the percentage of households experiencing food stress during COVID-19. All data are statistically significant at the $P < 0.05$ level except when marked with [X].

Table 10.
The socio-demographics of food stress.

educational level which is more difficult to explain, but may be related to greater health and food awareness in households with more education and thus increased likelihood that diet is prioritized. Cutting across this latter point are the data for income change that consistently show the almost doubling of each stress variable amongst income-lost households. This is almost certainly related to these households' sudden reduction of financial stability regardless of their income, education and household type prior to the pandemic.

3.2 The geography of food behaviour change

3.2.1 Food consumption changes

Table 11 shows how food consumption changed during COVID-19 across the regions defined in Section 2.3. All regions saw large decreases in fresh food, but with significantly lower decreases in capitals amongst the metros and in urban regions generally for fresh meat and fish, probably due to the relatively better logistics and supply infrastructures there. Processed and comfort food consumption also increased more in urban regions due to their better logistics and higher incomes, whilst processed foods actually slightly reduced in rural regions. Examining the metro hierarchy shows that capitals changed the types of food consumed significantly less than other metros, almost certainly due to their better food supply logistics. Capitals also have the highest mean incomes than other regions so their purchasing power is higher. However, this is not reflected in differences between urban and rural areas which are more mixed, with the latter reducing fresh everyday foods less than the former perhaps related to better in-situ supply, whilst reducing fresh meat and fish more maybe because supplies tend to rely on longer supply chains.

The geography of consumption change is also distinctive when looking at the national level using AIC data. The Low group of countries with the lowest consumption expenditure decreased all food types during COVID-19, with the marginal exception of only a very small increase in comfort food, probably indicating their

Food consumption change: before-during		Fresh everyday food (%)	Fresh meat & fish (%)	Processed food (%)	Comfort food (%)
Regional geography: metro hierarchy	Capital metro	−4.4	−4.7	1.0	6.9
	2nd tier metro	−6.6	−8.9	2.0	7.4
	Smaller metro	−5.3	−10.8	2.7	7.8
Regional geography: urban-rural continuum	Urban	−5.5	−6.3	2.9	7.1
	Intermediate	−5.0	−8.1	0.4	6.8
	Rural	−4.7	−7.4	−0.9	6.3
National geography: Actual Individual Consumption (AIC)	Low	−9.1	−18.7	−3.0	0.5
	High	−8.3	−15.2	7.3	13.5

Data show the net percentage of households which increased/decreased their consumption from before to during COVID-19. All data are statistically significant at the $P < 0.05$ level.

Table 11.
The geography of food consumption change.

greater financial strain. In contrast the High group experienced lower fresh food decreases and much higher processed and comfort food increases, indicating their relative financial resilience. This supports the view that national AIC does seem to impact important aspects of an individual household's financial situation and that the High group is more financially resilient, less subject to stress and thereby also more able to withstand the food shock of COVID-19.

3.2.2 How food is obtained

Examining aspects of how households changed their acquisition of food during COVID-19 in **Table 12** also shows important differences between the regional types but, unlike with food consumption, reveals important and significant contrasts between the three metros that reflect the characteristics presented in Section 2.3. Capitals and smaller metros, as relatively wealthy regions, both increase their move to local producers whilst second-tier metros, typically as relatively more socio-economically challenged, slightly decrease this behaviour. This is only one aspect that both reflects capitals' economic predominance as well as the increasing population and economic growth of the smaller metros, mainly at the expense of the second-tier metros and rural regions, which is also seen in many of the data presented below. (See also Section 4.2) A similar distinction amongst the metros is also seen in the increase in home delivery ordered online or by phone, whereas here this is likely to be related more to the state of the market in terms of the density of suitable shops. There are, however, no significant differences in travel distance to shops probably because this variable is likely to be directly dependent on the status of movement restrictions in different areas rather than geo-demographic factors.

Looking at the urban-rural continuum also shows a stronger move to local producers and to home delivery in urban regions, given their greater wealth and higher population densities providing better market opportunities for these outlets. Again, the reduced distance to shops is hardly significant due both to local movement regulations and the existing spacing of shops. In terms of national AIC differences, similar

Food behaviour change: how obtain food		Local producers (more-less) (%)	Travel distance to shops (more-less) (%)	Home delivery (during-before) (%)
Regional geography: metro hierarchy	Capital metro	1.4	−5.8	15.0
	2nd tier metro	−0.1	−11.4	9.1
	Smaller metro	6.9	−23.7	10.8
Regional geography: urban-rural continuum	Urban	3.0	−11.2[X]	15.9
	Intermediate	2.2	−11.9[X]	8.4
	Rural	1.3	−11.5[X]	8.2
National geography: Actual Individual Consumption (AIC)	Low	2.7	−18.2[X]	20.3
	High	11.5	−16.7[X]	10.8

Data show the net percentage of households which increased/decreased their behaviour from before to during COVID-19. All data are statistically significant at the $P < 0.05$ level except when marked with [X].

Table 12.
The geography of food behaviour change: How obtain food.

conclusions can be drawn from the much greater move to local producers by the High group but much less use of home delivery. The latter is difficult to explain but is perhaps related to the much stricter lockdown and closure rules in the Low AIC group, that mainly consists of the more southern and eastern European countries, during the first wave thereby increasing the need for home delivery.

3.2.3 Food handling and quality

As shown in **Table 13** there was a strong move to unpackaged food in all regions, again in capitals and smaller metros much more than second-tier metros and in urban more than rural regions, probably linked to the patterns of increased interest in health and food shown in **Table 14**.

Comparing the two AIC groups, the countries in the Low AIC group made a much bigger switch to unpackaged food than the High group, perhaps as a form of catch-up but also, as with the income-loss households in **Table 7**, a great increase in health-food awareness. Regarding the overall decrease in the purchase of organic food, capitals and High AIC countries do best, probably mainly due to more acute supply and price issues elsewhere.

In terms of the dramatic decrease in food waste in all regions and countries, the likely reasons for which are explained in Section 3.1.3, smaller metros stand out. As described in Section 3.2.2, this is the regional type with, overall, relatively high wealth coupled with the most cohesive socio-demographic which is also growing relatively fast in both population and economic terms. These characteristics lend themselves to high awareness of both health and food, as well as the links between them, and this is reflected in many of the food behaviour changes during COVID-19. Where there are exceptions (such as organic food) there are likely to be very specific reasons. Capital city regions, of course, have many households that fit this description, but most capitals tend to house significant low-wage as well as high-wage sectors, so are much more diverse and often less cohesive, unlike the smaller metros.

Food behaviour change: food handling and quality		Unpackaged food (more-less) (%)	Organic (more-less) (%)	Food waste (more-less) (%)
Regional geography: metro hierarchy	Capital metro	12.1	4.9	−21.9
	2nd tier metro	6.4	−3.0	−22.3
	Smaller metro	14.2	−8.2	−30.0
Regional geography: urban-rural continuum	Urban	13.9	0.1[X]	−23.6[X]
	Intermediate	6.2	−1.4[X]	−24.9[X]
	Rural	8.7	0.1[X]	−23.7[X]
National geography: Actual Individual Consumption (AIC)	Low	27.0	−3.1	−24.4
	High	13.9	−0.2	−28.0

Data show the net percentage of households which increased/decreased their behaviour from before to during COVID-19. All data are statistically significant at the P < 0.05 level except when marked with [X].

Table 13.
The geography of food behaviour change: Food handling and quality.

Looking at food waste reduction in the two country AIC groups, the High group is a little ahead of the Low group, perhaps because the countries in this group overall had slightly greater awareness of the problem.

3.2.4 Food preparation and importance

There were also huge increases in households' engagement in, and the awareness and thus assessment of, the importance of food in all regions and countries during COVID-19, as shown in **Table 14**. Both capitals and the smaller metros again have significantly greater positive changes than the second-tier, with smaller metros markedly ahead of capitals in terms of new recipes and ingredients and overall food

Food behaviour change: food preparation and importance		Plan meals (more-less) (%)	Range of food types (more-less) (%)	Recipes & ingredients (more-less) (%)	Overall food importance (more-less) (%)
Regional geography: metro hierarchy	Capital metro	41.3	11.7	28.1	32.8
	2nd tier metro	38.5	9.4	26.3	29.6
	Smaller metro	39.0	10.4	35.7	35.9
Regional geography: urban-rural continuum	Urban	42.0	12.3	34.2	35.8
	Intermediate	36.2	7.5	22.1	27.1
	Rural	42.8	13.9	23.9	31.3
National geography: Actual Individual Consumption (AIC)	Low	46.7	21.8	40.0	39.2[X]
	High	40.3	11.5	33.8	38.1[X]

Data show the net percentage of households which increased/decreased their behaviour from before to during COVID-19. All data are statistically significant at the P < 0.05 level except when marked with [X].

Table 14.
The geography of food behaviour change: Food preparation and importance.

importance, almost certainly for similar reasons as in Section 3.2.3. Along the urban-rural continuum it difficult to see any real pattern in changes in meal planning and the types of food used, perhaps because these aspects are likely to be less dependent on market dynamics. However, clear differences between urban and rural regions emerge again in terms of new recipes and ingredients and overall food importance. Perhaps here market dynamics play a bigger role through higher densities of supply and demand leading to greater diversity of ingredients and recipes, in turn promoting increased interest in food.

Looking at the two AIC country groups, the Low group has consistently greater changes than the High group. This is almost certainly for reasons similar as for the two income change groups in Section 3.1.4, i.e. their greater sensitivity to food during a shock related to their smaller available consumption income. However, it is clear that both groups significantly increased across all variables and it is noteworthy that the difference in their assessment of food importance is not significant.

3.2.5 Food vulnerability

Table 15 shows data that, in many ways, rests on similar explanations as in **Table 9**, but this time in terms of geography rather than only socio-demographics given that these two factors are clearly related.

In **Table 15**, the use of free food is lowest in the smaller metros as the most cohesive socio-demographic regional type. As seen in Section 2.3, both capitals and second-tier metros have many more low-wage jobs as well as pockets of poverty. In contrast the smaller metros have a higher incidence of growing own food, perhaps related to their greater physical space due to lower population densities amongst the metros and the likelihood of more modern town planning. Some similar reasons seem to apply along the urban-rural continuum. Rural areas often tend to have lower incomes and greater poverty, although this is only seen in terms of food banks rather than free meals, perhaps because the logistics for the latter are more demanding than for the former. In the case of growing own food, however, rural areas saw much

Food vulnerability		Often use food banks (during) (%)	Once week or more free meals (during) (%)	Often grow own food (during) (%)	High COVID risk anxiety (during) (%)
Regional geography: metro hierarchy	Capital metro	3.4	2.3	9.7	26.0
	2nd tier metro	2.4	1.7	13.3	22.0
	Smaller metro	1.9	1.2	15.1	23.6
Regional geography: urban-rural continuum	Urban	2.3	1.8	10.7	26.8
	Intermediate	3.9	2.1	17.3	22.0
	Rural	5.7	1.0	22.7	24.9
National geography: Actual Individual Consumption (AIC)	Low	7.0	2.1	34.6	15.2[X]
	High	1.4	1.1	23.7	14.9[X]

Data show the percentage of households experiencing food vulnerability during COVID-19. All data are statistically significant at the $P < 0.05$ level except when marked with [X].

Table 15.
The geography of food vulnerability.

greater increases than the other regions, given the substantially greater opportunities in these areas.

Similar explanations are likely for the differences between the two AIC groups in relation to free food and growing own food. The Low group has much less consumption income, it has been impacted more by the COVID-19 shock, and there is often more physical space for food growing in these countries. It is of interest that there are only small significant geographic distinctions in COVID-anxiety, maybe because this tends to be engendered by the media more than actual infections which have been higher in regions of greater population density. However, capitals, urban regions and Low AIC countries score a little higher than the other regions. This is almost certainly due to the impact greater population densities have in the two former regional types as well as the overall higher likelihood of contracting COVID-19 in the Low AIC countries during the first wave [22].

3.2.6 Food stress

Again, in some reflection of Section 3.1.6 and well as food vulnerability above, the geographic expressions of food stress in **Table 16** show some similar patterns. Despite logistics ensuring more stable food supplies, anxiety acquiring food and the incidence of missed meals seems to be greatest in capitals and urban regions generally, although in the latter it is only marginally significant. It is also in these regions that other data from the survey show there are more income-loss households than average, thus adding a financial element to this anxiety. This is probably also related to the actual incidence of COVID-19 infection which is higher in more densely populated areas and reflects the COVID-19 risk anxiety in **Table 15**.

In terms of stocking-up food, a similar pattern is seen, although there is no apparent difference between capitals and smaller metros, probably because households in the latter have equally sufficient financial resources and food awareness as the former. The increase in special dietary needs up the metro hierarchy is, however, more difficult to explain though may again reflect the greater incidence of COVID-19

Food stress		Some anxiety acquiring food (during) (%)	Some missed meals (during) (%)	Stock-up on food (during) (%)	Special dietary needs (%)
Regional geography: metro hierarchy	Capital metro	24.2	14.5	36.2	19.8
	2nd tier metro	22.6	8.3	30.6	16.3
	Smaller metro	20.7	5.7	36.2	15.1
Regional geography: urban-rural continuum	Urban	23.6	11.4	39.5	18.4^{X}
	Intermediate	22.1	8.9	30.0	18.2^{X}
	Rural	22.2	10.8	35.1	19.6^{X}
National geography: Actual Individual Consumption (AIC)	Low	30	14.5	46.1	20.8
	High	21.1	5.1	35.0	17.2

Data show the percentage of households experiencing food stress during COVID-19. All data are statistically significant at the $P < 0.05$ level except when marked with ^{X}.

Table 16.
The geography of food stress.

infections. Examining the data for the two AIC groups shows very significant differences across all variables and is again probably related to differences in their expenditure incomes and higher rates of COVID-19 infection during the first wave [22].

4. Discussion

Food is arguably our most vital strategic commodity. It is central to our existence, not just for sustenance and survival but as a huge contributor to our cultural, social and economic lives. The food industry also has huge environmental impacts. So, when food systems and patterns of food preparation, consumption and diet are disrupted by large scale social and economic shocks like the financial crisis, COVID-19 and the war in Ukraine, this is of utmost importance. This research shows that the majority of European households significantly changed important aspects of their food behaviour, many of which are likely to persist into the future. It is also clear that, although this chapter has taken food consumption as its example, the lessons are likely to apply to most, if not all, types of consumption in the age of disruption.

This chapter clearly shows that the food system is multidimensional, that both socio-demographic determinants and geography strongly affect both food behaviours and changes in food behaviours, and that there is a highly significant alignment and interaction between geography and society. It has confirmed that the most important predictors of food behaviour change during a significant disruption are household composition, education, income and geography, and that these are closely inter-dependent. In times of food system disruption during a crisis, both socio-demographics and geography are increasingly transforming the market system heretofore based on large centralized organizations, long supply chains and ever-increasing globalization.

4.1 Socio-demographics

There are very many highly significant differences in changes to food consumption during COVID-19 between different types of household, especially in terms of household composition, educational level achieved and income change. Households with children tend to be the largest households with the greatest range of food tastes and needs, so are likely to be the most sensitive to food system shocks. They have typically changed their food behaviour much more than other households. Their size often means tighter budgets and this shows in their relatively large reduction of fresh food but also largest increase in comfort food consumption, no doubt because of their children's demand for sugary foods whilst stuck at home during school shutdowns. Household with two or more adults were also relatively responsive to the shock, although these households tend to consist of much older, often retired, people many of whom are living on small incomes and are very concerned about their health and, especially since COVID-19, about the impact of food on this. Both households with children and with two or more adults also generally suffer much more than single households from food vulnerability and stress and this was magnified if the household lost income during the pandemic.

Somewhat similar patterns are seen in relation to the educational level of the household, so that the higher levels are the most resilient and least likely to change their food behaviours during the pandemic. The less educated the household, the more

likely it is to decrease fresh food consumption and increase processed food consumption, although the university educated households did increase their consumption of comfort food more, probably because of their typically higher incomes and access to shops. The less educated households also switched less to local producers, used home delivery, unpackaged and organic food much less and engaged less often in enhanced food preparation behaviours, as well as decreasing their food waste the least. It seems likely that awareness of the links between food and health were less clear to these households, a supposition reinforced by their much lower increase in evaluating the overall importance of food. These households were also more likely to revert to foodbanks during the pandemic as well as obtain free food from other sources, a situation reinforced by the fact that many more of their households lost income during the pandemic.

Households' income change is a good surrogate for household income which, in turn, is significantly correlated with Actual Individual Consumption (AIC) data even though this is generalised to the national level. The results presented above clearly show that households losing income during Covid-19 were likely to be fragile even before the pandemic which then made their situation worse. They nearly always experienced food behaviour changes arising from Covid-19 much more than no-income-loss households. Interestingly, the proportion of such households is also significantly lower in the smaller metros than in other regional types.

Overall, there are often quite stark food behaviour inequalities between household types. These show up, for example, in a significant trend to less healthy eating during the pandemic away from fresh food to more processed and sugary foods and alcohol, especially amongst households with children and income-loss households whose vulnerability has been further exposed. These differences existed before COVID-19, but the system shock has further exacerbated them. On the positive side, however, the pandemic has also dramatically accelerated the previous slow trend towards more local and seasonal food delivered along short supply chains, a move to smaller independent retail outlets, and much greater food awareness and interest in trying new types of food and recipes.

4.2 Geography and hybrid work

There is a strong tendency for more or less regular changes in food behaviour outwards from a country's capital city center to its rural periphery, i.e. down the metropolitan hierarchy and along the urban-rural continuum. These changes are directly related to decreasing population density and of economic activities which symbiotically both attracts and is dependent upon each region's distinctive socio-demographic characteristics. However, there is also an important counter trend with some movement of population out of both the largest, typically capital, metropolitan areas and from the so-called second-tier, typically older industrial, metro cities towards smaller metros in or beyond the suburbs and in peri-urban and adjacent rural areas. These smaller metros are also growing in size, also fed by some rural depopulation as more desirable destinations than the larger metros with their higher rents and living expenses.

This is a spatial dynamic, long recognized by geographers (for example refs. [23, 24]), as the current counter-urbanization phase of urban development in more economically developed countries. It has been ongoing since the 1990s and has been given added impetus by the disruptions of the early twenty-first century. For example, in Denmark there is an ongoing movement of population out of the five largest

Danish Cities, including Copenhagen, to fast-growing smaller provincial cities in their hinterlands as part of a development that is likely to continue to 2040 and beyond, also propelled by movements from rural areas [25]. This trend towards the growth of smaller metros has been ongoing for about 30 years but has now been sharply intensified by the accelerated adoption of digital technology during the pandemic. This is dramatically increasing online shopping, working from home and hybrid work in general, as well as online gatherings rather than meeting in person.

It is clear that the COVID-19 pandemic has already led to a strong overall increase of the digitalisation of society, and there are predictions that people are unlikely to return to the old ways of doing things. With fewer people coming into very large cities to work and shop, that leaves a big space in areas that were once characterised by bustling shops and offices. Consumption is now shifting significantly to these smaller cities and suburban centres. Those places that are most at risk are those that have little else to attract locals and visitors from further afield. According to a UK report [26], there has been a loss of commuter flow into these cities of between over a tenth to almost a third of commuter footfall seen pre-COVID-19. Apart from the largest, mainly capital, cities like London [26], contends that it is unlikely there will be a return to old commuting habits in most very large cities. Those able to telework from home are now doing so for at least part of the week or shifting to hybrid-working that mixes working from home, working closer to home in more convenient local suburban centres with much less frequent commuting to the large city. This is already leading to further significant reductions in office space in large cities and some collapse in their central retail areas.

This pandemic-induced 'zoomshock transformation' has magnified the existing counter-urbanization trend that, during COVID-19, led to a major shutdown of city and suburban centres with plummeting city-centre commercial real-estate values. Now, largely beyond the pandemic, 'zoomshock' seems likely to see an acceleration of the spatial mixing of population, consumption and work especially away from the very large city centres that questions the benefits of agglomeration [27].

The main mechanism seems to be that, although tele- and hybrid-work only increased slowly from 5.4% of the EU-27's employed population in 2009 to about 9% in 2019, since the outbreak of COVID-19 this rose so that over 40% of those currently working in the EU began to telework fulltime [28]. Almost all experience since the 1990s has shown multiple benefits of these new ways of working that directly impact socio-economic and consumption geographies, such as better compatibility between work and family obligations, more flexibility, more recreation and leisure time, increased local community activity, saving costs on commuting, and increased performance and employee satisfaction. However, difficulties include pressure to work more intensely and longer hours when employees are always online, collaboration and communication with colleagues and co-workers can be difficult, employees find it hard to separate work and private life, poorly equipped workplaces may lead to health impairments and psychological problems and organisations become highly dependent on technical equipment which does not always function well [29]. These problems impact vulnerable populations in general, and this polarization remains the main challenge, as clearly seen in many of the food consumption results reported in this chapter.

Notwithstanding this issue, the newer, smaller but growing metros tend to be the most socio-economically vibrant and, from this evidence, the sociability of smaller cities does seem to provide some solutions. They are arguably at the 'sweet-spot' between being too large and too small whilst retaining significant political and

economic resources. Compared to all other regional types, their populations show the greatest egalitarian and cohesive profiles in terms of income, age, education and family size, as well as the lowest proportion of households that lost income during the pandemic. Across nearly all types of food behaviour, these smaller metros directly reflect this regional geography by displaying many of the advantages of capital metros while foregoing some of the disadvantages. Capital cities often contain significant enclaves of poverty as well as very wealthy households, whilst second-tier metros tend to be former industrial cities now economically retarded with the lowest metro incomes and relatively high levels of social exclusion, unemployment and poverty.

This overall dynamic is being driven by a better quality of life in smaller metros that are able to balance urban and rural advantages with high service levels, as well as continued good connectivity to the larger metros when desired. Their relative lack of physical connectivity compared to the larger metros has been decisively countered by the dramatically increased take up of digital technology during the pandemic, including the strong moves to online shopping and working from home. For example, smaller metros typically change their food behaviour significantly less than all other regional types during Covid-19, showing them to be the most resilient to the disruptions of the pandemic. They also exhibit much smaller food behaviour differences between households that lost income during the pandemic and those that did not. This means that their overall food vulnerability is much lower.

5. Conclusion

Overall, more vulnerable households (however measured) suffered more during the COVID-19 shock, but this also meant that both their behaviour and awareness around the health-food relationship also improved significantly, though clearly from a low base. Less vulnerable and stressed households already had relatively high levels of behaviour change and awareness around the health-food relationship and, although this increased during the pandemic, this increase tended to be less given it was starting from a higher level. So, in many ways, the COVID-19 food shock pushed more vulnerable households to catch-up to some extent with the already relatively high levels of food-health awareness in less vulnerable households, despite the serious difficulties they encountered. Indeed, data from ref. [12] also indicates that more vulnerable households say their changed food behaviour is more likely to continue beyond COVID-19 than do less-vulnerable households. This includes, for example, greater increases in shopping with local producers and in more local shops, growing own food, using a wider range of food dishes and recipes, greater use of unpackaged food and much less food waste. Thus, a useful policy guide during this age of disruption would be to put in place measures to support the positive food behavioural changes of all households with a specific focus on the more vulnerable households and with lower incomes.

How all these impacts will play out over the longer term is a critical issue and needs focused research and policy action, especially because the likelihood of other shocks in future with similar effects is high. These could include new pandemics, the ongoing and increasingly alarming climate crisis, new disruptive technologies, geo-political and economic-trade tensions, etc. The recent Russian invasion of Ukraine and the growing disruption of both energy and food systems is but the latest example.

Acknowledgements

This chapter has been entirely prepared and written by the author, but he recognizes and is warmly appreciative of the tireless work, dedication and collaboration in preparing the data and some parallel studies of, especially, Alberto Sturla (Department of Policies and Bioeconomy, Council for Agricultural Research and Economics, Savona, Italy), Meike Janssen (Consumer and Behavioural Insights Group, Department of Management, Society and Communication, Copenhagen Business School, Denmark), Jan Vávra (Department of Local and Regional Studies, Institute of Sociology of the Czech Academy of Sciences, Prague, Czechia), Zdeňka Smutná (Department of Geography, Faculty of Science, Jan Evangelista Purkyně University in Ústí nad Labem, Ústí nad Labem, Czechia, and Faculty of Social and Economic Studies, Jan Evangelista Purkyně University in Ústí nad Labem, Ústí nad Labem, Czechia), Barbora Duží (Department of Environmental Geography, Institute of Geonics of the Czech Academy of Sciences, Brno, Czechia), Hristo Hristov (Nutrition Institute, Nutrition and Public Health research group, Ljubljana, Slovenia) and Igor Pravst (Biotechnical Faculty, University of Ljubljana, Jamnikarjeva 101, SI-1000 Ljubljana, Slovenia, and VIST–Faculty of Applied Sciences, Gerbičeva cesta 51A, SI-1000 Ljubljana, Slovenia).

The author also wishes to acknowledge the work of the following organisations which participated in the design and promotion of the questionnaire and assisted in preparing their own country's data for the dataset (in alphabetical order):

- BioSense Institute (Serbia)
- Copenhagen Business School (Denmark)
- Consiglio Nazionale per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria, CREA (Italy)
- Danish Technological Institute (Denmark)
- Deutsches Institut für Lebensmitteltechnik e.V., DIL (Germany)
- Institute of Geonics of the Czech Academy of Sciences (Czechia)
- Inštitut za nutricionistiko NUTRIS (Slovenia)
- Items International SARL (France)
- James Hutton Institute (United Kingdom)
- National University of Ireland, Galway, NUIG (Ireland)
- Q-Plan International (Greece)
- School of Sustainability, Interdisciplinary Center, Herzliya, IDC (Israel)
- Stichting Steunpunt Drechtstadsboer (the Netherlands)
- T6 Ecosystem (Italy)

- Társadalomtudományi Kutatóközpont, Szociológiai Intézet (Hungary)
- Third Millennium Governance (Denmark)
- Transition France (France)
- University of České Budějovice and Jan Evangelista Purkyně University in Ústí nad Labem (Czechia)

Support was also provided by the European Food Information Council (EUFIC) and the European network for COmmunity-Led Initiatives climate change and Sustainability (ECOLISE).

See also https://www.food-covid-19.org.

Conflict of interest

The author declares that the research was conducted, and the chapter prepared and written, in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author details

Jeremy Millard
Third Millennium Governance, Ry, Denmark

*Address all correspondence to: jeremy.millard@3mg.org

References

[1] The Guardian. Eurozone Economy Shrinks by Record 12.1% Due to Coronavirus. 2020. Available from: https://www.theguardian.com/business/2020/jul/31/eurozone-economy-shrinks-by-record-121-due-to-coronavirus-crisis [Accessed: March 16, 2022]

[2] IMF. War Sets Back the Global Recovery, World Economic Outlook, Full Report. 2022. Available from: https://www.imf.org/-/media/Files/Publications/WEO/2022/April/English/text.ashx [Accessed: April 26, 2022]

[3] BBC. Ukraine War: World Bank Warns of 'Human Catastrophe' Food Crisis. 2022. Available from: https://www.bbc.com/news/business-61171529 [Accessed: April 26, 2022]

[4] Aljazeera. WFP: 20 Million Risk Starvation as Horn of Africa Drought Worsens. 2022. Available from: https://www.aljazeera.com/news/2022/4/19/20-million-risk-starvation-as-horn-of-africa-drought-worsens-un [Accessed: April 26, 2022]

[5] The Guardian. Ukraine War Threatens Global Heating Goals, Warns UN Chief. 2022. Available from: https://www.theguardian.com/environment/2022/mar/21/ukraine-war-threatens-global-heating-goals-warns-un-chief [Accessed: April 26, 2022]

[6] The WEF. The Great Reset. 2020. Available from: https://www.weforum.org/great-reset [Accessed: September 15, 2020]

[7] The WEF. Lessons from CEOs: Leading through the COVID-19 Crisis and Beyond. 2020. Available from: https://www.weforum.org/agenda/2020/06/ceos-reflections-on-leading-through-covid-19-so-far/ [Accessed: September 15, 2020]

[8] European Union. A European Green Deal. 2020. Available from: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en [Accessed: September 15, 2020]

[9] European Union. A Renewed Trade Policy for a Stronger Europe. 2020. Available from: https://trade.ec.europa.eu/doclib/docs/2020/june/tradoc_158779.pdf [Accessed: September 15, 2020]

[10] Janssen M, Chang BPI, Hristov H, Pravst I, Profeta A, Millard J. Changes in food consumption during the COVID-19 pandemic: Analysis of consumer survey data from the first lockdown period in Denmark, Germany, and Slovenia. Frontiers in Nutrition. 2021;**8**:60. DOI: 10.3389/fnut.2021.635859

[11] Profeta A, Siddiqui SA, Smetana S, et al. The impact of Corona pandemic on consumer's food consumption. Journal of Consumer Protection and Food Safety. 2021;**16**:305-314. DOI: 10.1007/s00003-021-01341-1

[12] Millard J, Sturla A, Smutná Z, Duží B, Janssen M, Vávra J. European food Systems in a Regional Perspective: A comparative study of the effect of COVID-19 on household and city-region food systems. Frontiers in Sustainable Food Systems. 2022;**6**:844170. DOI: 10.3389/fsufs.2022.844170

[13] Capodistrias P, Szulecka J, Corciolani M, Strøm-Andersen N. European food banks and COVID-19: Resilience and innovation in times of crisis. Socio-Economic Planning Sciences. 2021;**82**:101187. DOI: 10.1016/J.SEPS.2021.101187

[14] Euractiv. Macron Wants to 'adapt' EU Farm to Fork to the Post-Ukraine War World. 2022. Available from: https://www.euractiv.com/section/agriculture-food/news/macron-wants-to-adapt-eu-farm-to-fork-to-the-post-ukraine-war-world/ [Accessed: April 26, 2022]

[15] Hristo H, Millard J, Pravst I, Janssen M. European household spending and socio-economic impacts on food behaviour during the first wave of COVD-19. Frontiers in Nutrition. 2022;**9**: 869091. DOI: 10.3389/fnut.2022.869091

[16] Eurostat. Household Composition Statistics. 2022. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Household_composition_statistics [Accessed: May 13, 2022]

[17] Wikipedia. International Standard Classification of Education, Developed and Maintained by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and Used by Eurostat. 2022. Available from: https://en.wikipedia.org/wiki/International_Standard_Classification_of_Education [Accessed: March 30, 2020]

[18] Eurostat. Regional Typologies Overview. 2020. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Regional_typologies_overview#Urban-rural_typology_including_remoteness. [Accessed: November 3, 2020]

[19] Eurostat. Postcodes and NUTS. 2021. Available from: https://ec.europa.eu/eurostat/web/nuts/correspondence-tables/postcodes-and-nuts [Accessed: December 15, 2021]

[20] Eurostat, European Commission. Statistical Office of the European Union, Eurostat Regional Yearbook. Luxembourg: European Union; 2021. p. 20. Available from: https://ec.europa.eu/eurostat/documents/3217494/13389103/KS-HA-21-001-EN-N.pdf/1358b0d3-a9fe-2869-53a0-37b59b413ddd?t=1631630029904 [Accessed: December 15, 2021]

[21] OECD. National Accounts of OECD Countries, 2021 Issue 1, OECD Publishing, Paris. https://www.oecd.org/publications/national-accounts-of-oecd-countries-2221433x.htm [Accessed: January 11, 2022]

[22] World Health Organisation. WHO Coronavirus Disease (COVID-19). Dashboard. 2020. Available from: https://covid19.who.int/ [Accessed: November 7, 2020]

[23] Aleksandrzak K. Urbanization—Components and Stages of Urbanization, i.e. the City's Life Cycle. 2019. Available from: https://geographicforall.com/en/urbanization-components-and-stages-of-urbanization-i-e-the-citys-life-cycle/ [Accessed: December 15, 2021]

[24] Mitchell CJA, Bryant CR. Counter Urbanization, in International Encyclopaedia of Human Geography. Second ed. Amsterdam: Elsevier; 2020

[25] Danish Knowledge Centre for Housing Economics (Boligøkonomisk Videnscenter (2021)). Demografi, socioøkonomi og boligstrukturer i danske kommuner. 2021. Available from: https://www.bvc.dk/faglige-udgivelser/demografi-sociooekonomi-og-boligstrukturer-i-danske-kommuner/ [Accessed: December 15, 2021]

[26] KPMG. The Future of Towns and Cities Post COVID-19. January 2021, UK. 2021. Available from: https://home.kpmg/uk/en/home/insights/2021/01/future-of-towns-and-cities-post-covid-19.html [Accessed: December 15, 2021]

[27] Millard J. How 'zoomshock' is transforming work, geography and society. Webinar presentation, Third Global Forum 2021 Webinar Series, 9 June 2021, "Sustainable Smart, Cognitive Cities, Regions & Communities and Tech for Good" and "From Industry 4.0 (merging of virtual, physical and biological) to Industry 5.0 (interaction and collaboration between humans and machines)". 2021. Available from: http://globalforum.items-int.com/gf/gf-content/uploads/2021/06/Jeremy-Millard-GF2021-webinar-9-6-21.pdf. [Accessed: March 14, 2022]

[28] JRC. Telework in the EU before and after the COVID-19: where we were, where we head to. The European Commission's Joint Research Centre, JRC120945. 2020. Available from: https://ec.europa.eu/jrc/sites/jrcsh/files/jrc120945_policy_brief_-_covid_and_telework_final.pdf [Accessed: April 19, 2021]

[29] Edelmann N, Millard J. Telework development before, during and after COVID-19, and its relevance for organizational change in the public sector. In: Procedings of the 14th International Conference on Theory and Practice of Electronic Governance. ICEGOV; 2021. pp. 436-443. DOI: 10.1145/3494193.3494252

Chapter 3

Upsurge of Online Shopping in Malaysia during COVID-19 Pandemic

Krishna Moorthy, Te Nian Ci, Aufa Amalina Kamarudin, Normala S. Govindarajo and Loh Chun T'ing

Abstract

The aim of this study is to assess the factors, perceived usefulness (PU), perceived ease of use (PEOU), subjective norms (SN), perceived risk (PR) and situational influences (SI)) that influence the consumers' behavioral intention to use online shopping during the Coronavirus time. This research has adopted the Technology Acceptance Model (TAM) as its theoretical base. This research is a quantitative research wherein data were collected through online questionnaire using convenience sampling method. A total of 203 valid samples were collected from Malaysian respondents from selected States. Then, single and multiple linear regression analysis were conducted to test the hypotheses. The results concluded that perceived usefulness, perceived ease of use and situational influences have significant influence on Malaysian consumers' behavioral intention to adopt online shopping during pandemic times. However, subjective norms and perceived risk have showed an insignificant relationship with consumers' behavioral intention. The findings have implications for Malaysian government and SME companies in Malaysia in promoting online business.

Keywords: online shopping, Covid-19, movement control order, technology acceptance model, Malaysia

1. Introduction

Covid-19 has accelerated the online shopping trends. With the outbreak of Covid-19, the global economy is facing a big challenge. According to World Health Organization (WHO) [1], 'Covid-19' namely the Coronavirus, is a newly discovered infectious disease on 31 December 2019 in China. This pandemic has brought a shock to every person, every country and even leads to disruptions in the world economy.

There is no exception for Malaysia as well. To prevent the virus spread from getting worst, the government implemented preventative measures, Movement Control Order (MCO) to urge everyone to stay at home [2]. During COVID-19 pandemic, Malaysian government has introduced the Movement Control Order (MCO) from 18 March 2020. This statutory order helped to slow down the transmission rate of the COVID-19 virus and increase social distancing among the public. This Movement

Control Order was extended many times and called in different names like Conditional Movement Control Order (CMCO), the Recovery Movement Control Order (RMCO), or the Enhanced Movement Control Order (EMCO) depending on the type of movement allowed for the people. These measures have restricted the non-essential stores (e.g. clothing shops, accessories shops etc.) from being opened and people are not allowed to cross states and even districts during the MCO period. Hence, to survive through this pandemic, business owners have to adopt a new norm: digitalisation of small and medium enterprises (SMEs) [3]. By this means, the transactions of online shopping up-surged significantly. One of the online shopping platforms in Malaysia, Lazada has experienced an increase of 80% on orders placed compared to the pre-pandemic, said by the CEO, Leo Chow [4]. The same situation goes to Shopee Malaysia as well, where Shopee recorded a boom, not only in volume and traffic but also the adoption of local brands (like Mamee, Hup Seng, etc.). This shows that many brands and sellers have started to digitalise to survive in this epidemic. These statistics have revealed the uptrend of online shopping in Malaysia during Covid-19 pandemic.

1.1 Problem statement

Covid-19 is a recent virus outbreak since the end of 2019. It has brought a big challenge and vast change to the global business, including Malaysia. Many issues have arisen due to the pandemic outbreak. The MCO imposition resulted in the ramp up of online purchases among consumers due to the closure of most of the physical stores [5]. According to EcommerceDB, Malaysia became the 38th largest online shopping market, with a revenue of US$4 billion in 2020, placing ahead of Portugal. The online shopping market expansion in Malaysia is expected to continue over the years. Hence, identifying the determinants will be able to sustain the trend for long term.

Whilst there has been a wealth of existing research (before the Covid-19 outbreak) on online shopping trends and prospects, the research might be outdated since the sudden virus epidemic has impacted the economy significantly [6, 7]. Besides that, the previous studies only generally discussed the impact of the pandemic on online shopping [8, 9]. There is also a study related to the factors influencing online purchase of fashionable apparel [10]. However, the study only focused on a specific item of online purchase. Hence, there is a research gap on identifying the factors that contribute to the upsurge of online shopping in Malaysia during Covid-19 situation.

1.2 Research objectives

The general objective of the study is to determine the factors that contribute to the upsurge of online purchase in Malaysia during Covid-19 pandemic. The specific objectives are as shown below:

1. To identify the relationship between perceived usefulness and perceived ease of use of using online shopping during the Covid-19 pandemic.

2. To examine the relationship between perceived usefulness and behavioral intention of using online shopping during the Covid-19 pandemic.

3. To identify the relationship between perceived ease of use and behavioral intention of using online shopping during the Covid-19 pandemic.

4. To examine the relationship between subjective norms and behavioral intention of using online shopping during the Covid-19 pandemic.

5. To identify the relationship between perceived risk and behavioral intention of using online shopping during the Covid-19 pandemic.

6. To determine the relationship between situational influences and behavioral intention of using online shopping during the Covid-19 pandemic.

2. Literature review

Literature review helps to gain an understanding of the existing findings and research relevant to a particular area of study and topic and to present that information in the form of a summarized report. It also helps the researchers to identify the research gaps to formulate the research questions of the study accordingly.

2.1 Online shopping

According to Market Business News, one form of electronic commerce is online shopping wherein consumers are allowed to directly buy goods or services from a vendor through the internet, using a mobile app or web browser. Consumers find it very interesting to visit the website of the seller directly or by searching among various available sellers of the same product. They can see the product's availability and prices while searching. Consumers can use laptops, desktop computers, smartphones and tablet computers.

2.2 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) was first introduced by Davis in 1986. Davis proposed the TAM to explain computer usage behavior [11]. This theory could explain the user adoption of technology in organization. Davis explained that TAM is to trace the impact of external factors on internal beliefs, attitudes and intentions. Hence, two key determinants, perceived usefulness and perceived ease of use have been introduced in this model as in **Figure 1**.

Though there are criticisms about its generality, many researchers adopted this theory in their studies [13, 14]. It is widely adopted to study topics related to IT adoption as its purpose is to explain user behavior in technology acceptance. Those studies include examining the use of Learning Management Systems (LMSs) in higher education [15], use of mobile banking apps [16], and use of Moodle [17].

Thus, in this study, TAM model is applied to study the factors that contribute to the upsurge of online shopping in Malaysia during Covid-19 pandemic. Perceived risk, subjective norm and situational influence are also integrated into this research in order to provide a comprehensive understanding of the online shopping in this pandemic time.

2.3 Relationship between perceived usefulness (PU) and perceived ease of use (PEOU)

As pointed by Venkatesh and Davis [18], PU is affected by PEOU. An individual's perceived usefulness on online shopping can be explained by his or her perception of

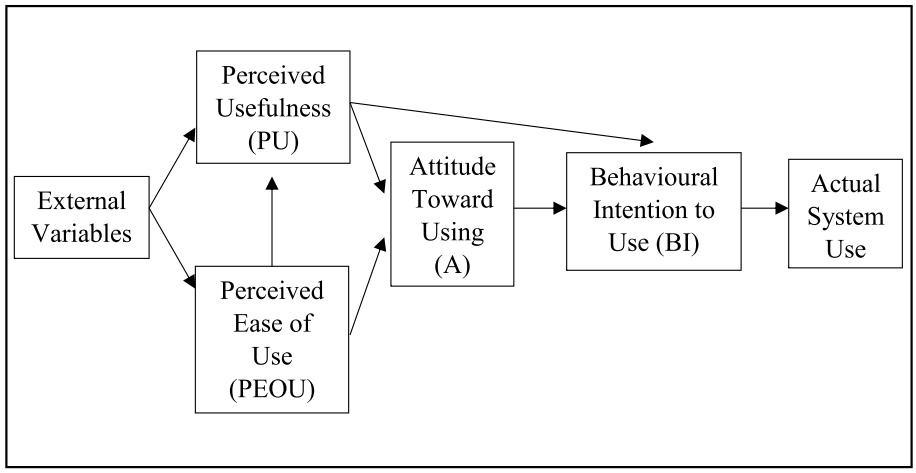

Figure 1.
Original technology acceptance model (TAM) [12].

the technology's simplicity of use. When a technology is easy to use, the consumers will then increase their perceived usefulness. Rattanaburi and Vongurai [19] explained that PEOU of the mobile shopping applications is significantly affected the PU among the Generation Y in Thailand. Additionally, this relationship has also been empirically investigated by several researchers and found to have positive relationship in various contexts [20, 21]. Hence, it is hypothesized that:

H1: There is a positive relationship between perceived usefulness and perceived ease of use of using online shopping during the Covid-19 pandemic.

2.4 Relationship between perceived usefulness (PU) and behavioral intention (BI)

As proposed in TAM, PU is defined as an individual believes that using a particular technology would result in his or her improvement in job performance [22]. It is an expectation that the particular technology used will benefit in achieving a valued outcome. Based on the study of Kucukusta et al. [23], the findings suggested that the functionality, efficiency and effectiveness of the Internet make online booking useful. This can imply the PU as the degree to which users believe that if they use the online booking system, they will able to enjoy the convenience of booking through Internet. Hence, the usefulness of online shopping is vital, especially in this pandemic. With the shut-down of brick-and-mortar stores, people have to shop online to purchase goods and services. Apart from this, online purchase can reduce the risk of infection by avoiding contact with people [24]. Numerous studies have found that PU and BI to shop online are related [25–27]. These explanations lead to the following hypothesis:

H2: There is a positive relationship between perceived usefulness and behavioral intention of using online shopping during the Covid-19 pandemic.

2.5 Relationship between perceived ease of use (PEOU) and behavioral intention (BI)

PEOU is defined as the degree to which an individual believes that using a particular technology would be free from effort, as stated in the TAM [22]. If a technology is

easy to use, then the barriers can be eliminated, and individuals will be more willing to adopt that particular technology. A study indicated that the poor design in online shopping sites can lose the buyers' focus on shopping. This is because it reduced the perception of buyers on the ease of use of online shopping [28]. In addition, the ease of navigating through online sites, the ease of placing orders, the ease of conducting transactions, and other ease of use that allow the consumers to purchase online, can increase the interest in online shopping among the users [29]. This can be related to the level of easiness that a user feels when shopping online through online shopping sites or platforms. Individual tends to use online shopping if it is easy to learn and use. Thus, the lower the complexity to use online shopping, the higher the intention of an individual to use online shopping. In the previous studies, there are a surprising number of researchers that showed a positive relationship between these two variables [25, 30, 31]. Thus, the following hypothesis is proposed:

H3: There is a positive relationship between perceived ease of use and behavioral intention of using online shopping during the Covid-19 pandemic.

2.6 Relationship between subjective norms (SN) and behavioral intention (BI)

Based on the study of Fishbein and Ajzen [32], SN is defined as an individual's perception that people who are important to him or her think he/she should or should not engage in certain behavior. In 1985, Ajzen further defined SN as a perception of belief that an individual believes that a specific individuals or groups think he or she should or should not perform the behavior. These individuals or groups can be the family, friends, supervisors or even the society at large. When there is a person or a group of people kept on introducing and praising a particular online shopping platform, the individuals will be influenced and get interested to the online shopping platform too. Hence, SN can influence the BI of an individual towards online shopping. Akar's [33] research paper acknowledged the positive relationship between SN and BI. The online questionnaire was carried out in Turkey and concluded that SN has significant influence on the consumer's BI towards online purchase during pandemic. This relationship is also recognized by the study of Islam et al. [34], in which the data was collected in Bangladesh. The significant relationship between SN and BI of using online shopping has been found by many prior literatures [24, 35, 36]. These resulted in the following hypothesis being proposed:

H4: There is a positive relationship between subjective norms and behavioral intention of using online shopping during the Covid-19 pandemic.

2.7 Relationship between perceived risks (PR) and behavioral intention (BI)

The concept of PR was introduced by Bauer in 1960. He defined PR as 'perceived consequences of an outcome in case of a wrong choice; and subjective probability to make a mistake'. Pham, Nguyen, Do, Tang and Hoai [37] adopted the concepts of PR in their study by separating it into several variables, which include financial risks, product risks, social risks, time risks, distribution risks, and information risks. The study of Iriani and Andjarwati [27] also studied PR by dividing it into several indicators, such as financial risk, performance risk and security risk. Therefore, in this study, the perceived risk will be studied in terms of health risk. This is due to the individual perception of their health hazards that they might be exposed to the Covid-19 virus when shopping in malls and stores physically [26]. Pham et al. [37] has conducted a study related to Vietnamese consumer switching behavior towards online

shopping during the pandemic. This study has indicated that PR in terms of products risks, time risks and social risks has significant effect on influencing the Vietnamese customers shopping online during the pandemic. Aside from this, several previous literatures also concluded on this positive relationship [31, 38]. Therefore, this hypothesis is made in this research:

H5: There is a positive relationship between perceived risk and behavioral intention of using online shopping during the Covid-19 pandemic.

2.8 Relationship between situational influences (SI) and behavioral intention (BI)

As defined by Tanner and Raymond [39], SI refers to the temporary conditions that affect how the consumers behave. It can be a condition where they actually buy the products, buy additional products or not buying anything at all. They also explained that the influences can be resulted from time factors, physical factors, social factors, the reason for the consumer's purchase and the consumer's mood. With all these factors, it can influence people's buying behavior. Besides that, situational influences are significant in shaping and reinforcing the online shopping motivations. Hence, in this study, the SI will conceptualize the impact of Covid-19 pandemic. The study of Hashem [40] revealed that the Covid-19 pandemic had a significant influence over the Jordon customer behavior towards e-shopping. Several prior studies also support the association of SI and BI in the context of online groceries shopping [41] and online book shopping [42]. In this study, Covid-19 pandemic is an essential situational influence that can affect the online shopping adopting intention among consumers. Based on these previous studies, the following hypothesis is developed:

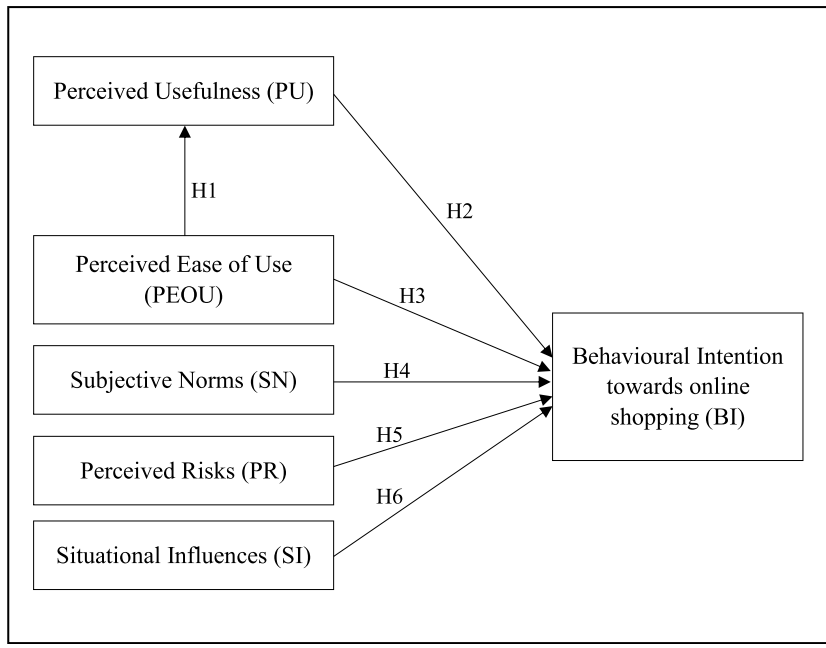

Figure 2.
Proposed research framework.

H6: There is a positive relationship between situational influences and behavioral intention of using online shopping during the Covid-19 pandemic.

2.9 Research framework

Figure 2 shows the research framework of this study. The independent variables include perceived usefulness, perceived ease of use, subjective norms, perceived risks and situational influences, whereas behavioral intention of using online shopping is the dependent variable.

3. Research methodology

In this research, quantitative method is used to deal with the statistical data. It collects the data based on numbers and mathematical calculations. This method relies on collection and analysis of numerical data in order to describe, explain or predict the variables. This type of study basically answers the research questions through the test of hypothesis, in order to determine the relationship between two variables (independent and dependent) [43].

3.1 Data collection

Primary data was collected through online self-administered questionnaire. This quantitative method is able to test the hypothesis developed and gather the data about the determinants contributing to upsurge of online shopping in Malaysia during Covid-19 pandemic. The questionnaire study was conducted within Malaysia, via online distribution and collection to test the relationship between PU, PEOU, SN, PR, SI and BI. The quantitative data analysis in this study is aided by using the Statistical Package for Social Science (SPSS) software.

3.2 Target population

The target population in this research is individuals of 18 years and above and residing in Malaysia, who have been shopping online during the pandemic. This is because they are the main contributors to the online shopping growth. According to International Trade Administration (ITA) [44], Malaysia has approximately 16.53 million online shoppers in 2019. These statistics reflected 50% of the Malaysia population and 62% of mobile users who purchase online using their devices.

3.3 Sampling frame and sampling location

Due to the absence of online shopping users' detail information, it is impossible to identify all the elements in the population. Hence, the sampling frame is not applicable in this study.

The percentage of Malaysian online shopping users by State are shown in **Table 1**. From the table, it can be seen that Wilayah Persekutuan Putrajaya, Wilayah Persekutuan Labuan, Perlis, Selangor, Wilayah Persekutuan Kuala Lumpur, Terengganu, Melaka, Pulau Pinang, Negeri Sembilan and Johor are the top 10 highest among the 16 States. Hence, they are chosen as the sampling location in this research. It is deemed sufficient to represent the whole population.

States	Percentage (%)
W.P. Putrajaya	70.5
W.P. Labuan	60.5
Perlis	49.4
Selangor	40.0
W.P. Kuala Lumpur	38.0
Terengganu	35.5
Melaka	32.5
Pulau Pinang	32.5
Negeri Sembilan	27.5
Johor	26.5
Kedah	25.0
Sarawak	24.0
Pahang	24.0
Sabah	22.5
Perak	22.0
Kelantan	22.0

Table 1.
Percentage of online shopping consumers by state. (Malaysian Communications and Multimedia Commission, 2018).

3.4 Sampling technique

Non-probability sampling was used in this study. This is due to the unavailability of sampling frame. The population size is extensive and difficult to examine, so non-probability sampling is the most suitable method for this research. Among the methods available, convenience sampling is the most suitable method to be used. This is because it is less costly, simple to implement and efficient. Convenience sampling is a sampling method whereby a sample is taken from a group of people who are easy to be contacted or reached by the researcher [45]. This sampling method was consistent with the method used in many previous literatures related to online shopping adoption [25, 46].

3.5 Sampling size

Based on the study of [47], the item-to-response ratios range was recommended to be in the range from 1:4 to 1:10. In this research, there are 28 items to be measured in the online questionnaire. Hence, a sample size of 112 to 280 is deemed to be sufficient for this study, based on the recommended ratios range. In this study, a total of 203 questionnaires have been collected and all of them are usable for the study. As 203 is between the recommended range of samples, it is considered adequate for the purpose of this research.

3.6 Research instrument

To collect primary data for this research, a self-administered questionnaire has been employed as the research instrument. The reason for choosing this survey

Variables	Cronbach's alpha	Number of items
PU	0.829	5
PEOU	0.876	5
SN	0.755	3
PR	0.778	5
SI	0.724	5
BI	0.805	5

Table 2.
Reliability statistics (pilot test).

method is due to the limited time available and there is no cost requirement. The questionnaire was created by Google Form and the survey link are shared to various social media (e.g. Facebook, Instagram, etc.). Data were collected for one-week period, from 15 May 2021 to 21 May 2021. During this time period, Malaysia was under the Movement Control Order 3.0 due to covid-19. The questionnaire is divided into three sections: Demographic information of respondents, questions related to the five independent variables (PU, PEOU, SN, PR & SI) and questions related to the dependent variable (BI).

3.7 Pilot test

In spite of the fact that the items in the questionnaire are adapted from earlier studies that have been tested on their reliability and validity, this questionnaire still needed to have a pilot study. As stated by Treece and Treece [48], the suggested sample size for a pilot test is 10% of the sample size in this study. Hence, in this study, the pilot test was carried out with 35 respondents. Based on the data collected in the pilot test, all the questions in the variables are acceptable as the Cronbach's Alpha value are above 0.7 [49], as shown in **Table 2**.

4. Research results

4.1 Demographics

There are 203 respondents in total, and no missing data, thus all are usable. All (100%) of the respondents are Malaysian, aligning to the target respondents of this study. Among the respondents, 54 are from Selangor (26.6%), 49 from Negeri Sembilan (24.1%), 25 from Johor (12.3%), 22 from Kuala Lumpur (10.8%), 13 from Putrajaya (6.4%), 11 from Penang (5.4%), 10 from Malacca (4.9%), 9 from Terengganu (4.4%), 6 from Perlis (3.0%) and 4 from Labuan (2.0%). Out of 203 respondents, approximately two-third of them are female and the remaining are male. The age group data showed that 104 respondents are from age group of 18–25 years (51.2%), followed by 46 of them from age group of 26–35 years (22.7%), 22 under the 36–45 years' age group (10.8%), 19 from 46 to 55 years' age group (9.4%) and remaining 12 above 55 years old (5.9%). 98 out of 203 of the respondents (48%) are students. These results are not surprising, considering that the majority of the

respondents are from 18 to 25 years' age group. Besides students, there are 61 employees (30%), 21 self-employed (10.3%), 17 freelancers (8.4%), 3 housewives (1.5%) and the remaining 3 categorized as Others (1.5%). The respondents' occupation for the 'Other' category is the pensioner etc. Among the respondents, 102 (50.3%) of them shop 1–2 times a month through online platform before the Covid-19 pandemic. It is followed by 62 (30.5%) respondents who shop 3–5 times a month before the pandemic, 29 (14.3%) shop 6–10 times a month and only 10 (4.9%) of them shop more than 10 times in a month. The results of the online purchase frequency were found to be changed during the Covid-19 pandemic. Before the pandemic, the highest percentage is 1–2 times a month. However, during the pandemic, the highest percentage is 3–5 times a month. The 1–2 times a month category then drop to become the lowest percentage, at 16.7%. The 'Above 10 times a month' category has increased to 18.7%.

4.2 Reliability analysis for full data

The reliability analysis result can be seen in **Table 3**. All the factors are reliable and consistent. Broadly speaking, all the variables are above 0.8 alpha, which implies good reliability, except for SI variable with 0.786 alpha. However, this alpha value is still acceptable, as 0.7 alpha implies as acceptable reliability [49].

4.3 Normality analysis

The result of normality test shows that all the items are normally distributed. This is due to the skewness value of this study comes within the range of ± 3 and the kurtosis value of this study falls between the range of ± 10 [50].

4.4 Correlation coefficient analysis

Table 4 shows that the correlation coefficient values in this study are between +0.6 and +0.8. Hence, it can be categorized between the moderately positive and strongly positive [51]. Aside from this, the correlations are also below 0.9, so there is absence of multicollinearity problem [52].

4.5 Inferential analysis

In this study, the regression technique was used to test the relationship between the dependent and independent variables. The analysis is divided into two parts.

Variables	Cronbach's alpha	Number of items
PU	0.807	5
PEOU	0.845	5
SN	0.814	3
PR	0.800	5
SI	0.786	5
BI	0.844	5

Table 3.
Reliability statistics (full data).

	PU	PEOU	SN	PR	SI	BI
PU	1					
PEOU	.734**	1				
	.000					
SN	.719**	.629**	1			
	.000	.000				
PR	.699**	.660**	.644**	1		
	.000	.000	.000			
SI	.722**	.652**	.702**	.740**	1	
	.000	.000	.000	.000		
BI	.732**	.699**	.636**	.644**	.707**	1
	.000	.000	.000	.000	.000	

***Correlation is significant at the 0.01 level (2-tailed).*

Table 4.
Pearson's correlation coefficient analysis.

A simple linear regression (SLR) is carried out to examine the relationship between the PU and PEOU, where PU is considered to be the dependent variable in this relationship. Then, multiple linear regression (MLR) is applied to identify the relationship between the independent variables (PU, PEOU, SN, PR and SI) and the dependent variable (BI).

4.6 Multiple linear regression (MLR)

As shown in **Table 5**, the R^2 value is 0.636, implying that the five variables, PU, PEOU, SN, PR and SI, can explain 63.6% of the variance in BI, while the remaining 36.4% is explained by additional factors not included in this study.

As depicted in **Table 6**, the F-value is 68.947 and p-value is 0.000 at 5% significance level. This means that it is significant as the p-value is lower than 0.05. It demonstrates that the dependent variable (BI) has a substantial relationship with the five independent variables (PU, PEOU, SN, PR and SI).

From the **Table 7**, it can be seen that at 5% significance level, PEOU (p-value- = 0.000), PE (p-value = 0.000) and SI (p-value = 0.001) have significant and positive effects on the dependent variables (BI). This is due to their p-value are less than 0.05. However, SN (p-value = 0.376) and PR (p-value = 0.468) are found insignificantly

Model summary[b]				
Model	**R**	**R square**	**Adjusted R square**	**Std. error of the estimate**
1	.798[a]	.636	.627	.27962

[a]Predictors: (constant), SI, PEOU, SN, PR, PU.
[b]Dependent variable: BI.

Table 5.
Model summary for all variables.

ANOVA[a]						
Model		**Sum of squares**	**df**	**Mean square**	**F**	**Sig.**
1	Regression	26.955	5	5.391	68.947	.000[b]
	Residual	15.403	197	.078		
	Total	42.358	202			

[a]*Dependent variable: BI.*
[b]*Predictors: (constant), SI, PEOU, SN, PR, PU.*
[c]*α = 0.05.*

Table 6.
Analysis of variance (ANOVA) for all variables.

Coefficients[a]						
Model		**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Sig.**
		B	**Std. error**	**Beta**		
1	(Constant)	.507	.217		2.337	.020
	PU	.284	.078	.280	3.623	.000
	PEOU	.244	.065	.252	3.734	.000
	SN	.049	.055	.060	.888	.376
	PR	.051	.071	.051	.727	.468
	SI	.257	.073	.261	3.516	.001

[a]*Dependent variable: BI.*
[b]*α = 0.05.*

Table 7.
Multiple linear regression coefficient.

associated with BI as their p-values are higher than 0.05. As a result, H2, H3 and H6 are statistically supported, but H4 and H5 are not supported.

Thus, the MLR equation is as follows:

$$BI = 0.507 + 0.284\ PU + 0.244\ PEOU + 0.049\ SN + 0.051\ PR + 0.257\ SI$$

4.7 Simple linear regression (SLR)

The R^2 value of 0.539, depicts that PEOU can explain 53.9% of the variance in PU, whereas the remaining 46.1% is explained by the other variables not examined in this study, as presented in **Table 8**.

The **Table 9** shows the F-value (1, 201) = 235.024, and p-value = 0.000 at 5% significance level, which indicates that the PEOU plays a significant role in shaping PU. These clearly shows the positive effect of the PEOU.

Table 10 shows that PEOU (p-value = 0.000) has a significant and favorable influence on PU as the p-value is less than 0.05. Hence, H1 is supported.

To sum up, the SLR equation can be written as follow:

$$PU = 1.324 + 0.702\ PEOU$$

Model summary[b]				
Model	**R**	**R square**	**Adjusted R square**	**Std. error of the estimate**
1	.734[a]	.539	.537	.30723

[a]*Predictors: (Constant), PEOU.*
[b]*Dependent Variable: PU.*

Table 8.
Model summary for PEOU and PU.

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean square**	**F**	**Sig.**
1	Regression	22.183	1	22.183	235.024	.000[b]
	Residual	18.972	201	.094		
	Total	41.155	202			

[a]*Dependent variable: PU.*
[b]*Predictors: (constant), PEOU.*
[c]*α = 0.05.*

Table 9.
Analysis of variance (ANOVA) for PEOU and PU.

Coefficients[a]						
Model		**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Sig.**
		B	**Std. error**	**Beta**		
1	(Constant)	1.324	.204		6.480	.000
	PEOU	.702	.046	.734	15.330	.000

[a]*Dependent variable: PU.*
α = 0.05.

Table 10.
Single linear regression coefficient.

A summary of the hypothesis testing has been developed in **Table 11**. H1, H2, H3 and H6 are supported, whereas H4 and H5 are not supported.

5. Discussion

The findings suggest that consumers believe PEOU to be a key element in determining the PU of online shopping ($p < 0.05$). This result was confirmed by the prior studies which done by [19–21]. When the online shopping is simple to be accessed by users, they can attain their shopping objectives easily, and thus, increase the perceived usefulness on online shopping among them. Users may not consider e-shopping to be useful if they have to cope with the difficulties in using online shopping. This is because if they are busy handling the difficulties, they could not see

Hypothesis	p-value	Result
H1: There is a positive relationship between PU and PEOU of using online shopping during the Covid-19 pandemic.	0.000	Supported
H2: There is a positive relationship between PU and BI of using online shopping during the Covid-19 pandemic.	0.000	Supported
H3: There is a positive relationship between PEOU and BI of using online shopping during the Covid-19 pandemic.	0.000	Supported
H4: There is a positive relationship between SN and BI of using online shopping during the Covid-19 pandemic.	0.376	Not supported
H5: There is a positive relationship between PR and BI of using online shopping during the Covid-19 pandemic.	0.468	Not supported
H6: There is a positive relationship between SI and BI of using online shopping during the Covid-19 pandemic.	0.001	Supported

Table 11.
Summary for hypotheses testing.

the benefits of using it. To sum up, there is a positive relationship between PU and PEOU in online shopping during pandemic.

The result ($p < 0.05$) implied that PU significantly influence BI. Consumers' behavioral intention to utilize online shopping during a pandemic is profoundly influenced by PU. This finding is in line with the findings of a number of prior studies [25, 26]. By comparing the online purchase to traditional purchase from physical stores, online shopping enables users to reach the items faster and also more choices are available compared to physical stores [27]. The consumers are able to shop in their homes while maintaining social distancing during this pandemic. Hence, the perceived usefulness is established. On top of that, consumers have little opportunities to purchase items other than necessities, like clothing, stationery, etc. during the lockdown [53]. So, online shopping can be a good substitute for physical stores. Consequently, PU is a factor for consumers' BI on using online shopping during pandemic.

PEOU is also found to have positive impact on BI of using online shopping during Covid-19 pandemic ($p < 0.05$). This significance and positive relationship were evidenced by Verweijimeren [41]; Yadav et al. [30]; and Lisdayanti et al. [31] in their study. Youssef et al. [25] explained the ease of use was contributed by the languages available on the platform, the design of the platform and guidance video provided. In Malaysia, Shopee application, one of the top-ranking online shopping in Malaysia, also provided several languages in the application (i.e., Malay, English and Mandarin) and guidance video to use Shopee application was provided on YouTube too. Thus, users may consider online shopping was easy to use (such as adequate search support provided, provide relevant recommendations, etc.). When users found that online shopping was easy to navigate, they may not get frustrated when using online shopping. Instead, users may find it helpful to achieve their purchase objectives easily and thus, developed the intention to purchase online.

The findings ($p > 0.05$) indicate that SN is not considered a factor that influences the consumers' BI of using online shopping. This result was supported by several prior literatures [26, 53]. The study of Koch et al. [53] showed internal SN has no influence on customers' BI to adopt online shopping, whereas external SN have significant influence. The study defined internal SN as internal sources of social influence, such as family and

friends, while external SN is described as external sources of social influence, such as mass media. The insignificant relationship is ascribed to the large Generation Z respondents in this study. Generation Z is people that born between 1997 and 2015, who born into new technology. They rely heavily on digital media. In this study, the questionnaire items design for subjective norm was related to internal SN. However, Generation Z is more easily influenced by mass media reports or expert opinions, especially in this epidemic. This is the reason why findings indicated the insignificant relationship between SN and BI in this study, as most of the respondents are from Generation Z. However, there are also some literatures that are not supporting this result [33, 34, 36].

The results ($p > 0.05$) also show the PR is not a factor that affects the consumers' BI in using online shopping during pandemic. Several studies also demonstrated the same results as this study [27, 26]. Gao et al. [53] found that the insignificant relationship because people may still be concerned about the potential risk of being infected when they purchased online, even though online shopping is the most suitable and safer alternative method for shopping in brick-and-mortar stores. They might worry that people who packaged and delivered their parcels was infected by virus and in this way, PR is not a factor to influence the consumers' BI to adopt online shopping during Covid-19. Therefore, the same result in this study would be due to the same reason as provided by Gao et al., where Malaysian online consumers may find the risk of Covid-19 virus being transmitted through parcel. However, this insignificant relationship result was contrasted by some prior research [31, 37, 38].

The results ($p < 0.05$) depict that SI is considered a determinant factor that influences consumers' BI of using online shopping. Many previous studies also recognized that SI plays an important role in the behavioral intention of using online shopping during Covid-19 pandemic [40–42]. As stated in Akar [33], Covid-19 has brought a big change across the world and resulted in instabilities in the society. These pandemic concerns can affect the consumers' online shopping intentions. The study stated that Covid-19 had an influence over the customer behavior in terms of frequency, necessity, payment method, price and products availability. During the MCO period in Malaysia, most of the retail stores were forced to stop operations. Thus, the alternative method available for consumers is to shop through online shopping. This has led consumers to switch to e-shopping, and thus, built the BI of using online shopping during Covid-19 crisis.

5.1 Theoretical implications

This study's main theoretical implication is that it adds value to the literature of technology dissemination, to be more specific, the online shopping research. This research gives a comprehensive overview of Malaysian consumers' perception towards online shopping throughout the pandemic. This study focused on studying the determinant factors of consumers' behavioral intention to use online shopping during the Covid-19 times. The researchers adopted the TAM model and added some variables, such as subjective norms, perceived risk and situational influences, aimed to fit the current situation. This can provide a deeper understanding about the online shopping in Malaysia and it is useful for future research.

5.2 Practical implications

Covid-19 hits Malaysia economy heavily, and online shopping is the only way to substitute the physical retail stores. Hence, this study is able to bring implication for

Malaysian government agencies to further plan to improve the online shopping usage among the citizens. According to this study, consumers' BI to embrace online shopping during a pandemic is influenced by PU, PEOU and SI. From the insight of this finding, Malaysia government can provide supports to those SME companies and online shopping companies to enhance their online shopping platforms. The government can provide IT training especially to those SME owners who run business in traditional business model, who are not familiar with online shopping technology prior to this pandemic. The pandemic has also significantly affected the day-to-day business operations. Those sellers are still struggling with their businesses to minimize their losses during this difficult time. Accordingly, this study could benefit SME sellers to survive through this pandemic and to avoid suffering losses by adopting online shopping business model.

5.3 Limitations

Firstly, this is a cross-sectional study. The study result is only limited to a single point of time. However, the Covid-19 impact is still continuing and its influence on consumers is still ongoing and changing, so a longitudinal study is able to capture more accurate result. Secondly, due to time and cost constraint and also the pandemic, this study's data collecting technique was decided to be an online questionnaire. Sometimes, the participants may not read and answer the questions carefully. This might result in inaccurate data collection. In addition to this, the quantitative method indeed provides wide scope of data collection but less detailed, compared to qualitative method which provides narrower but more thorough responds. Apart from these, the sampling location for this study is limited to Malaysia, and more specifically only 10 States involved due to time constraint. Hence, this limits the generalizability of this study to other countries. Lastly, the convenience sampling technique was applied in this study on account of the limited time available. Whilst convenience sampling was easy to apply and participants are readily available, this sampling technique is lack of generalizability to the population as a whole and could lead to a biased result.

6. Conclusion and recommendations

This study presented a comprehensive understanding about the determinants that contributed to the up-surged online shopping in Malaysia during the pandemic. The study integrated TAM theory by using PU, PEOU, SN, PR and SI variables to provide useful insights on the consumers' BI on using online shopping. The results concluded that perceived usefulness, perceived ease of use and situational influences have significant influence on Malaysian consumers' behavioral intention to adopt online shopping during pandemic times. However, subjective norms and perceived risk have showed an insignificant relationship with consumers' behavioral intention. This research adopted the TAM model and added some variables, such as subjective norms, perceived risk and situational influences, aimed to fit the current situation. This can provide a deeper understanding about the online shopping in Malaysia and it is useful for future research. Furthermore, this study is useful for Malaysian governments and SME owners to gain an insight into the online shopping adoption determinants. Limitations and recommendations have been included in order to enhance future studies. Regarding recommendations, the first recommendation would be to carry out the longitudinal perspective for future research. This can analyze the changes in

respondents in the long term. Although investigating a single point in a decision event is allowed, the antecedent factors that lead to that tipping point is also important. Future research can also focus on changes in before and after the event. Future researchers can also consider to adopt multimethod quantitative if there is sufficient time and budget. By applying two or more quantitative methods, the drawbacks can be offset by each other's benefits. The next recommendation is related to the sampling location. Future research can conduct in the whole country, Malaysia. This can cover all the states in Malaysia, as citizen in different states may have different viewpoints and perception due to the different development of online shopping and logistics among the states. To address the limitation on convenience sampling technique, future researchers can gather large samples in order to strengthen the generalizations.

Author details

Krishna Moorthy[1]*, Te Nian Ci[1], Aufa Amalina Kamarudin[1], Normala S. Govindarajo[1] and Loh Chun T'ing[2]

1 School of Economics and Management, Xiamen University Malaysia, Sepang, Selangor, Malaysia

2 Faculty of Business and Finance, Universiti Tunku Abdul Rahman, Perak, Malaysia

*Address all correspondence to: krishna.manicka@xmu.edu.my

References

[1] World Health Organization. Coronavirus. 2020. Available from: https://www.who.int/health-topics/coronavirus#tab=tab_1

[2] Shah AUM, Safri SNA, Thevadas R, Noordin NK, Rahman AA, Sekawi Z, et al. COVID-19 outbreak in Malaysia: Actions taken by the Malaysian government. International Journal of Infectious Diseases. 2020;**97**:108-116. DOI: 10.1016/j.ijid.2020.05.093. Epub 2020 Jun 2. PMID: 32497808; PMCID: PMC7264933

[3] Tong A, Gong R. The Impact of COVID-19 on SME Digitalisation in Malaysia. 2020. The Impact of COVID-19 on SME Digitalisation in Malaysia. Available from: https://blogs.lse.ac.uk/seac/2020/10/20/the-impact-of-covid-19-on-sme-digitalisation-in-malaysia/

[4] Nathan L. The Boom of Online Shopping in Covid-19 Era. 2021. Available from: https://themalaysianreserve.com/2021/01/01/the-boom-of-online shopping-in-covid-19-era/

[5] Bhatti A, Akram H, Basit HM, Khan AU, Naqvi SM, Bilal M. Online shopping trends during COVID-19 pandemic. International Journal of Future Generation Communication and Networking. 2020;**13**(2):1449-1452. Available from: https://lovacky.eu/ws/media-library/8291b8bb61d0458d9bec753432dc4842/qualitativepaper.pdf

[6] Goyal S, Sergi BS, Esposito M. Literature review of emerging trends and future directions of online shopping in global business landscape. World Review of Entrepreneurship, Management and Sustainable Development. 2018;**14**(3):312-332. DOI: 10.1504/wremsd.2019.098454t

[7] Kiu CC, Lee CS. Online shopping market trends: A case study in leveraging Web 2.0 technologies to gain and improve competitive advantage. International Journal of Business Information Systems. 2017;**25**(3): 373-392. DOI: 10.1504/IJBIS.2017.10005086

[8] Hasanat MW, Hoque A, Shikha FA, Anwar M, Hamid AB, Huam H. The impact of coronavirus (Covid-19) on E-business in Malaysia. Asian Journal of Multidisciplinary Studies. 2020;**3**(1): 85-90. Available from: https://www.researchgate.net/publication/340445932_The_Impact_of_Coronavirus_Covid-19_on_E-Business_in_Malaysia

[9] Lee N, Cheong J, Mansur K, Mahmud R. The impact of coronavirus (Covid-19) on E-business in Malaysia: A review. In: 1St International Conference on Entrepreneurship and Small Business (ICES2020). 2020;**3**(1):212-219

[10] Harizan SHM, Shukor MHA. Factors influencing the intention to buy fashionable apparel via online platforms: An empirical evidence from Malaysia. International Journal of Asian Social Science. 2021;**11**(2):98-113. DOI: 10.18488/journal.1.2021.112.98.113

[11] Davis FD. A technology acceptance model for empirically testing new end-user information systems: Theory and results [doctoral dissertation]. US: Massachusetts Institute of Technology; 1986. Available from: https://dspace.mit.edu/bitstream/handle/1721.1/15192/14927137-MIT.pdf

[12] Davis FD, Bagozzi RP, Warshaw PR. User acceptance of computer technology: A comparison of two theoretical models. Management

Science. 1989;**35**(8):982-1003. DOI: 10.1287/mnsc.35.8.982

[13] Mathieson K. Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. Information Systems Research. 1991;**2**(3):173-191. DOI: 10.1287/isre.2.3.173

[14] Taylor S, Todd PA. Understanding information technology usage: A test of competing models. Information Systems Research. 1995;**6**(2):144-176. DOI: 10.1287/isre.6.2.144

[15] Fathema N, Shannon D, Ross M. Expanding the technology acceptance model (TAM) to examine faculty use of learning management systems (LMSs) in higher education institutions. Journal of Online Learning & Teaching. 2015;**11**(2): 210-232. Available from: https://www.researchgate.net/publication/281842180_Expanding_The_Technology_Acceptance_Model_TAM_to_Examine_Faculty_Use_of_Learning_Management_Systems_LMSs_In_Higher_Education_Institutions

[16] Leiva F, Climent S, Cabanillas F. Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. Spanish Journal of Marketing-ESIC. 2017;**21**(1):25-38. DOI: 10.1016/j.sjme.2016.12.001

[17] Essel DD, Wilson OA. Factors affecting university students' use of Moodle: An empirical study based on TAM. International Journal of Information and Communication Technology Education (IJICTE). 2017; **13**(1):14-26. DOI: 10.4018/IJICTE.2017010102

[18] Venkatesh V, Davis FD. A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science. 2000;**46**(2):186-204. DOI: 10.1287/mnsc.46.2.186.11926

[19] Rattanaburi K, Vongurai R. Factors influencing actual usage of mobile shopping applications: Generation Y in Thailand. Journal of Asian Finance, Economics, and Business. 2021;**8**(1): 901-913. DOI: 10.13106/jafeb.2021.vol8.no1.901

[20] Denaputri A, Usman O. Customers' Trust and Technology Acceptance Model on Online Purchase Intention. 2020. Available at SSRN: https://ssrn.com/abstract=3647193. DOI: 10.2139/ssrn.3647193

[21] Ananda NA, Fietroh MN, Mikhratunnisa M, Rizqi RM. Theory acceptance model and purchase intention in online shopping. Advances in Social Science, Education and Humanities Research. 2020;**465**:165-169. DOI: 10.2991/assehr.k.200827.042

[22] Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly. 1989;**13**:319-340. DOI: 10.2307/249008

[23] Kucukusta D, Law R, Besbes A, Legohérel P. Re-examining perceived usefulness and ease of use in online booking. International Journal of Contemporary Hospitality Management. 2015;**27**(2):185-198. DOI: 10.1108/IJCHM-09-2013-0413

[24] Koch J, Frommeyer B, Schewe G. Online shopping motives during the COVID-19 pandemic—Lessons from the crisis. Sustainability. 2020;**12**(24):10247. DOI: 10.3390/su122410247

[25] Youssef AA, Jaafari M, Belhcen L. Factors Affecting the Online Purchase Intention during COVID-19 Crisis: The

Case of Morocco. SSRN; 2020. DOI: 10.2139/ssrn.3734389

[26] Salem, M. A., & Nor, K. M. (2020). The effect of COVID-19 on consumer behaviour In Saudi Arabia: Switching from brick and mortar stores to online shopping. International Journal of Scientific & Technology Research, 9(07), 15-28. Available from: https://www.ijstr.org/final-print/jul2020/The-Effect-Of-Covid-19-On-Consumer-Behaviour-In-Saudi-Arabia-Switching-From-Brick-And-Mortar-Stores-To-Online shopping.Pdf

[27] Iriani SS, Andjarwati AL. Analysis of perceived usefulness, perceived ease of use, and perceived risk toward online shopping in the era of Covid-19 pandemic. Systematic Reviews in Pharmacy. 2020;**11**(12):313-320. DOI: 10.31838/srp.2020.12.50

[28] Ramayah T, Ignatius J. Impact of perceived usefulness, perceived ease of use and perceived enjoyment on intention to shop online. ICFAI Journal of Systems Management (IJSM). 2005;**3** (3):36-51

[29] Davis K. Newstrom, Human Behavior at Work: Organization Behavior. New York: McGraw Hill Book Company; 1985

[30] Yadav M, Goel M, Sharma B. Consumer perception towards online shopping during lockdown. International Journal of Management. 2020;**11**(7): 1578-1584. DOI: 10.34218/IJM.11.7.2020.140

[31] Lisdayanti A, Roespinoedji D, Saudi MH. The effect of perceptions of ease and perception of risk on interest in shopping online using the shopee application in the pandemic era. Palarch's Journal of Archaeology of Egypt/Egyptology. 2020;**17**(10): 1288-1297. Avaialble from: https://archives.palarch.nl/index.php/jae/article/view/4826

[32] Fishbein M, Ajzen I. Belief, Attitude, Intention, and Behaviour: An Introduction to Theory and Research. Reading, MA: Addison-Wesley; 1975

[33] Akar E. Customers' Online Purchase Intentions and Customer Segmentation During the Period of COVID-19 Pandemic. Journal of Internet Commerce. 2021;**20**(3):371-401. DOI: 10.1080/15332861.2021.1927435

[34] Islam A, Anjum N, Ahmed I. Predicting consumers' intention to shop online in an emerging market: A COVID-19 perspective. Journal of Marketing and Consumer Behaviour in Emerging Markets. 2021;**1**(12):4-18. DOI: 10.7172/2449-6634.jmcbem.2021.1.1

[35] Ranasinghe U, Kuruppu U, Herath H,Wijayagrahi H, Mel WD. Factors affecting young consumers' online purchase intention in Sri Lanka: With special reference to undergraduates in general sir John Kotelawela defence university. 13th International Research Conference, General Sir John Kotelawela Defence University, Allied Health Sciences Sessions. 2020:85-94. DOI: 10.13140/RG.2.2.29965.36321

[36] Moon J, Choe Y, Song H. Determinants of consumers' online/offline shopping behaviours during the COVID-19 pandemic. International Journal of Environmental Research and Public Health. 2021;**2021**(18):1593. DOI: 10.3390/ijerph18041593

[37] Pham VK, Nguyen TL, Do TTH, Tang MH, Thu Hoai HL. A Study on Switching Behavior Toward Online Shopping of Vietnamese Consumer During the Covid-19 Time. 2020

[38] Prasad RK, Srivastava MK. Switching behavior toward online shopping: Coercion or choice during Covid-19 pandemic. Academy of Marketing Studies Journal. 2021;**25**(1): 1-15. Available from: https://search.proquest.com/openview/3874aad4d31ccc54327075a97fa2e538/1?pq-origsite=gscholar&cbl=38744

[39] Tanner J, Raymond M. Principles of Marketing. Nyack, NY: Flat World Knowledge; 2010

[40] Hashem TN. Examining the influence of COVID 19 pandemic in changing Customers' orientation towards E-shopping. Modern Applied Science. 2020;**14**(8):59-76. DOI: 10.5539/mas.v14n8p59

[41] Verweijmeren RW. The effect of COVID-19 on consumer adoption of the online purchase channel for grocery shopping. In: Behavioural, Management and Social Science. 2020. Available from: http://essay.utwente.nl/81787/

[42] Nguyen HV, Tran HX, Van Huy L, Nguyen XN, Do MT, Nguyen N. Online book shopping in Vietnam: The impact of the COVID-19 pandemic situation. Publishing Research Quarterly. 2020;**36**: 437-445. DOI: 10.1007/s12109-020-09732-2

[43] Eldabi T, Irani Z, Paul RJ, Love PE. Quantitative and qualitative decision-making methods in simulation modelling. Management Decision. 2002; **40**(1):64-73. DOI: 10.1108/00251740210413370

[44] International Trade Administration. 2020. Malaysia—eCommerce. Available from: https://www.export.gov/apex/article2?id=Malaysia-Online shopping

[45] Saunders M, Thornhill A, Lewis P. Research Methods for Business Students. United Kingdom: Pearson Education Limited; 2009

[46] Dinesh S, MuniRaju Y. Scalability of online shopping in the covid-19 era. International Journal of Research-GRANTHAALAYAH. 2021;**9**(1):123-128. DOI: 10.29121/granthaalayah.v9.i1.2021.3032

[47] Hinkin T. A review of scale development practices in the study of organizations. Journal of Management. 1995;**21**(5):967-988. DOI: 10.1016/0149-2063(95)90050-0

[48] Treece EW, Treece JW. Elements of Research in Nursing. 3rd ed. Maryland Heights, MO: Mosby; 1982

[49] Kraisuth D, Panjakajornsak V. Thai AEC engineer readiness: A confirmatory factor analysis. SAGE Open. 2018;**8**(1): 1-16. DOI: 10.1177/2158244017745346

[50] Kline RB. Principles and Practice of Structural Equation Modeling. NY: The Guilford Press; 2015

[51] Ratnasari D, Nazir F, Toresano LOHZ, Pawiro SA, Soejoko DS. The correlation between effective renal plasma flow (ERPF) and glomerular filtration rate (GFR) with renal scintigraphy 99m Tc-DTPA study. Journal of Physics Conference Series. 2016;**694**(1):1-6. DOI: 10.1088/1742-6596/694/1/012062

[52] Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis. 7th ed. Upper Saddle River, NJ: Pearson Education; 2010

[53] Gao X, Shi X, Guo H, Liu Y. To buy or not buy food online: The impact of the COVID-19 epidemic on the adoption of online shopping in China. PLoS One. 2020;**15**(8):1-14, e0237900. DOI: 10.1371/journal. pone.0237900

Chapter 4

Gadgets Are Always in the Hands of Consumers: The Triggers for Impulsive Buying Behavior

Zinggara Hidayat

Abstract

Media technology is changing how people communicate, work, consume goods and services, and socialize. Meanwhile, digital devices always move wherever people move, even when the owner is sleeping, making people very dependent on gadgets. This book chapter examines impulse buying habits by controlling online product campaigns. Because online and offline life cannot always overlap during the COVID-19 pandemic, gadgets always guide every activity, including shopping, and become impulsive triggers. The literature review approach to 152 articles that have been published in various academic journals is analyzed with the dimensions of "Resources" of shopping activities, psychologically "Internal" factors, and "External" factors of retail industry marketing communication activities. The results show that new resources that are the primary basis for impulsive buying are gadgets or devices and marketplaces with their applications. Internal factors that encourage impulsiveness are cognitive dissonance, hedonism and materialism, anxiety/uncertainty, and self-esteem, plus 18 external factors that trigger impulsive buying (price discounts, marginal need for the item, mass distribution, self-service, social media ad campaigns, prominent store display, short product weight, ease of storage, retailer's apps, visual and aroma products, live streaming, credit card and e-money, peer group interaction, in-store events, sales-person performance, point-of-purchase, and online review). In closing, managerial implications and future research related to impulsiveness and online shopping are also discussed.

Keywords: consumer behavior, gadget, impulsive buying, live streaming, marketplace, shopping

1. Introduction

Impulsive buying behavior is a topic that has attracted the attention of researchers in the field of consumer behavior. This concept is even more so with the significant changes in media technology. Social media is changing the landscape of channels of marketing distribution, retailing, online shopping, the way people shop, and the communication approach taken by retailers. Media technology causes the rapid and significant changes that occur not only at the level of individual consumers—with all its psychological consequences, but also in groups, communities, and society.

Furthermore, the e-commerce landscape is increasing in various online shopping names such as e-shop, e-store, Internet shop, webstore, virtual store, and online store. The existence of the retailing world is in a conventional transition journey by integrating the online life applications of its customers. People shop from home and go to the store shopping while having fun.

The uniqueness of contemporary consumer behavior is that interactions, communications, and transactions are carried out online and offline wherever they shop. Gadget communication devices or devices have been massively distributed, adopted, and used by people who are the target market for the retail industry. Devices or gadgets have become part of the fashion elements inherent in the individual's body. Digital devices are becoming an inseparable part of the human body where they move by absorbing information, getting entertainment, and shopping. Gadgets, applications, and e-money have become resources that make it easy to shop.

Shopping is an integral part of everyone's free time in urban, suburban, and even rural areas. However, this chapter discusses consumer behavior motivated by urban and suburban interactivity with modern shopping. Because shopping is part of the urban lifestyle and has been embedded in urban culture, expressions such as "shopaholic," "retail therapy," and "shop 'til you drop" have become commonplace in urban popular culture [1].

Many scholars with their respective perspectives have studied various studies on shopping. The concept of shopping has several aspects related to urban people's leisure time, such as individual independence, having fun, enjoying the shopping recreation arena, and becoming a hobby in between busy work [2]. Meanwhile, several other perspectives are unique for discussing shopping activities because they involve the motive of consumerism religiosity [3] and become the determinant of political consumerism and donations [4]. Shopping can also be seen as part of the freedom that must fight for because it is a human right [5] and a study of environmental care or shopping as eco-consumerism [6]. All study aspects are interesting to discuss but are still neglected regarding devices and marketplaces as new resources and internal psychological and external factors that determine impulsive buying behavior. This book chapter explicitly discusses this new element as a trigger for impulsive buying.

Various research approaches to examine impulsive buying have been carried out by many researchers, including empirical research [7], qualitative approaches [8], even terms of gender differences in examining cognitive and affective impulse buying [9], and external and internal trigger cues of impulse buying online [10]. This article was compiled using a literature review approach that analyzed 152 similar articles from various academic journal publications. This discussion aims to summarize with a focus on subjects missed by previous research regarding impulse buying both offline and online. Shopping is an activity that consumers prefer. Apart from the economic cycle in individuals and families, spending most of that income is also an activity for fun. Many consumers are accustomed to buying impulsively. Whether young people or adults in a family, almost everyone experiences it.

This chapter discusses impulsive buying behavior by considering the combination of offline and online conditions. The existence of physical stores and shopping centers is still growing in city centers. Still, retailers are very aggressive in digital retailing, collaborating with unicorns, delivering services, and financial technology with e-money, and revamping the website into a shopping application as the main homepage to build long-term relationships with every family. The focus of attention in the discussion is consumer behavior from individuals, groups, and consumers who classically have impulsive characteristics as shoppers, both in conventional

stores and e-stores. This discussion puts gadgets at the center and guides everyone's activities, including shopping.

2. Conceptual framework

2.1 Impulse

The term "impulsive" is generally understood as a psychological problem. However, impulsive behavior can be viewed from various perspectives. From a philosophical view, impulsiveness is addressed centrally in the legend of Adam and Eve [11], and sometimes people associate it with "The Grasshopper and the Ant" [12]. That impulsivity has become part of the identity and necessity of living humans on planet Earth.

Furthermore, from a sociological point of view, people in their groups have behavior patterns of "deferred gratification," [13] "impulse renunciation," [14] and "instrumental orientation" [15]. Every human being from the moment they are born into children, adolescents, and growing up.

The impulse from a psychological perspective views human consumption behavior [16]. Psychological studies define impulse as "a strong, sometimes irresistible urge; a sudden inclination to act without deliberation" [17]. Impulse becomes a stimulating and motivating agent from within the individual, both consciously and unconsciously. Psychological impulses thus describe actions that occur suddenly and spontaneously. After being triggered by a strong stimulus, the impulse is forced to appear and demands immediate action. Impulses are not planned but come suddenly after a confrontation with a particular unavoidable stimulus [18].

Social psychologists study impulsivity through experimental research on people's capacity to delay gratification. Impulsivity was positively correlated with age, intelligence, social responsibility, and the presence of a father at home for his family. If someone is quiet, it turns out that his ability to delay gratification is negatively correlated. People from disadvantaged families also experienced low ability to delay gratification and the length of the procrastination interval [19–21].

Psychoanalytic further illustrates that impulse control has become a social need, based on Freud's (1956) claim that human civilization is determined by individual development and internalized impulse control. Impulse, for him, is a competitive force between pleasure and reality. People compromise desired pleasures and realities, which gives birth to rational considerations. However, some people are in the spikes of stimuli in everyday life, and they become accustomed to it as a unique personality [22]. The pleasure principle causes immediate pleasure. People are always comfortable with pleasure, but when there is no meeting point with reality, the impulse moves toward equilibrium at the rational point.

The solid and persistent urge of impulse concept becomes unbearable, resulting in a sudden tendency to act without consideration [17, 12]. Impulses always arise in confrontation with a stimulus [18]. In addition, impulses maintain substantial incentive value consisting of hedonic reactions to tempting situations [23]. In addition, impulses can be challenging to resist by involving pleasurable experiences [12].

Analysis with a more recent economic perspective on impulse focuses its attention on the problem of conflict due to scarcity. The dispute arises from consumers' choices to get goods because they are faced with decisions between saving and impulsive spending [24].

2.2 Impulse buying

In the context of consumer behavior, the psychological-economic perspective is the approach to discussing impulsive buying in this chapter. The term "impulse buying" refers to a range of phenomena in consumers with a narrower and more specific meaning than "unplanned buying." Individual consumers are faced with many new products, the advantages of new features, and new ways that are more attractive every time consumers experience impulse pressure. The definition of impulse buying is appropriate in the following way: [12]

> *Impulsive buying occurs when a consumer experiences a sudden, often strong, and persistent urge to buy something immediately and spontaneously. The urge to buy is hedonic in nature and can stimulate emotional conflict without regard for the consequences.*

Individual consumers get pleasure in impulsive buying and make it an extraordinary and exciting experience [12, 25]. Impulse buying is often compelling and urgent when consumers physically visit a store. So are contemplative purchases compared to surfing online when people relax and freely adjust their exposure. But both are equally fast, and even online shopping can be even quicker. Buyers tend to take the product rather than linger choosing the product. The impulsive behavior is more spontaneous, instant than long, thinking, and careful. While contemplative buying is more of a continuum, impulsiveness is more emotional [12], and consumers enjoy walking quickly between displays while rapidly picking up items.

The concept of impulsive buying has long attracted the attention of researchers. Early studies of the retail business in the 1950s showed that compulsive and impulsive buying was common. A certain percentage of retail sales are made by customers in response to sudden urges while shopping [26]. Customers buy many unplanned items from their homes but decide when they see them in the store. Purchases immediately and with solid encouragement [27, 28] are made by shoppers with a sense of pleasure and enjoy this shopping way.

Impulse buying is a buying process that is not based on a previous purchase plan but occurs when an impulse or stimulus arises from the feeling of wanting to have something visible at that time. Impulsive buyers then manipulate emotional or cognitive reactions. So, the main characteristics of impulse buying are unplanned, immediate, emotional, or mental reactions and exposure to the stimulus [29]. Impulsive shoppers feel the adrenaline of shopping pleasure when they can pick up any item they see and feel good about. Mindfulness occurs in the shopping experience, that is, in a state of mind, established by a non-judgmental awareness of the present and non-reactionary attention to one's thoughts, sensations, feelings, and emotions [30].

Decades after the initial research on impulse buying, online impulse buying is now finding new ways to make people more accustomed to being impulsive. The enjoyment of online surfing is also obtained as people shopping come to the store. The psychological factors of impulsive online buying are stress reactions, self-esteem, materialism, boredom, positive influence, absorption, shopping pleasure, need for consumption, and hedonic and utilitarian habits [31].

Four types of impulse buying are found in consumer behavior [28]. The first is pure impulse buying. This type of transaction is made with a genuinely impulsive purchase, a novelty purchase, or a breakout that breaks the usual pattern. Emotional attraction triggers pure impulse buying.

The second is reminder impulse buying. This type of purchase occurs when a customer sees an item and then remembers that the item's stock at his house is running low and so decides to buy it immediately. The customer also places the advertisement or other information about the product and buys it instantly. This "remembering" factor triggers impulsive buying.

The third is suggestion impulse buying. This type of suggestion occurs when a customer sees a product for the first time and visualizes his need for a moment, even though he has no prior knowledge of the product. Since the product is new, quality, functionality, and the like must be evaluated at the point of sale. Thus, the purchase of suggestions tends to be somewhat rational.

The final one is planned impulse buying. This kind of strange-looking purchase occurs when a buyer enters a store (or online application) with a particular purchase plan in mind or notes but is accompanied by the hope or intention of buying other items depending on conditions such as discount prices and other benefits. This type of "planned" is the most significant impulsiveness, and it is suspected that housewives like this way of shopping.

2.3 Young consumers

Impulsive buying highlights suspected consumer characteristics—and various studies have been conducted on this consumer group—to be identical to the impulsive shopping experience. Young consumers often feel anxious about image satisfaction to please their loved ones, and young people like adventures, including when shopping. Payment solution facilities also support the habit of not having to think long term and intensify irrational buying behavior among young consumers [32].

Furthermore, young consumers who are very synonymous with technology need further rights. That young people have a habit of digging up information quickly and accurately about what products they buy. The daily life of young people is difficult to separate online and offline because wherever they are, they are always shared via live streaming images or videos [33]. The independence and intelligence of young people to acquire product knowledge are extraordinary, so it is assumed that there are no new products that they are not familiar with before deciding to buy impulsively. However, various studies have shown that intrinsic factors make sense to influence young consumers' impulsive buying tendencies [32].

2.4 Female consumers

Various studies concluded two groups of consumers with different behavior between males and females from all selected intrinsic factors. Based on the analysis, female tend to be more prone to cognitive dissonance, unwanted advocacy, and affirmative buying sensations than their counterparts [32]. Many male consumers are concluded as a group of consumers who rely on rationality in the decision-making process. Meanwhile, the emotional aspect is identified with female characteristics in the decision-making process. However, further investigation must consider other variables such as education level, managerial experience, leadership training, etc.

Female consumers are significantly the decision-makers for almost all products related to the family or household. Various product lines are intended for living rooms, family rooms, dining rooms, kitchens, furniture, electronics, and home appliances. Even the determination of the color of the walls and roof of the house is in the hands of female consumers. Female consumers play a significant role in spending

family money. Meanwhile, impulsive buying as an act involving the emotional side is a characteristic of females. These two merging sides make female consumers very vulnerable to impulse buying.

Earl Puckett, a practitioner in the retail industry and Chairman of the Allied chain of department stores, was quoted in Fortune magazine as saying: "Female spend money like conservative trustees in charge of somebody else's money."! It has also been said that "one of the harshest canards of our time is that female are impulsive buyers with an almost neurotic compulsion to squander their household money on any bauble that chances to catch their fancy" [28, 34]. This retail industry practitioner's comments reflect the general belief that in shopping for daily necessities, female are the main realistic and efficient buyers. Female consumers are very decisive in distributing and consuming products even though many of their purchases are not carefully planned. The intentional non-planning type of impulse buying may be an integral part of the efficiency of female consumers as contemporary shoppers.

Groups of urban female workers grow as communities that quickly form global networks between countries. The existence of this female consumer community is essential as a core element of urban culture. Their skills in viral products, menus, atmosphere, locations, brands, and so on are very significant. Female with modern urban lifestyles have a substantial relationship with impulse buying behavior among working ladies, while brand reputation and country of origin of the product are not [35].

3. Methodology

The literature review is the methodology of choice in this research article, considering the field of business research is accelerating at a tremendous speed [36]. The literature review method attempts to analyze, summarize, and evaluate various academic writings on impulsive buying from various credible sources [37]. Various secondary data sources were explored and reformulated in this literature review. Multiple sources were evaluated, primarily academic journal articles, books, and web-based resources [38]. Search literature through "Google scholar," "ResearchGate," and "Academia" with the keywords such as "impulsive buying," "online impulsive," and "impulsive online buying." Selected articles are verified by taking research papers published in international journals. Data come from 152 relevant articles. The conceptual framework is geared toward developing an understanding of the subject area. The literature review involves scanning, taking notes, compiling a literature review, writing a literature review, and building a bibliography.

Categorization is based on shopping events, namely offline or physically coming to the onsite store with all the atmosphere that might affect impulsive buying. In addition, online shopping events with all elements of websites and applications and support facilities make it easier for people to decide on impulse shopping.

4. The triggers for impulsive buying behavior

Among the various models of buying decision-making and consumer behavior, one thing that has received less attention is the unconscious mental processes of consumer choice. This basis is used as a guide for developing the new Martin-Morich model of consumer behavior. Predictions on consumer behavior to be

accurate first must be understood consciously or unconsciously how consumers interact with brands, products, websites, or stores as an interaction level of automation. The level of consumer automation along the conscious to the unconscious continuum is broken down into autopilot, pilot, or co-pilot mode categories [39]. The level of automation (autopilot) is higher to navigate the situation if the consumer is more familiar and familiar with the environment and the more routine his behavior becomes.

In a person, an automatic process affects attitudes, beliefs, and goals to do something that psychologically involves behavioral mimicry, activation of traits and stereotypes, and the pursuit of unconscious goals. If the autopilot has often worked, automation becomes a habit. If the consumer perceives the environment as a novel, the conscious mind is actively involved in interpreting its environment and figuring out what to do [39]. Next, this basic model of consumer behavior was developed to analyze impulsive buying behavior (**Figure 1**).

A summary of the analysis results is presented in **Figure 2**, which shows the factors of impulsive buying behavior. Based on the findings of classical research, impulsiveness is divided into the impulsive mix such as pure, reminder, suggestion, and planned impulsive buying. The four components are triggered by three groups of triggers such as resources (money, time, physical effort, mental effort, gadgets, and marketplace apps). The second trigger group is internal or psychological factors such as cognitive dissonance, hedonism and materialism, anxiety/uncertainty reduction, and self-esteem. Third, there are 18 dominant external factors, such as price discounts, marginal need for items, mass distribution, self-service, social media ad campaigns, prominent store displays, and short product life. In addition, it is necessary to consider the small size of lightweight, ease of storage, retailer's apps, visual and aroma products, and live streaming. Onsite and online shopping experiences are also stimuli for impulsiveness, such as live streaming, credit cards and e-money, peer group interaction, in-store events, sales-person performance, point-of-purchase (pop), and online reviews.

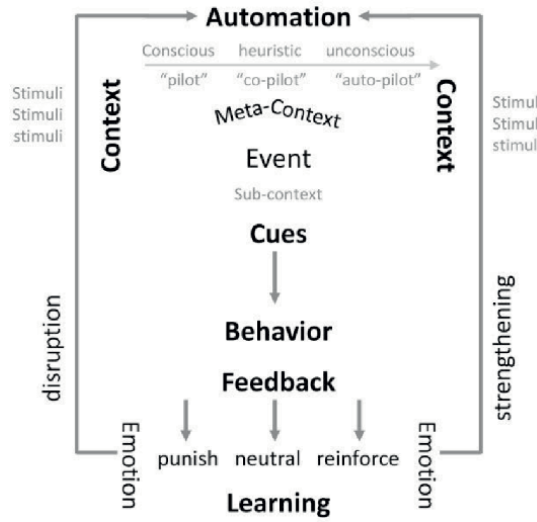

Figure 1.
The Martin-Morich model of consumer behavior [39].

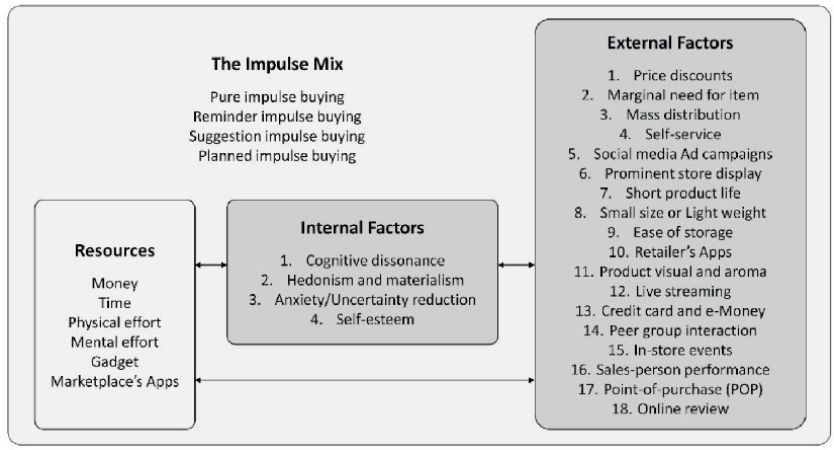

Figure 2.
The impulsive buying behavior factors. (source: Based on literature review) [28, 33].

The macro-environment in a society certainly has a hand in influencing the attitudes, thoughts, actions, and behavior of consumers. However, in this chapter, the cultural aspect is set aside because it only focuses on the closest internal and external factors to consumers. The assumption is that urban and suburban communities in various nation-states are relatively like modern societies and have relatively equal access to technological developments. So, impulse buying is influenced by multiple economic, personality, time, location, and even cultural factors. Impulsive buyers vary among different shoppers considering the purchase of the same item and for the same shopper who buys the same thing but in different buying situations. There has been an "impulse mix" of the four types of impulse buying above [28].

Whether physical distance or through online channels, the convenience of shopping allows consumers to intensify their impulse buying. The purchase of an item involves the expenditure of several resources: money, for the thing itself and for any expenses incurred to go to and from the store; time, on the way to or from the place of the purchase; physical exertion, such as walking or driving to or from a place of the purchase; and finally, mental effort, scheduling trips to the store and budgeting for purchases [28]. Contemporary society in the digital era adds resources such as media devices (gadgets) and marketplace apps. Technology has accelerated and made it easier for impulsive buying (**Figure 2**).

4.1 Internal factors

Internal factors in this case are psychological such as cognitive dissonance, hedonism and materialism, anxiety/uncertainty reduction, and self-esteem. These four elements influence impulse buying, although there may still be other psychological elements, but various studies have concluded that they have a significant effect.

4.1.1 Cognitive dissonance

Leon Festinger invented Cognitive Dissonance Theory (CDT) to explain when an individual holds two or more elements of knowledge that are relevant to each other but inconsistent with each other, uncomfortable states are created [40]. These conditions may make consumers feel uncomfortable about their previous actions or beliefs,

that is, a situation that consumers might seek to resolve by changing their attitudes to suit their behavior. Festinger theorized that people motivated by an unpleasant state of dissonance to engage in cognitive work to reduce inconsistency. To reduce dissonance, individuals can add consonant cognition, reduce dissonant cognition, increase the importance of consonant cognition, or reduce the importance of dissonant cognition. One way to reduce dissonance that is most often assessed is attitude change. Attitude changes in response to a state of dissonance are expected to lead to the cognitions that are most resistant to change [41, 42].

Consumers prone to cognitive dissonance tend to achieve unmatched product combinations. It will be easy for sellers to identify these consumers and match the appropriate product combinations [32]. Retailers or online stores can help consumers reduce cognitive dissonance [41] by providing broader and deeper merchandising width and depth. The shopper chooses the opportunity to know the current product diversity and make it a planned impulsive buyer.

According to Festinger, a person's attitude can change because of the factors inherent in the person. Individuals who are more impulsive will experience higher levels of cognitive dissonance after an unplanned purchase than individuals who are less impulsive [5]. Consumers act differently in inconsistent ways with their attitudes, beliefs, or opinions when confronted with marketing cues. Other previous studies have shown that sales promotions significantly affect impulsive buying behavior and post-purchase cognitive dissonance [43].

4.1.2 Hedonism and materialism

In philosophical psychology, hedonism is the view that all human action is ultimately motivated by desires for pleasure and the avoidance of pain. An intense emotional impulse accompanies every impulse purchase. The desire that likes feeling comfortable and happy and trying to avoid unpleasant things. Hedonism has been studied by many prominent philosophers, including Epicurus, Jeremy Bentham, and John Stuart Mill. The Britannica Encyclopedia writes: [44]

> *Psychological hedonism is a form of psychological egoism. Psychological egoism is a broader notion, however, since one can hold that human actions are exclusively self-interested without insisting that self-interest always reduces to matters of pleasure and pain.*

Furthermore, materialistic values and desire for goods may strongly correlate with online impulse buying [31]. Usually, people who adhere to extreme materialism seek dignity and social status [45]. A materialist considers material possessions as a central attribute of an individual's identity for success. Materialism is an individual's devotion to material desires, the desire to have more material things, and an interest in material ownership to achieve the desired condition, which ultimately determines and grows the nature of materialism in the individual. It is also found that consumers with high impulsivity have a high desire to buy impulsively because of hedonistic motivation [45, 46].

Hedonic shopping motivation strongly predicts exploratory information seeking and impulse buying. Further data show that hedonic shopping motivation influences online shopping behavior, affecting pre-purchase browsing time. Pre-purchase browsing time has a positive relationship with online purchase frequency [47]. Hedonic and Utilitarian shopping motive factors have been used to infer various effects of online shopping behavior, broadly categorized as impulse buying behavior and rational buying behavior [48].

Furthermore, hedonic motivation moderates the relationship between social characteristics of the retail environment and consumers' positive emotional responses [49]. Impulse buying behavior is a consumer experience that gradually becomes a habit. The patterns of shopping behavior formed in their subconscious will always repeat themselves. Because, psychologically, when a motor schema is triggered more frequently by exposure to a particular stimulus, it is more likely to persist in the future as a consumer habit [31].

4.1.3 Anxiety/uncertainty reduction

Anxiety/uncertainty reduction theory proposed by Berger and Calabrese [50] and developed by Gudykunst is related to anxiety that occurs due to uncertainty in predicting what and who is faced and what will happen in the future [51]. Although the context of interpersonal communication is from two different cultural backgrounds, a buyer, on the one hand, is also filled with anxiety because they do not know or do not have complete information on the conditions that occur.

Impulsive buying in times of crisis, such as the COVID-19 pandemic, can be understood because of the great anxiety of the consumer community about the scarcity of consumer goods. But even in regular times, fear always arises in individual consumers. Excessive anxiety due to scarcity or the individual is obsessed with buying—and their behavior occurs in response to negative emotions and decreases the intensity of negative emotions. Consumer euphoria or relief comes from negative emotions and lack of knowledge. Then, this feeling is the most common consequence of compulsive buying. Empirical studies proved the relationship between compulsive buying and anxiety [52]. For example, individual anxiety arises from excessive fear of information and news. If conventional media is now rarely consumed by families, exaggerated news on social media is a substitute. Sharing news that is not verified is increasingly making everyone anxious, which results in impulsive buying.

On the other hand, compulsive buying can also cause anxiety during the post-purchase period, especially compulsive buying, as consumers escape from the problems they face. Consumers can experience stress due to various life problems, and then he feels to reduce it by impulsive buying, but it turns out to bring new anxiety. Consumers who are reactive to stress can buy impulsively to lower negative emotional states and carry out shopping to avoid boredom and possible antecedents of online impulse buying [31].

4.1.4 Self-esteem

Self-esteem highlights the existence of individuals in a group. Self-esteem is the result of, and a necessary ingredient in, the process of self-verification that occurs in groups, sustaining individuals and groups. The self-esteem built up by self-verification buffers the negative emotions that arise when self-verification is problematic, thus allowing continued interaction and continuity in structural arrangements during periods of disruption and change [53]. Self-esteem amid peer groups, communities, or social structures can trigger impulsive buying. In the construction of feudal society, self-esteem often trumps individual rationality. People buy not because of need but to gain an image in the heads of their neighbors, coworkers, family, and even the wider community. Empirical research found that the greater the online impulse buying behavior, the lower the self-esteem [31]. Thus, compulsive buying behavior has a significant relationship with buying social status, materialism, and the perceived self-esteem of certain people. Specifically for the fashion product category,

research has found that compulsive buying is positively correlated with perceived social qualities [54].

Furthermore, empirical research shows that female score higher on self-esteem and fear of negative evaluation scales than men. Self-esteem and anxiety are positively related to impulsive and compulsive buying behavior [55].

4.2 External factors

4.2.1 Price discounts

The price factor is always a consideration for consumers to make purchases, both regular and impulsive. People tend to want to own a product when the price is discounted, and opportunities are scarce. The heavily discounted price automatically eliminates most other shopping opportunities. When there are discounts for high-cost products, such as cars, houses, and other luxury goods, there will be impulse buying by certain consumer groups. Thus, prices affect impulses, especially for consumers who know how to compare prices from different locations and sources. Impulse buying also occurs in convenience goods [28]. Empirical research investigates the effect of price discounts and bonus packages on online impulse buying and finds that the discount variable will further trigger online impulse buying for consumers if the product offered has a low price. The phenomenon of online and offline impulse buying certainly has a positive impact on marketers, retailers, and profits for stores [56].

4.2.2 Marginal need for the item

Regular purchases are based on needs, not wants [57]. Consumers must know or predict the level of demand for an item of goods. If it is beyond their needs, then the item is impulsive. Some consumer goods, such as grocery stores, bread, dairy, meat, and similar or packaged health aids and drugs at drugstores, are necessities that shoppers should schedule for regular trips. If it is not needed, it can be postponed until it is convenient to buy it, or it is called a marginal need item [28].

4.2.3 Mass distribution

Cooperation between manufacturers and online shops is a contemporary channel of marketing that makes it easier for consumers to find the products they are looking for. However, even in a conventional retail business, the problem of distribution and channel of marketing is very crucial. Because the more outlets where an item is available, the more opportunities for consumers to find and buy it. Since the impulsive consumer does not shop specifically for the item, it should be displayed and made available to them in as many marketplaces and stores as possible where they usually surf or come to shop [28, 58].

4.2.4 Self-service

Indeed, self-service allows shoppers to purchase more quickly and with greater freedom than attendant service operations. Online shopping also provides flexibility and pleasure to surf, explore product knowledge, or combine the desired product items yourself. However, self-service also offers an excellent opportunity to find unplanned items and make impulse purchases. As more items become available in

supermarkets and online shop websites and applications, there are increased opportunities for impulse buying [28]. Visual merchandising for online stores must pay attention to the attractiveness of merchandising presentation during self-service, such as fixturing, product density, display, and product adjacency; in-store environment, such as layout and interior; and in-store promotion as signage [59].

4.2.5 Social media ad campaigns

Advertising and marketing communication campaigns on social media are significant activities to attract consumers to shop impulsively. Impulsive buying tendencies of young consumers and marketers will be required to resort to an indirect approach of influencing the domestic ingredients through promotional and advertising techniques [32]. Because gadgets are permanently attached to the owner's body wherever they move, IG is one of the favorite social media among young people and female as part of their lifestyle [60]. Then, IG affects impulsive buying. The main reason for the decision from impulse buying is good online advertisement content, which is marked by informative, easily understood, and easily accessed content and attractive visualization [61]. Also, brand attitude and merchandise attractiveness, in turn, are positively related to the impulse to purchase [61, 62].

4.2.6 Prominent store display

Since, by definition, shoppers do not explicitly look for impulse items in stores, a prominent display of these items is necessary to increase the consumer's impulse buying opportunities. Here, the collection includes favorable shelf positions, special in-store promotions, and distinctive packaging [28]. Retail stores and online shops must display an atmosphere of engagement by providing comfort, enjoyment, modern style, and attractiveness of goods arrangement [63]. Empirical studies prove that the window display, forum display, floor merchandising, and shop brand name were significantly associated with consumer impulse buying behavior [64]. The display arrangement is also supported by an atmospheric engagement effect such as background music and scent [65] so that it affects impulsive buying.

4.2.7 Short product life

Items that are perishable or for other reasons have a short product life will be purchased more often than products with longer life. Except for necessities which may also be perishable or short-lived, the faster the buying cycle of an item, the more likely it is to be bought on impulse. The buyer purchasing the item often reduces his need to plan for it. He is more likely to rely on finding it in stores and buying it on impulse [28]. Empirical studies show that product categories that involve consumers' feelings at a low level stimulate consumers' online impulse buying tendencies. It is also proven that simultaneously there is an interaction effect between time pressure (product life cycle) and product type [66].

4.2.8 Small size or lightweight

Store visitors love to take things on the display shelves with ease and freedom. They grabbed it quickly and filled the trolley he was pushing. Products of small size and lightweight are preferred in impulse buying. So, regardless of price, size, or weight, an

item affects impulse buying. If the product is too big and heavy, then impulsive buyers tend to delay taking it spontaneously and become delayed impulsive buying or do not buy the item because they forget. On the other hand, small, light, easy-to-transport items do not pose such problems and are more likely to be impulsive [28, 67].

4.2.9 Ease of storage

Buyers who provide a place to put their groceries at home can easily match the physical size of the goods. That way, he immediately decided to impulsive buying. However, there are always consumers who do not associate the place of placing their interests in their homes, causing new problems in their homes. Thus, items that do not have storage problems are more likely to be impulsive items [28, 68, 69].

4.2.10 Retailer's apps

The physical presence of consumers in stores is replaced by marketplace or retailer applications. Consumers can freely choose the products and brands they want and they can shop efficiently because they do not have to leave the house. If consumers are already in the store area, connectivity with retailer applications continues. It is easier for consumers to control store containment through the gadgets in their hands. Devices model become guides in in-store shopping events or at home. Shopping online or both while visiting a store is a fun event and affects impulse buying. Positive and negative influences can impact hedonic and utilitarian online browsing, which in turn affects impulse buying intentions, and, thus, online impulse buying behavior [31].

Consumers' shops are guided by applications installed through Google Play or the App Store. But the trigger can be from IG ads, Facebook, or news from peer group friends. Consumers rely on their ability to multitask media on the impulse to buy. Even on the move and on location at store locations, multitasking continues. Empirical research finds that media multitasking increases purchase urges for individuals with higher impulse buying tendencies by mediating the high perceived utility of information. Media multitasking enhances purchase impulses for individuals with lower or moderate impulse buying movements by negotiating the high perceived utility of communication and social presence [70].

4.2.11 Visual and aroma

The visual appearance of the product usually attracts the eye. Still, if the consumption product includes food and beverage offerings in a restaurant, then the aroma must also draw the sense of taste of the traffic of visitors around it. Those with significant absorption levels may be more susceptible to sensory stimuli, being more likely to engage in online impulse buying [31]. The higher, more convincing smell of fast food within reach of consumers can well reverse the planning tendencies of highly adventurous shoppers. Opening a barbeque shop in a local community can trigger higher sales because it is vulnerable to irrational buying desired by shoppers.

4.2.12 Live streaming

Live streaming, one of the real-time social media applications, has become an excellent channel for communication campaigns. One live streaming is TikTok, with features that make it easy for creative users to interact and communicate commercial

messages. Practitioners and researchers refer to the *TikTok Way* as a new stream of shopping channels. Live streaming feature to drive interactive, informative, and immersive online shopping experience. Live streaming e-commerce revolutionizes conventional e-commerce business models by offering unprecedented real-time interaction between sellers and consumers, effectively reducing perceived distances, and solving the problem of information opacity [70, 71]. This interactivity mode provides information about the product, and the entertainment element is robust so that viewers can immediately make impulse buying.

Interactivity in computer-mediated communication (CMC) creates a two-way synchronous connection between sellers and consumers and vice versa reciprocally. Through written communication, consumers can participate actively by providing comments, reviews, experiences, and shares to potential consumers [72]. The potential ability of livestream commerce is to exploit consumers' impulsive "see-now-buy-now" mentality [71]. Moreover, the power of live streaming commerce to rake in billions in revenue within hours has propelled this commercial model into the global spotlight. Impulse buying in streaming marketing presents new challenges for developing producer-consumer interaction and collaboration models. In live streaming parasocial interactions, vicarious experiences, scarcity persuasion, and price perception can drive cognitive and affective reactions, which encourage impulse buying [71].

4.2.13 Credit card and eMoney

Financing credit facilities with credit cards are beneficial for consumers to transact so that they do not need to spend money when shopping in cash. It is like the e-money payment application. Although it is the same as paying cash, physical money is not required, including spending by m-banking transfer. Everything triggers consumers to shop freely and take items that are not planned or impulse buying. The decision-making process to buy on credit is defined as the cognitive process of choosing to use installments or pay on a delayed basis. The credit card payment facility is seen as an action that begins with choosing to consume the product and ends when the product is paid for, or debt is incurred to obtain it. The process is carried out in three phases [73], (1) before obtaining credit, (2) during the use of the credit, and (3) during the repayment period.

4.2.14 Peer-group interaction

Peer interaction includes both online and offline communication as both are integrated. Offline channels are slightly more likely to encourage impulse buying than online channels because everyone has relatively switched to social media channels of communication. The group's cohesiveness can influence its members to follow the trend of consumption that is trendy in the group. They share and provide recommendations to buy products that they do not need so much that they become impulsive. Thus, social networking within peer groups can significantly impact impulse buying [74].

In urban communities, such as female's workgroups or peer groups, consumers always influence each other to get the same shopping experience. Thus, social and idea shopping can influence online impulse buying [31].

4.2.15 In-store events

It is essential to attract the attention and engagement of visitors. Efforts to entertain and make visitors relax to enjoy the atmosphere will lead to their decision to buy

impulsively. People come to stores or shopping centers not only for shopping purposes but also to enjoy entertainment, eat, and meet friends. In-store events will provide a memorable experience, so one can easily be persuaded to buy impulsively. Several factors that must be considered are as follows: [49] (1) the ambient characteristics or design of the retail environment on consumers' positive emotional responses to the retail environment, and (2) consumers' positive emotional responses to the retail environment on impulsive buying behavior. On the other hand, online events on websites or applications, such as uniqueness and up-to-date appearance, emotional buying motives, and identity buying motives, influence online impulse buying directly [65, 75, 76].

The in-store shopping environment is divided into two categories [67, 77, 78], such as in-store promotions in coupons, discounts, and gifts. Also, the atmosphere inside the store is like the store display, salesforce, background music, and ventilation. However, in-store events can make a lasting impression, and visitors can spontaneously make impulse purchases because they are entertained and involved. Consumer characteristics and situational factors are against impulse buying. The resulting value for the impulse buying tendency constructs, such as the shopping enjoyment tendency, shows a significant positive effect [79].

The presence of celebrity endorsers in P-o-P advertising increases consumer impulse buying. Furthermore, celebrity endorsers are more effective in the case of high-involvement products than in the case of low-involvement products, and celebrity fit with product category also affects impulse buying, but only in the case of high-involvement products [80].

4.2.16 Sales representative performance

Shopping at hypermarkets, supermarkets, and minimarkets generally have officers or merchandisers who manage each product category area. They can be referred to as sales representatives sent by brand owners. Representatives work to break the ice with shoppers, speak politely, and help consumers start the in-store shopping process. The right approach and politeness in interacting and communicating will produce positive results to support impulse buying. The sales representative's role is seen as a cultural role, and their performance reflects the quality of retail services. The service quality of sales representative affects consumers' mood toward impulse buying [81].

4.2.17 Point-of-purchase (P-o-P)

Point-of-purchase (P-o-P) are strategic spots in stores often passed by visitors with relatively dense traffic compared to most routes. The placement of unique shelves in P-o-P with striking designs, colors, and lighting allows you to get a solid eye-catching from potential buyers. Electronic devices such as digital layers on each side of the sales shelf and hanging posters can be an attraction to trigger impulse buying stimuli. Various studies have also proven the importance of P-o-P, as in the type of brick-and-mortar shop [78] making impulsive buying, and likewise, consumer impulse buying and in-store stimulation in supermarkets [63]. In the application, P-o-P in physical stores is also replaced with online P-o-P in the form of banners to attract buyers' impulse purchases. P-o-P is integrated with a customer engagement atmosphere that presents enjoyment, modernity, and a strong appeal according to the urban lifestyle in stores or on websites, online retailer applications, or online shops (marketplaces).

Consumers do not like wasting time. When they are already in the queue in front of the cashier, consumers do not want to go back around looking for a product they

forgot to buy. Therefore, the P-o-P position in front of the cashier becomes very strategic for the impulsive product category. Meanwhile, features of mobile phone location-based advertising (MLBA) services such as customization, permission, and intrusiveness affect attitudes and purchase intentions. Interactive advertising will direct buyers to make impulsive buying when they are in-store. Visitors can engage in interactive advertising locally in the checkout area that provides dedicated P-o-P racks [82].

4.2.18 Online review

Gadgets or devices are always in the hands of almost all individual consumers, and they are connected online with social networks and channels of marketing and distribution. If there is not yet known information, people immediately go to Google to find it out very quickly. For example, during their lunch break, a group of female urban working groups has left the office to find the best place to eat in town. On the way, they find out and decide based on the recommendations of *Google Review* or *Zomato*. Impulsive buying will occur, and people will decide which path to go to the restaurant they just found in their car.

Online reviews have shown important information that influences consumers' online shopping behavior, especially its effect on consumers' online impulse buying behavior [83]. Empirical research findings suggest that consumers' perceived utilitarian and hedonic value from reading online reviews enhances their browsing behavior. Browsing marketplace apps affects consumers' impulse to buy impulsively and ultimately affects their impulse buying behavior.

After Google Reviews and *Zomato* are checked by consumers, they also need recommendations from ordinary people or celebrities who have consumed a product on YouTube or Instagram. However, online reviews are not the ultimate guide to decision-making, but a strong desire to explore new products and meeting places and try new challenges that lead to impulse buying. Empirical research shows the emergence of celebrity roles in social media and embedded social interactions in impulse buying, even though users encounter them simultaneously and frequently while browsing. Consumers are always looking for and asking for their gadgets to help provide the best choice when shopping. Consumers look to social media celebrity posting channels and contextual interactions to decide on impulse purchases [84].

5. Conclusions

Impulse buying has become part of some people's identity as consumers and cannot be separated from its characteristics as part of the economic cycle in their lives. In varying degrees of impulse buying, four types of impulses can shift according to changes from the emotional side to the rational side and vice versa. They can be divided into pure impulse buying, reminder impulse buying, suggestion impulse buying, and planned impulse buying.

The resources used by consumers in the practice of impulse buying include capital in the form of money, time, physical effort, mental effort, gadgets or media technology, and marketplace applications.

Internal factors that determine the occurrence of impulse buying include cognitive dissonance, hedonism and materialism, anxiety/uncertainty reduction, and self-esteem. Some or all of them can intertwine with individual consumers to make impulse

buying consciously and unconsciously, and physically directly at store locations and or online through devices or gadgets that are always in the hands of consumers.

External factors that determine the occurrence of impulse buying are all marketing communication activities in physical retailing and or online shopping activities. Eighteen external factors include price discounts, marginal need for the item, mass distribution, self-service, social media ad campaigns, prominent store displays, short product life, small size or lightweight, and ease of storage. In addition, the determining factors are the retailer's application, visual and aroma products, live streaming, credit cards and e-money, peer group interaction, in-store events, sales-person performance, point-of-purchase (P-o-P), and online reviews.

The managerial implication of this chapter is that consumers must be dynamic in adopting the type of impulse buying in themselves, and gadgets should be used to explore information so that consumers get high value when shopping. The recommended impulse buying is planned impulse buying by considering the role of technology in obtaining information about the products purchased. The managerial implication for retailers and online shops is that as part of the marketing channel, the companies must educate their consumers. Retailers and online stores arrange the suitable type of impulses. Companies and customers need a mutual relationship, collaborates in customer engagement, and prioritizes the role of media or online technology as a two-way communication channel with customer.

Acknowledgment

The authors would like to thank the Research Center of Bina Nusantara University, for funding this research with contract number 017/VR.RTT/III/2021.

Author details

Zinggara Hidayat
Communication Department, BINUS Graduate Program—Master of Strategic Marketing Communication, Bina Nusantara University, Jakarta, Indonesia

*Address all correspondence to: z.hidayat@binus.edu

References

[1] Darrat AA, Darrat MA, Amyx D. How impulse buying influences compulsive buying: The central role of consumer anxiety and escapism. Journal of Retailing and Consumer Services. 2016;**31**:103-108. DOI: 10.1016/j.jretconser.2016.03.009

[2] Jackson EL. Shopping and leisure: Implications of West Edmonton Mall for leisure and for leisure research. Canadian Geographer/Le Géographe Canadien. 1991;**35**(3):280-287. DOI: 10.1111/j.1541-0064.1991.tb01102.x

[3] Rittenhouse BP. Shopping for Meaningful Lives: The Religious Motive of Consumerism. Eugene, OR, US: Wipf and Stock Publishers; 2013

[4] Sandovici ME, Davis T. Activism gone shopping: An empirical exploration of individual-level determinants of political consumerism and donating. Comparative Sociology. 2010;**9**(3):328-356. DOI: 10.1163/156913209X12499527665468

[5] Micheletti M, Follesdal A. Shopping for human rights. An introduction to the special issue. Journal of Consumer Policy. 2007;**30**(3):167-175. DOI: 10.1007/s10603-007-9039-0

[6] Dauvergne P, Lister J. The prospects and limits of eco-consumerism: Shopping our way to less deforestation? Organization & Environment. 2010;**23**(2):132-154. DOI: 10.1177/1086026610368370

[7] Chopdar PK, Paul J, Korfiatis N, Lytras MD. Examining the role of consumer impulsiveness in multiple app usage behavior among mobile shoppers. Journal of Business Research. 2022;**140**:657-669. DOI: 10.1016/j.jbusres.2021.11.031

[8] Bayley G, Nancarrow C. Impulse purchasing: A qualitative exploration of the phenomenon. Qualitative Market Research: An International Journal. 1998;**1**(2):99-114. DOI: 10.1108/13522759810214271

[9] Coley A, Burgess B. Gender differences in cognitive and affective impulse buying. Journal of Fashion Marketing and Management: An International Journal. 2003;**7**(3):282-295. DOI: 10.1108/13612020310484834

[10] Dawson S, Kim M. External and internal trigger cues of impulse buying online. Direct Marketing: An International Journal. 2009;**3**(1):20-34. DOI: 10.1108/17505930910945714

[11] Kopetz CE, Woerner JI, Briskin JL. Another look at impulsivity: Could impulsive behavior be strategic? Social and Personality Psychology Compass. 2018;**12**(5):e12385. DOI: 10.1111/spc3.12385

[12] Rook DW. The buying impulse. Journal of Consumer Research. 1987;**14**(2):189-199

[13] Schneider L, Lysgaard S. The deferred gratification pattern: A preliminary study. American Sociological Review. 1953;**18**(2):142-149. DOI: 10.2307/2087723

[14] Davis A, Havighurst RJ. Social class and color differences in child-rearing. American Sociological Review. 1946;**11**(6):698-710. DOI: 10.2307/2087065

[15] Parsons T, Shils EA. Values, motives, and systems of action. Toward a General Theory of Action. 1951;**33**:247-275. DOI: 10.4159/harvard.9780674863507.c4

[16] Mandolfo M, Lamberti L. Past, present, and future of impulse buying research methods: A systematic literature review. Frontiers in Psychology. 2021;**12**:1-11. DOI: 10.3389/fpsyg.2021.687404

[17] Goldenson RM, Glanze WB. Longman Dictionary of Psychology and Psychiatry. New York: Longman; 1984

[18] Wolman BB. Concerning psychology and the philosophy of science. In Wolman BB, editor. Handbook of general psychology. Englewood Cliffs, NJ: Prentice-Hall; 1973. pp. 22-48

[19] Melikian L. Preference for delayed reinforcement: An experimental study among Palestinian Arab refugee children. The Journal of Social Psychology. 1959;**50**(1):81-86. DOI: 10.1080/00224545.1959.9921980

[20] Mischel W. Theory and research on the antecedents of self-imposed delay of reward. Progress in Experimental Personality Research. 1966;**3**:85-132

[21] Walls RT, Smith TS. Development of preference for delayed reinforcement in disadvantaged children. Journal of Educational Psychology. 1970;**61**(2):118. DOI: 10.1037/h0028878

[22] Freud S. Introductory lectures on psychoanalysis. New York, NY, US: WW Norton & Company; 1949, 1977

[23] Hirschman EC, Holbrook MB. Hedonic consumption: Emerging concepts, methods and propositions. Journal of Marketing. 1982;**46**(3):92-101. DOI: 10.1177/002224298204600314

[24] Thaler RH, Shefrin HM. An economic theory of self-control. Journal of Political Economy. 1981;**89**(2):392-406

[25] Iyer GR, Blut M, Xiao SH, Grewal D. Impulse buying: A meta-analytic review. Journal of the Academy of Marketing Science. 2020;**48**(3):384-404. DOI: 10.1007/s11747-019-00670-w

[26] Clover VT. Relative importance of impulse-buying in retail stores. Journal of Marketing. 1950;**15**(1):66-70

[27] Bellenger DN, Robertson DH, Hirschman EC. Impulse buying varies by product. Journal of Advertising Research. 1978;**18**(6):15-18

[28] Stern H. The significance of impulse buying today. Journal of Marketing. 1962;**26**(2):59-62. DOI: 10.1177/002224296202600212

[29] Koski N, Mesiranta N. Impulse buying on the internet: Encouraging and discouraging factors. In: Frontiers of e-Business Research (FeBR) 2004. Kalevantie Tampere, Finland: Tampere University of Technology and University of Tampere; 2005. pp. 23-23

[30] Park HJ, Dhandra TK. Relation between dispositional mindfulness and impulsive buying tendency: Role of trait emotional intelligence. Personality and Individual Differences. 2017;**105**:208-212. DOI: 10.1016/j.paid.2016.09.061

[31] Pacheco DC, Moniz AI, Caldeira SN, Silva OD. Online impulse buying—Integrative review of psychological factors. Perspectives and Trends in Education and Technology. 2022:527-536. DOI: 10.1007/978-981-16-5063-5_44

[32] Sofi SA, Nika FA. Role of intrinsic factors in impulsive buying decision: An empirical study of young consumers. Arab Economic and Business Journal. 2017;**12**(1):29-43. DOI: 10.1016/j.aebj.2016.12.002

[33] Hidayat Z, Hidayat D. Techno-entrepreneurship as identity construction for the Indonesian generation Z. Journal of Educational Media, Memory, and

Society. 2020;**12**(2):30-56. DOI: 10.3167/jemms.2020.120202

[34] Burck G. What makes women buy? Fortune, Special issue: How Women Spend, August. 1956;**54**(2):93-94

[35] Yue CY, Razak AZ. Impulse buying behavior among working ladies: A literature review. International Journal of Accounting. 2018;**3**(13):26-34

[36] Snyder H. Literature review as a research methodology: An overview and guidelines. Journal of Business Research. 2019;**104**:333-339. DOI: 10.1016/j.jbusres.2019.07.039

[37] Knopf JW. Doing a literature review. PS. Political Science & Politics. 2006;**39**(1):127-132. DOI: 10.1017/S1049096506060264

[38] Rowley J, Slack F. Conducting a literature review. Management Research News. 2004;**27**(6):31-39. DOI: 10.1108/01409170410784185

[39] Martin N, Morich K. Unconscious mental processes in consumer choice: Toward a new model of consumer behavior. Journal of Brand Management. 2011;**18**(7):483-505. DOI: 10.1057/bm.2011.10

[40] Festinger L. A Theory of Cognitive Dissonance. Redwood City, CA, US: Stanford University Press; 1957

[41] Mattia G, Di Leo A, Principato L. Online Impulse Buying and Cognitive Dissonance. Basingstoke, Hampshire, UK: Springer International Publishing; 2021

[42] Harmon-Jones E. Cognitive dissonance theory. In: Littlejohn SW, Foss KA, editors. Encyclopedia of Communication Theory. Thousand Oaks, CA: SAGE, 2009. pp. 109-111

[43] Akbar MI, Ahmad B, Asif MH, Siddiqui SA. Linking emotional brand attachment and sales promotion to post-purchase cognitive dissonance: The mediating role of impulse buying behavior. The Journal of Asian Finance, Economics, and Business. 2020;7(11):367-379. DOI: 10.13106/jafeb.2020.vol7.no11.367

[44] Britannica.com

[45] Wang Y, Lu H, Wang D. Buy or not: How the presence of others affects the occurrence of consumers' impulsive buying behavior. Journal of Contemporary Marketing Science. 2020;**3**(2):207-224. DOI: 10.1108/JCMARS-01-2020-0002

[46] Cuandra F, Kelvin K. Analysis of influence of materialism on impulsive buying and compulsive buying with credit card use as mediation variable. Jurnal Manajemen. 2021;**13**(1):7-16. DOI: 10.29264/jmmn.v13i1.8548

[47] Kim S, Eastin MS. Hedonic tendencies and the online consumer: An investigation of the online shopping process. Journal of Internet Commerce. 2011;**10**(1):68-90. DOI: 10.1080/15332861.2011.558458

[48] Arul RK. Influence of hedonic and utilitarian motivation on impulse and rational buying behavior in online shopping. Journal of Statistics and Management Systems. 2020;**23**(2):419-430. DOI: 10.1080/09720510.2020.1736326

[49] Chang HJ, Eckman M, Yan RN. Application of the stimulus-organism-response model to the retail environment: The role of hedonic motivation in impulse buying behavior. The International Review of Retail, Distribution and Consumer Research. 2011;**21**(3):233-249. DOI: 10.1080/09593969.2011.578798

[50] Berger CR, Calabrese RJ. Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. Human Communication Research. 1974;**1**(2):99-112. DOI: 10.1111/j.1468-2958.1975.tb00258.x

[51] Gudykunst WB. Applying anxiety\uncertainty management (AUM) Theory to intercultural adjustment training. International Journal of Intercultural Relations. 1998;**22**(2):227-250. DOI: 10.1016/S0147-1767(98)00005-4

[52] Weinstein A, Mezig H, Mizrachi S, Lejoyeux M. A study investigating the association between compulsive buying with measures of anxiety and obsessive–compulsive behavior among internet shoppers. Comprehensive Psychiatry. 2015;**57**:46-50. DOI: 10.1016/j.comppsych.2014.11.003

[53] Cast AD, Burke PJ. A theory of self-esteem. Social Forces. 2002;**80**(3):1041-1068. DOI: 10.1353/sof.2002.0003

[54] Yurchisin J, Johnson KK. Compulsive buying behavior and its relationship to perceived social status associated with buying, materialism, self-esteem, and apparel-product involvement. Family and Consumer Sciences Research Journal. 2004;**32**(3):291-314. DOI: 10.1177/1077727X03261178

[55] Biolcati R. The role of self-esteem and fear of negative evaluation in compulsive buying. Frontiers in Psychiatry. 2017;**8**:74. DOI: 10.3389/fpsyt.2017.00074

[56] Xu Y, Huang JS. Effects of price discounts and bonus packs on online impulse buying. Social Behavior and Personality: An International Journal. 2014;**42**(8):1293-1302

[57] Kotler P, Burton S, Deans K, Brown L, Armstrong G. Marketing. Pearson Higher Education AU; 2015

[58] Hänninen M, Mitronen L, Kwan SK. Multi-sided marketplaces and the transformation of retail: A service systems perspective. Journal of Retailing and Consumer Services. 2019;**49**:380-388. DOI: 10.1016/j.jretconser.2019.04.015

[59] Wu J, Kim A, Koo J. Co-design visual merchandising in 3D virtual stores: A facet theory approach. International Journal of Retail & Distribution Management. 2015;**43**(6):538-560

[60] Ittaqullah N, Madjid R, Suleman NR. The effects of mobile marketing, discount, and lifestyle on consumers' impulse buying behavior in online marketplace. International Journal of Scientific and Technology Research. 2020;**9**(3):1569-1577

[61] Astuti SR, Khasanah I, Yoestini Y. Study of impulse buying on Instagram users in Indonesia. Diponegoro. International Journal of Business. 2020;**3**(1):47-54. DOI: 10.14710/dijb.3.1.2020.47-54

[62] Zhu YQ, Amelina D, Yen DC. Celebrity endorsement and impulsive buying intentions in social commerce-the case of Instagram in Indonesia: Celebrity endorsement. Journal of Electronic Commerce in Organizations (JECO). 2020;**18**(1):1-7

[63] Zhou L, Wong A. Consumer impulse buying and in-store stimuli in Chinese supermarkets. Journal of International Consumer Marketing. 2004;**16**(2):37-53. DOI: 10.1300/J046v16n02_03

[64] Bhatti KL, Latif S. The impact of visual merchandising on consumer impulse buying behavior. Eurasian Journal of Business and Management. 2014;**2**(1):24-35

[65] Tendai M, Crispen C. In-store shopping environment and impulsive buying. African journal of Marketing

Management. 2009;**1**(4):102-108. DOI: 10.5897/AJMM.9000045

[66] Zhao Z, Du X, Liang F, Zhu X. Effect of product type and time pressure on consumers' online impulse buying intention. Journal of Contemporary Marketing Science. 2019;**2**(2):137-154. DOI: 10.1108/JCMARS-01-2019-0012

[67] Joseph BC. Impulse purchasing behavior. AU Journal of Management. 2010;**8**(2):42-51

[68] Mathur S. A review of impulse buying behavior: Definition & affecting factors. Journal of Emerging Technologies and Innovative Research. 2019;**6**:270-275

[69] Chang Y. The influence of media multitasking on the impulse to buy: A moderated mediation model. Computers in Human Behavior. 2017;**70**:60-66. DOI: 10.1016/j.chb.2016.12.071

[70] Lo PS, Dwivedi YK, Tan GW, Ooi KB, Aw EC, Metri B. Why do consumers buy impulsively during live streaming? A deep learning-based dual-stage SEM-ANN analysis. Journal of Business Research. 2022;**147**:325-337. DOI: 10.1016/j.jbusres.2022.04.013

[71] Ang T, Wei S, Anaza NA. Livestreaming vs pre-recorded: How social viewing strategies impact consumers' viewing experiences and behavioral intentions. European Journal of Marketing. 2018;**2**(2):137-154

[72] Kang K, Lu J, Guo L, Li W. The dynamic effect of interactivity on customer engagement behavior through tie strength: Evidence from live streaming commerce platforms. International Journal of Information Management. 2021;**56**:102251

[73] Mette FM, de Matos CA, Rohden SF, Ponchio MC. Explanatory mechanisms of the decision to buy on credit: The role of materialism, impulsivity and financial knowledge. Journal of Behavioral and Experimental Finance. 2019;**21**:15-21. DOI: 10.1016/j.jbef.2018.10.002

[74] Aragoncillo L, Orus C. Impulse buying behaviour: An online-offline comparative and the impact of social media. Spanish Journal of Marketing-ESIC. 2018;**22**(1):42-62. DOI: 10.1108/SJME-03-2018-007

[75] Asuquo EE, Igbongidi PB. Retail store merchandise assortment and display and their influence on consumer impulse buying behaviour in north-West Nigeria. Global Journal of Management and Business Research. 2015;**15**(6):1-9

[76] Chang WL, Lu LC, Lin HJ, Chang KY. Mediating effect of buying motives between physical vanity and online compulsive buying. African Journal of Business Management. 2011;**5**(8):3289-3296. DOI: 10.5897/AJBM10.1409

[77] Jhawar N, Kushwaha VS. In-store shopping environment and impulsive buying with special reference to Indore city. IUP Journal of Marketing Management. 2018;**17**(1):25-37

[78] Atulkar S, Kesari B. Role of consumer traits and situational factors on impulse buying: Does gender matter? International Journal of Retail & Distribution Management. 2018;**46**(4):386-405. DOI: 10.1108/IJRDM-12-2016-0239

[79] Parmar Y, Mann BJ, Ghuman MK. Impact of celebrity endorser as in-store stimuli on impulse buying. The International Review of Retail, Distribution and Consumer Research. 2020;**30**(5):576-595. DOI: 10.1080/09593969.2020.1781229

[80] Pornpitakpan C, Yuan Y, Han JH. The effect of salespersons' retail service

quality and consumer's mood on impulse buying. Australasian Marketing Journal (AMJ). 2017;**25**(1):2-11. DOI: 10.1016/j.ausmj.2016.12.003

[81] Prakash A, Sharma A. Dimensions of point of purchase factors in impulsive buying of women's skincare cosmetics in India. Research. 2016;**10**(2):30-43

[82] Gazley A, Hunt A, McLaren L. The effects of location-based-services on consumer purchase intention at point of purchase. European Journal of Marketing. 2015;**49**(9/10):1686-1708. DOI: 10.1108/EJM-01-2014-0012

[83] Zhang KZ, Xu H, Zhao S, Yu Y. Online reviews and impulse buying behavior: The role of browsing and impulsiveness. Internet Research. 2018;**28**(3):522-543. DOI: 10.1108/IntR-12-2016-0377

[84] Zafar AU, Qiu J, Li Y, Wang J, Shahzad M. The impact of social media celebrities' posts and contextual interactions on impulse buying in social commerce. Computers in Human Behavior. 2021;**115**:106178. DOI: 10.1016/j.chb.2019.106178

Chapter 5

The Acceleration of Digital Maturity during the COVID-19 Pandemic in the Retail Industry in Sri Lanka

Sankhani Hemachandra and Nora Sharkasi

Abstract

The recent saying is that COVID-19 pandemic had the most exerted influence in the world after the Second World War. Developing countries, such as Sri Lanka, are no exception. The pandemic brought various digital initiatives to cope with limitations that lead to a much-accelerated digital transformation. The retail sector continued to undergo digital transformation in Sri Lanka with a particular focus on advancing the customer experience by digitally creating, delivering, and capturing value. We interviewed top management in various areas in the retail industry in Sri Lanka and followed a hybrid research methodology for analysis combining the grounded theory and the framework-based approach. We described the gap between the focus of the literature's digital maturity models in the past 10 years and the top management's needs throughout the accelerated digital transformation during the pandemic as follows: the difference in the percentage of the expression of common dimensions in digital transformation and maturity models and the percentage of the expression of dimensions in the managers' interviews. Our findings call for the attention of academic research to dedicate more attention to further integrate more dimensions related to technology, cloud and data, digital marketing, and products into the digital transformation and maturity models.

Keywords: digital transformation, digital maturity, digital marketing, digitalization, digitization

1. Introduction

The origination of the Internet reinforced process automation by linking businesses with customers *via* web platforms, social media, and mobile apps. This digital transformation influenced all business functions and disrupted the ecosystem in every industry. Nowadays, technology is associated with almost every activity of individuals, from buying groceries to finding a life partner [1]. Digital-native companies are considered grown-ups in a digitally empowered world among companies. Their perspective has been shaped by new technologies, strategies, and approaches to impact

the organizational value chain. Not all organizations are comfortable enough in transforming their businesses to comply with the new competitive environment. It requires understanding digital maturity and learning how to respond to the competitive environment rather than converting processes overnight [2].

Bumann and Peter [3] attempted to distinguish digital transformation from the often interchangeably two concepts that have distinct meanings: "Digitization" and "Digitalization." Digitization and digitalization are often defined based on personalized or organizational perspectives [4]. Extant literature has divided digital transformation into three phases starting from "digitization," which is defined as "the conversion from analog to digital" [5]. The second phase is "digitalization," which is defined as "the innovation of business models and processes that exploit digital opportunities" [4] and finally digital transformation. Vial [6] observed three paradigms of digital transformation definitions. First, digital transformation as organization-centric. Second, digital transformation is based on the technologies used and the nature of the transformation crop up. Third, clustering the similarities, such as the use of standard terms. Kane et al. [7] argue that digital transformation is not about using technologies individually but integrating them to transform businesses. A definition of digital transformation that combines all three paradigms is introduced by Vial [6] as "A process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies." This definition is also supported by Maltaverne [5], who defined digital transformation as "New ways of doing things that generate new sources of value."

Not all organizations are comfortable enough in transforming their businesses to comply with the new competitive environment. It requires understanding digital maturity and learning how to respond to the competitive environment rather than converting processes overnight [2], which implies the definition of digital maturity as "a measure of an organization's ability to create value through digital." Kane [2] emphasizes that focusing on digital maturity instead of digital transformation is more beneficial for the organization. Since becoming mature is a gradual process, it is not easy to see how it looks at the end; hence, it is a never-ending loop. Preparing for a digital future requires the development of digital capabilities within a firm's activities, culture, people, structure, and sync with organizational goals. In the journey of achieving digital maturity, Kane et al. [8] mentioned that 90% of the digitally matured organizations have overcome the constraints associated with the process by optimizing digital strategy within the business strategy. Further, Kane et al. [8] mentioned that leaders from highly digitally matured organizations could anticipate digital trends and prepare for industry disruptions with the upper hand.

According to the academic literature, digital maturity models are nourished by the Capability Maturity Models (CMM) and its derivatives, such as Capability Maturity Models Integration (CMMI) [9]. In the spectrum of capability maturity levels, "initial" and "optimized" positions are considered as least and highest maturity levels, respectively. Middle levels have been named as "repeated, defined, and controlled" in the ascending order [10]. The dictionary definition of "maturity" falls into two aspects: "reaching the state of completeness" and "raise it to full growth." However, within the literature, it is termed as "process maturity," "organizational maturity," "process capability," "project maturity," and "maturity of product capabilities" [9]. The process maturity is a stalk concept of total quality management, which demonstrates improvement in technical and business processes [9] and plays a vital role in digital transformation due to mapping the existing process in the transformation process [11]. Paulk et al. [12] have considered capability maturity in organizational

software development and maintenance due to the importance of software development in the digital space.

Digital maturity models provide assistance to identify gaps, manifest vital areas to focus on, and help figure out the starting point of each phase of the digital transformation journey. Hence, digital maturity models act as a guide or a tool to refer to digital transformation to make it less complex [13]. Bumann and Peter [3] examined different dimensions that are studied in the most common models of digital maturity in the literature. **Table 1** illustrates the expression of the 20 main dimensions expressed in the most common digital maturity models in the literature.

The analysis of Bumann and Peter [3] provides an in-depth insight into the most applied dimensions in digital transformation and maturity frameworks available within the referred literature in the past 10 years. Models presented by Anderson and Ellerby [13], Schumacher et al. [17], Peyman et al. [15], and Schäfer et al. [16] have paid attention to all highly applied dimensions. Kane et al. [8], Valdez-De-Leon [18], Peter [20], and Schlaepfer et al. [21] reported specific dimensions that others have not caught, namely, investment, process digitalization, cloud and data, digital marketing, digital environment, value chain—ecosystem, innovation, and structure. At the score level, culture (score: 9), strategy/technology (score: 7), leadership (score: 5), customer/operation/people (score: 4), organization/governance (score: 3), and monitoring and control/products (score: 2) are the most vital dimensions, and the rest, such as investment, process digitalization, cloud and data, digital marketing, digital environment, value chain, innovation, tasks, and structure, look like the supporting action fields for digital maturity models.

COVID-19 has recently accelerated the implementation of digital transformation worldwide and across different industries [22]. It accelerated the planned digitalization and digitization processes for enterprises already undergoing transformation. It has also created the neediness for such acceleration in companies that are not digitally mature yet. In this exploratory study, we considered the effect of COVID-19 on the acceleration of digital maturity in the retail sector in Sri Lanka. The Sri Lankan government declared a lockdown from March 20, 2020 to nearly 52 days across Sri Lanka [23]. First, a state of emergency was imposed, and under the state of emergency, a curfew was declared. During the curfew, people were confined to their homes, except for essential service workers (firefighters, police force, doctors, etc.) and those granted special permission such as in supermarkets and pharmacies [24]. Supermarkets and pharmacies started online ordering systems and delivery services; such activities were also closely monitored by the Sri Lankan army. By the third week of May, the curfew was lifted [23]. At the beginning of the lockdown, companies in the country were completely closed but slowly started to operate remotely, and many were reluctant to adopt the work-from-home concept. As we will see in the results section, many companies were unprepared to meet the new normal's requirements. In the early few weeks of the lockdown, there were also huge inefficiencies in distributing essential groceries and supplies by the government [25].

Due to the exogenous and endogenous tensions arising during the COVID-19 pandemic, to keep business up and running, an agile execution of digital transformation was crucial to achieve a quick response to bounce back [26]. Such a rapid response happened in the absence of a well-formed and approved digital business strategy and a lack of secured sufficient resources. Researchers debated the importance of the fusion of digital business strategy and digital transformation strategy [27]. During the COVID-19 pandemic, Sri Lankan companies accelerated their digital transformation activities and witnessed gradual success attributed with many ups and downs.

Source	Strategy	Leadership	Investment	Organization	Culture	Technology	Customers	Process digitalization	Cloud and data	Monitoring	Digital marketing	Products	Operation	People	Governance	Digital environment	Value chain	Innovation	Tasks	Structure
[14]		x	x																	
[7]	x	x			x	x														
[15, 16]	x	x			x	x						x	x	x	x					
[8]	x				x									x					x	x
[17]	x	x			x	x	x					x	x	x	x					
[18]	x			x	x								x				x	x		
[19]	x			x	x	x	x			x				x						
[20]		x			x	x	x	x	x	x	x									
[21]					x	x									x	x				
[13]	x			x	x	x	x						x							
Total Score	7	5	1	3	9	7	4	1	1	2	1	2	4	4	3	1	1	1	1	1

(Source: Ref. [3] with Adjustments)

Table 1.
Comparative analysis of digital transformation maturity frameworks and action fields/dimensions.

This chapter aims at understanding the priorities of digital transformation during the COVID-19 pandemic that was carried out by retail companies in Sri Lanka. It also explores the level of digital maturity achieved due to the disruptive force of the pandemic. By conducting and analyzing in-depth interviews with managers of vital retail companies in Sri Lanka, we attempt to perform a comparative analysis of our findings and the dimensions expressed in the most popular digital transformation and maturity models described in the literature. The main objective is to identify possible gaps between the focus of academic research and the current priorities of retail managers after the COVID-19 pandemic in a developing country like Sri Lanka.

2. Methodology and data

2.1 Method

In line with the scope of our research question, we followed a hybrid research methodology combining the grounded theory [28] and the framework-based approach in qualitative research [29]. We opted for the grounded theory approach due to its popularity in qualitative research as a systematic approach yet flexible, and because it acts as a heuristic device instead of a formal rule or guideline [30]. Being theoretically sensitive, the researchers separated relevant information from the data collected and unlocked meaning in the data based on in-depth reading, personal experience, and understanding of the context [31]. The framework-based approach was utilized due to its use in evaluation studies with a wide variety of data collection methods, such as interviews, observation, and focus groups; hence, it is not limited to philosophical or theoretical approaches.

The data analysis started with broad observations gleaned from the interviews. We used in-depth interviews (IDI) to understand the management response amid the COVID-19 pandemic with respect to digital transformation and digital maturity. The researchers prepared a list of preliminary questions, at the first stage of data collection, the researcher interviewed only three firms as a preliminary step of the research, and the preliminary analysis is described in Ref. [32]. In rhythm with the flow of the interview, the researcher asked unplanned questions. Some of the additional questions were repeated in multiple interviews and thus added to the list of structured questions. The researcher first listened to the interviews before transcribing the corpus into an MS Word document. Then, the researchers went over the transcribed text again and performed a line-by-line coding identifying key terms and phrases using MS Excel. With this, the researchers removed the dross and divided the corpus into smaller segments of paragraphs.

The encoding was performed manually after many rounds of memoing to produce the main themes or categories extracted from the (IDI). The temporal context was distinguished as before or after COVID-19 pandemic. The process we followed comprised the following steps: (i) Line-by-line coding: assign codes to each line in the interview transcript to extract as many insights as possible. It allows for generating new themes that are not available in previous studies. (ii) *In vivo* codes: These are the symbolic markers of the informant's articulation, reflecting their perception of the topic by highlighting the main keywords and generating multiple *in vivo* codes. (iii) Focused coding: This is a more selective and directive phase where the coding process synthesizes a large portion of data. It selects the most frequent codes in the *in vivo* coding and forms salient categories. In this process, only the *in vivo* codes that have a

more analytical sense are considered. (iv) Temporal context: distinguishes the statement based on whether it belongs to the state before or after the pandemic. Not all segments contain temporal context, some were left blank. (v) Categories: are budding while engaging in the focused coding. The pool of tentative categories was evaluated to form permanent categories; subsequently, the relationships among them were identified. (vi) Memoing: Memo writing acts as an intermediary connecting data collection and analysis, and it prompts one to analyze data and codes while writing. Successive memo writing increases idea abstraction that generates new insights and converts protrude codes to theoretical categories. **Figure 1** is a pictorial of the main processes of the hybrid methodology.

2.2 The data

Primary data were collected through interviews. All interviews were conducted online due to travel restrictions imposed globally by the COVID-19 pandemic. The approach to inquiry took the form of in-depth interviews (IDI) following the standards of purposive sampling [33]. The researchers focused on purposive sampling because of their perspective of knowledge and understanding of the retail industry in Sri Lanka. Purposive sampling technique allows to seek research participants with much-needed flexibility. This nonprobability sampling is often used in qualitative research, and it allows exploratory researchers to gather initial data quickly and lays the foundation for a more extensive study.

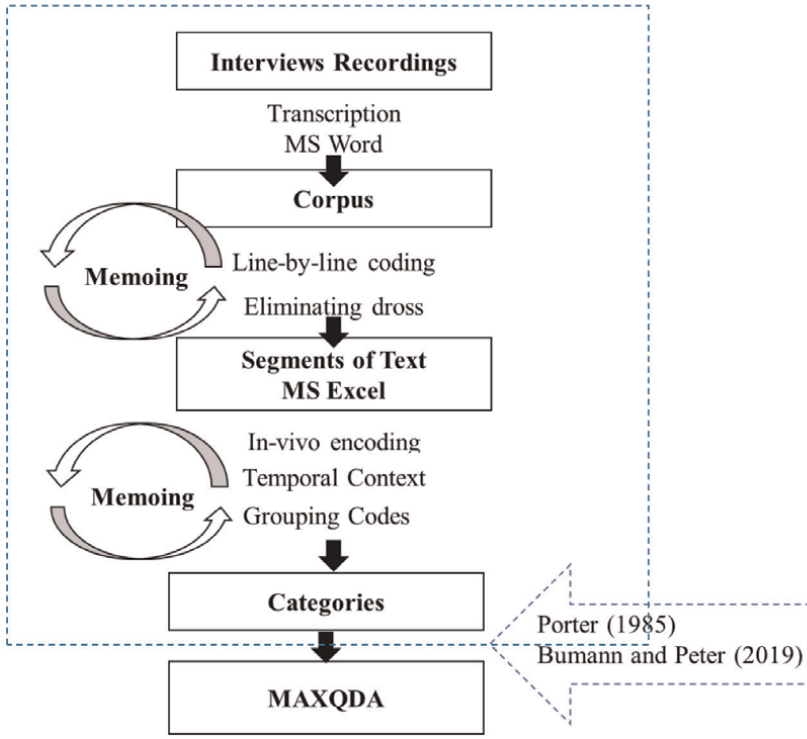

Figure 1.
High-level overview of the data analysis process.

Interview participants have been selected to represent various segments of the retail industry in Sri Lanka, from supermarkets, apparel, stationery, fast moving consumer goods (FMCG), and electronics. They are all considered as prominent players in the retail sector in Sri Lanka. This wide selection of participants covers a broad range of perspectives on the progression of the digital transformation during the COVID-19 pandemic and the level of digital maturity accelerated by it. **Table 2** shows the company profile of respondent [R1] through [R9]. The numbering of respondents follows the chronological order of conducting the interviews in the data collection stage.

Respondent [R1] is a manufacturer and distributor of food items, beauty products, personal care goods, pharmaceuticals, and baby products; the head of customer excellence was interviewed. The respondent [R7] was the head of logistics of a manufacturer and distributor of food items in the FMCG sector. The chief marketing officer of [R10] and the marketing manager of [R3] were interviewed for the electronics sector. In the supermarket sector, we interviewed the former head of marketing [R5], the head of e-commerce [R6], and the brand manager of [R2]. In branded apparel [R4], the supply chain manager was interviewed. The director of operations and supply chain was interviewed in Stationery [R8]. The respondent [R9] was a business intelligence analyst in e-commerce online retailing.

The results of the grounded theory approach uncovered three main themes: (1) value creation, (2) digital transformation, and (3) digital maturity. To compare the

Respondents	Market Share	Employee Count	Market	Duration	Word Count
FMCG					
[R1]	60% of the FMCG	1900	Mass market	50 min	5029
[R7]	$0.312 bn market capitalization	2600	Mass market	20 min	1726
Electronics					
[R10]	$0.001 bn market capitalization	13,000	Mass market	20 min	1629
[R3]	$0.039 bn market capitalization	3723	Mass market	30 min	2460
Supermarkets					
[R5]	$0.253 bn market capitalization	8932	Mass market	35 min	2523
[R6]	$0.006 bn market capitalization	20,092	Mass market	45 min	4553
[R2]	N/A	42	Mass market	40 min	3232
Other					
[R4]	$0.028 bn market capitalization	172	Middle upper-income	20 min	1870
[R8]	$0.016 bn market capitalization	93	Mass market	25 min	2565
[R9]	N/A	69	Mass market	25 min	2016

Table 2.
Company profiles.

extracted themes from the grounded theory approach with the widely discussed themes of digital maturity in the literature, we followed a framework-based approach. For this purpose, we incorporated the following frameworks into our framework-based approach: (1) the widely adopted value chain framework by Porter [34] and (2) the digital maturity frameworks analyzed by Bumann and Peter [3]. The latest release of MAXQDA software in 2022 was used for analysis in the framework-based approach. The main keywords of the listed tasks or dimensions in Ref. [3] were inserted into the system to count their occurrences in the corpus to achieve a quantitative comparison.

3. Findings

3.1 Digital maturity in the retail industry in Sri Lanka during COVID-19 pandemic

3.1.1 Leadership and culture

Leadership plays a critical role in the digital transformation process because it drives the business by merging digital culture with digital competence to achieve goals. Management is the decision-maker to apply digital technology, infuse work culture, and cocreate with the ecosystem. The company's innovative and visionary leadership investigates how technology might be used to improve the customer experience and internal processes. Even though the retail industry's leadership is visionary and willing to put in the time and effort, "our management and directors have given time and effort to the digital [R3]." The understanding of the digital transformation process remains shaky for a variety of reasons, including a lack of long-term results, a lack of time discipline, difficulty in underestimating customers' reactions, a lack of trust, a fear of change, and a lack of digital education. "Not knowing what to use for what, not understanding … do it for the sake of doing it [R8]," "They – the IT team – mix everything up [R2]," "not looking into long term, scared to take the challenge because digital is expensive [R6]."

COVID-19 pandemic has changed the view of business leaders and opened a new perception to enhance customer experience, which was not there before. The real inspiration for the digital transformation has been reshaped toward a customer-centric approach, and the idea of digital technology implementation was reengineered to find solutions for customer pain points, "understand how to give them a personalized experience because of the data that give the persona of who the customer is assumed to be versus who the consumer really is [R8]."

Digital culture motivates business leaders to look ahead and find new solutions for a better customer experience. The digital culture values collaboration through transparency over individual effort. With such a culture in place, decision-making turns into fact-based rather than experience-based and diffuses throughout the organization. "In the FMCG sector, we never had a data scientist, the decisions were taken based on the leaders' experience and their gut feelings. But now, we have realized that with the new technology coming into play, we must make more fact-based decisions [R1]."

3.1.2 Innovation, digital environment, processes, operations, customers, and the people

Before the COVID-19 pandemic, companies had a vision toward digital transformation but were unaware of its scope, which has changed over the pandemic. "We

were not serious about the digital transformation and what it can do [R6]." After the pandemic hit, they identified the gaps in previous implementations and invested more in digital services. "The process was initiated before the pandemic [R2], [R4], [R6], [R8], and [R10]," "I just wish we could have done it faster [R8]."

The traditional value chain has been shaken up by the digital era and has undergone a technological transformation to create value for customers in the retail industry. During process transformation, the value chain faced two main challenges: first, rapid changes in customer behavior, and second, changes in the internal processes (affecting employees and business partners), which were triggered by the limitations imposed by the COVID-19 pandemic. Both changes are strongly intertwined.

Digital initiatives were limited to some business functions, and implementation was not a success at the beginning. "During the first lockdown, our website crashed multiple times, then we realized that we have to invest in digital assets [R6]," "now, we have seen a more advanced picture [R4]." However, due to the limitations that arose during the COVID-19 pandemic, business collaborations became more challenging, yet significant. The business models changed into a customer-centric approach by creating more creative avenues to reach out and service customers. The perception of the businesses changed after the pandemic from cost reduction and disintermediation [6] for enhancing customer experience and offering personalized shopping experiences. The real inspiration for the digital transformation has been reshaped in a customer-centric manner, and the objective behind implementing digital technology has become to find solutions for customers' pain points "Understand how to provide them a personalized experience because of the data that gives the persona of who the customer really is [R8]."

COVID-19 pandemic stressed businesses to develop innovative solutions to keep operating under the "new normal." There were numerous changes in the value chain functions even before the pandemic due to the advantages associated with digitalization. According to respondents, the changes in the value creation had happened throughout the main functions and the sub-functions of the value chain framework [34]. Retailers have successfully integrated all functions of the value chain and the ecosystem into one platform. The inbound logistics has undergone tremendous changes to reach supply chain 4.0. Due to the environmental and technological disruptions, the operational model has changed from seeking cost-effectiveness to enhancing customer experience. With the introduction of social media and shared economy platforms as a new way of doing business, "We tied up with Uber Eats and The Pickme foods to achieve the last-mile delivery to the customer, which was a success [R2]." Besides focusing on e-commerce, companies have also improved their internal operational processes by applying digital tools that led to escalated customer experience during outlet visits. "We did not want customers to come to us, we wanted to go to the customers … enhance the experience of our customer's digitalization, we promised them within 4 hours we will be delivering products to their doorsteps, with the picking app, they can pay without going to the cashier [R2]." "The most important thing is the customer's experience [R4]." By doing so, self-billing mobile apps were introduced in addition to e-commerce and door-to-door last-mile delivery. Sri Lankan companies have only focused on immediate cost-efficiency provided by digital finance. This had limited the use of digital finance to wiring transfers, payment approvals, and bookkeeping. "… that is done via wire transfer from bank to the bank [R1–2], [R4], and [R7]." When companies begin to rely on data-driven insights, they will be able to successfully restructure their financial processes.

SAP applications, Oracle, online HR systems, and other web applications and software packages had become familiar to all interviewed companies, "SAP, zoom, teams, workday HR platforms [R1]," "we do work with Oracle … [R2–4] and [R6–7]." On the other hand, companies are still trying to figure out how to utilize historical data and data visualization for decision-making. "We are internally gearing to have information in our fingertips. Now, the problem is with these processes. Now, we are having so much of data, much of data lakes, but we don't know what to do with this data. Right now, the company is focusing on what sort of data mining techniques, what sort of data analytical tools can be used to extract this information. So, now, the Company is more focusing on recruiting data analysts and data scientists [R1]."

However, the digitalization on the customer side was not accompanied with a similar digital attention on the internal processes that added an extra burden to the workforce, "Operation department, it was a nightmare, people who are working in that department had to pick groceries, make the Billings, we needed more workforce to get the work done [R2]." For digital communication, Sri Lankan companies mostly rely on primitive digital solutions, such as emails, pdf files for contracts, and excel sheets. This still hinders the advancement toward the next horizon of the digital supply chain, "Now we have digitized through SAP, but the SAP version is at a very beginner level. It is not a fully pledged integrated SAP system yet. We are still relying on Excel [R1]."

Before the pandemic, "there were very few people who came into digital platforms, we got only 5% of sale from the e-commerce platform [R3]," "we were rejecting it. We were used to having to spend time in meeting rooms, none-of-us logging into MS teams, it was a hassle [R1]." Internally, it is a people issue, the COVID-19 pandemic caused additional pressure on employees initially "since we were forced to work from home, we did not have any other option, and I think we adapted ourselves quickly to digital platforms [R1]."

Managers stated that the hard part of digital transformation is to overcome employees' reluctance, "I think the hard part in any digital transformation for employees is to first get through the initial barrier of clearing out internal processes. So, for the first bit of time, there was much doubt, and there was much negativity around the fact that it could take too long, and we're doing unnecessary things, and they – the IT team – didn't understand [R8]." The spectrum of HR requirements has been advanced from employee personal profile creation to location detection for attendance marks, "we can go to the website and apply for leaves, our profile is there, medical reports, salary slips [R2 – 3], [R7]," "attendance can be marked via phone through an app, we go to the app and then scan the location or take a picture [R2]." While some location-based HR monitoring practices may flare privacy concerns worldwide, they seem to be acceptable in Sri Lanka.

3.1.3 Digital marketing, technology, and customers

Sales and marketing became the highly digitally affected functions with the organizations. Companies showed a stronger tendency toward digital advertising for various reasons, cost-effectiveness, targeted marketing, home-centric routine due to the COVID-19 pandemic, heavy use of social media due to mandatory social distancing, "we cannot afford to go for traditional media, it is very expensive, digital marketing is efficient because we are talking to the right audience, we can target them based on their interest. Now people tend to do home workouts following YouTube or other sort of application [R3]." However, it is difficult to see corporations delving deeper into how marketing functions can be digitalized.

To achieve significant improvements in digital marketing, marketing leaders must embrace a wide range of digital platforms and a centralized platform for managing all digital marketing tools to achieve omni-marketing [35]. Some interviewed companies are still in the early stages of exploiting social media and e-commerce platforms, some stepped into digital for the first time due to the tensions induced by the COVID-19 pandemic, "we have moved our entire sales process into digital platform launched our website during the lockdown and shifted from place to space first time in the history of the company [R1]." Even though some retail companies followed a diversification approach in terms of visibility on social media, they have not yet embraced a central application that could simultaneously manage and automate communications over social media as done with Omni-channel marketing, "for each brand, we have our own social media accounts used other pages like retail chains to promote items we used distribution channels that are digitally strong, we launched our website during the lockdown which contains all our products, and through fan pages, in social media, we communicated our delivery services and all the other information and guidance required [R1]." The main goal of moving to social media was mainly for communicating with customers and clients to make sales, customer relationship management was not highlighted in most interviews, "we took all our marketing and promotional related activities to digital platforms, through these digital platforms; we were able to deliver our products to customers' doorsteps during this period and during the lockdown, we listed and made available our products in other e-commerce sites and delivery sites, by namely Uber, pick me, kapruka.lk, etc.… before this, we were kind of distant from our customers [R2]."

The digitalization of marketing involves more than just advertising on digital platforms, and creating interactive, responsive, and personalized digital campaigns also necessitates the development of the right technology to communicate with all stakeholders of the company [36]. "To communicate with our clients, it was through intermediaries; it took two, three stages to reach out … digital platforms give us a chance to get directly connected with our clients, good opportunity to get their direct response … we are developing a kind of platform where we can do direct marketing and sales [R2]." Such digital marketing implementation demanded investment in restructuring technology infrastructure in the company to align to digital marketing capabilities, "15 years ago, it was on paper, sales rep visit the outlet, take the sales order, write it on paper, bring it to the distribution point … now we have digitized through SAP… all the network planning, supply planning, demand targeting is now happening through the SAP system, but the SAP version is at the very beginning level. It is not a fully pledged integrated SAP system. Still, we are relying on Excel [R1]."

With the digitalization of processes, the question that remains is whether the customer is ready to accept digital technology. Without customer engagement, the chance of success in digital initiatives becomes pervasive. Specifically, in the retail industry, customers become a barrier to value creation due to the expectation of touch and feel—customers demand the feel of the physical touch before making a purchase decision over the easy online ordering, "they don't Feel the same quality, don't feel the same satisfaction when they go to the physical store and buy it. For example, they want to buy some garments; they need to touch it, try it, and see. They are not confident in ordering online [R7]." "Customers need the visual part to convert their intention to a purchase [R9]." The understanding of the quality of shopping in Sri Lanka is that customers consider shopping as a form of relaxation away from their busy lives where they get time to spend with family and interact with other customers, "people think going to the supermarket is like a picnic … You meet people

there, you feel good [R5]," "You can have a chat with the customer, and salesman, and it's an interaction [R4]." This is still ahead to achieve in digital.

The lack of digital literacy, at the present date, is also another important factor affecting customers' acceptance. In general, the majority of purchasing power is held by generation X whom to be seen as not tech-savvy compared to millennials and generation Z, "in Sri Lanka, purchasing age category is generation X [R5]." "There is a very small segment who are very tech-savvy and open to buying things online, even to share their credit card details online [R3]," "they do not want to login to websites [R6]."

3.2 Comparative analysis of digital maturity findings and focus of academic research

We followed a hybrid approach for data analysis, which combined grounded theory and a framework-based approach to extract main themes from the corpus of the managers' in-depth interviews and conduct comparative analysis. The three main themes extracted by employing the grounded theory approach were as follows: (1) value creation, (2) digital transformation, and (3) digital maturity. In line with the main themes extracted, we employed the work of Bumann and Peter [3] that described the most common digital transformation and maturity models in the literature in the past 10 years—as reported earlier in **Table 1**—to conduct comparative analysis.

We conducted a comparative analysis to investigate the gap between the priorities of the most common digital transformation and maturity models proposed in the literature in the past 10 years, and the current priorities of retail managers upon the COVID-19 pandemic in Sri Lanka. We constructed **Table 3**, in a similar manner to **Table 1**, which was constructed by Bumann and Peter [3]. To conduct a comparative analysis, we counted the occurrence of the dimensions in the corpus of the in-depth interviews for each respondent (for the respondents' profiles, see **Table 2**) as follows: counting dimensions that occurred in the context of a need or a priority, not a complaint or a comparison before and after the pandemic. As in Ref. [3], we made sure that we convert our word count into percentages by dividing the total word count over the aggregate word count in all interviews excluding the dross. This count is reported in Score A at the bottom of **Table 3**, while Score B in **Table 3** was obtained from **Table 1**—sourced from Ref. [3].

Mathematically, we describe the gap between the focus of digital transformation and maturity models surveyed by Bumann and Peter [3] and the top management's needs during the COVID-19 pandemic as follows: the difference in the percentage of the expression of the dimensions of digital transformation and maturity models in Ref. [3] from the percentage of the expression of these dimensions in the managers' interviews summarized in Score A in **Table 3**.

The findings of comparative analysis suggest that academic models of digital transformation and maturity prioritized the following dimensions: strategy, leadership, culture, operations, governance, innovation, tasks, and structure. The findings of in-depth interviews show that retail managers prioritize the following dimensions: technology, customers, processes, cloud and data, digital marketing, products, organization, and value chain. Retail managers and models of transformation and maturity paid equal attention to the following dimensions: investment, monitoring and control, and the people. **Figure 2** is a visual representation of our comparative analysis. Our findings call for academic research to dedicate more attention to the following

	Strategy	Leadership	Investment	Organization	Culture	Technology	Customers	Process	Cloud and data	Monitoring	Digital marketing	Products	Operation	People	Governance	Digital environment	Value chain	Innovation	Tasks	Structure
[R1]	2	8	5	7	1	47	8	9	29	1	9	9	9	9			4	1		
[R2]	8	14	6	8		43	20	12	8		14	24	7	7				2		1
[R3]		1	3	8		35	5	4	3		13	11		2		1	1	2		
[R4]	2			6		36	13	17	6		15	4	2	3						
[R5]		2	4	1		29	5		2		11	3					1			
[R6]		6	5	11		41	3	25	18	1	12	17	9	5				1		3
[R7]						14	4	2	6	1		3		12		1		2		
[R8]	1	4	1	14		22	17	14	18			3	2	6			4	1		3
[R9]	2	2	4	4		14	29	2	10		11	17	11	8		1				
[R10]	12	1	1	16		22	9	11	1		11	7		6				8		
Count	27	38	29	75	1	303	113	96	101	3	26	98	40	58	0	3	70	17	0	7
Score A	2%	4%	2%	7%	0.5%	29%	12%	8%	8%	0.5%	12%	11%	4%	6%	0%	1.5%	7%	1%	0%	0.5%
Score B	12%	8%	2%	5%	15%	12%	7%	2%	2%	3%	2%	3%	6%	6%	5%	2%	2%	2%	2%	2%
Difference	−10%	−4%	0%	2%	−15%	17%	5%	6%	6%	−3%	10%	8%	−2%	0%	−5%	−1%	5%	−1%	−1%	−2%

Score A—percentage of dimensions expressed in the interviews.
Score B—percentage of dimensions expressed in ***Table 1*** *by Bumannand Peter [3].*

Table 3.
Comparative analysis of dimensions count.

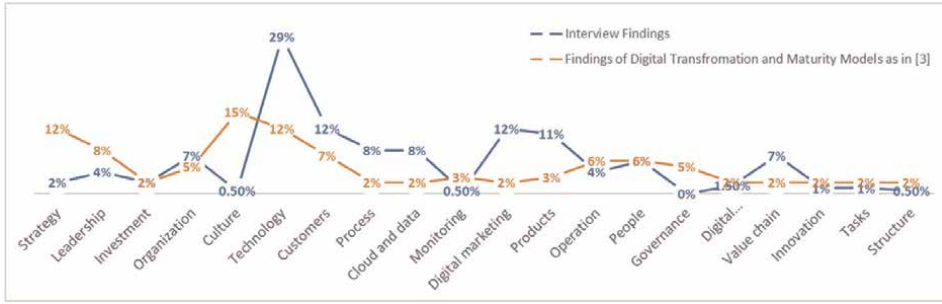

Figure 2.
Visual representation of comparative analysis.

dimensions in the transformation and digital maturity models: technology, digital marketing, customers, cloud and data, products, processes, and value chain.

4. Conclusion

The digital era is associated with the internet of things, robotic process automation, blockchain technologies, and advanced data analytics for real-time demand planning and sales and operations. In the context of the retail sector in Sri Lanka, the COVID-19 pandemic has brought about acceleration in digitization and digital transformation in the value chain processes. Before the COVID-19 pandemic, such digitization was limited to the implementation of enterprise resource planning solutions; however, due to the pressures of COVID-19, the retail industry in Sri Lanka has been experiencing digital transformation throughout the different processes of the value chain and witnessing an early stage of implementing data analytics for decision making and prediction.

Digital finance or Fintech, which is well-known to offer cost-efficiency by streamlining process automation and provide value-added contributions to the company, has not been well-implemented yet. Optimal implementation of Fintech technologies requires a holistic integration with all transactional and operational systems in place. The implementation of Fintech in the retail industry in Sri Lanka is limited to wiring transactions and online payment systems and mobile applications. Moreover, there are no plans yet to accelerate an innovative implementation of Fintech systems and services through blockchain integration. In the digital transformation process, managers had to face two types of challenges: first, emerge the digital technology with the organization strategies, and second, maneuver with changing: customer behavior, diminishing profit margins, and regulatory processes [3].

All interviewees pointed to the role of COVID-19 pandemic in the acceleration of digital transformation, which altered the business value chain in different ways related to logistics and supply chain, customer, employees, and business partners. Retail companies accelerated digital transformation during COVID-19 pandemic by applying various technologies to their organizational functions. The retail sector in Sri Lanka is still undergoing digital transformation. Many firms are pursuing digital transformation as a strategic goal to modernize their operations and remain competitive. Managers acknowledged the need for action toward a more accelerated digital transformation and the urgency of doing so, but they have limited resources to figure

out what the best course of action should be. They seem to be struggling to adapt to the new digital environment.

Customers and suppliers are still struggling to cope with new changes due to the lack of digital literacy of generation X. Several other concerns, such as changing customer behavior, strict regulatory requirements, and diminishing profitability during the pandemic, add to the complexity of digital transformation. In addition, incumbents are battling the rising disruptive technical actors, such as Fintech startups, environmental disturbances as in COVID-19 outbreak, and the bargaining power of established large technology firms.

To answer the research question pertaining the identification of a discrepancy between the focus of digital transformation and maturity models in the literature within the past 10 years and the priorities of retail managers in top retail companies in Sri Lanka as follows: We compute the difference in the percentage of the expression of the dimensions of digital transformation and maturity models in [3] and the percentage of the expression of these dimensions in the managers' interviews. The findings suggest that a gap exists between the dimensions that academic digital transformation and maturity models had focused on the needs of managers experiencing an accelerated digital transformation after COVID-19 pandemic. The digital transformation and maturity models paid equal attention to managers' need for the following dimensions: investment, monitoring and control, and the people. It seems that the acceleration of digital transformation during the COVID-19 pandemic had called for academic research to exert more efforts in supporting managers to service customers and advance their purchase experience by focusing on the following dimensions: implementation of processes, the deployment of cloud and data, and the utilization of digital marketing for selling products. Technology, digital marketing, products, cloud and data, customers, value chain, and organization were expressed more in the interviews by the following differences 17%, 10%, 8%, 6%, 5%, 5%, and 2%, respectively. These factors are extremely important if businesses plan to embrace an accelerated digital transformation aiming at customer experience enhancement. Our findings call for the attention of academic researchers to consider and further integrate the following dimensions into their studies: technology, digital marketing and products-related dimensions, customers, cloud and data, value chain, and organization.

Conflict of interest

The authors declare no competing interests in conducting this research.

Author details

Sankhani Hemachandra[1] and Nora Sharkasi[2*]

1 Digital Business and Innovation Program, Tokyo International University, Japan

2 Institute for International Strategy (IIS), Tokyo International University, Kawagoe, Japan

*Address all correspondence to: nsharkas@tiu.ac.jp

IntechOpen

References

[1] Mühleisen M. The long and short of the digital revolution. Finance & Development. 2018;**55**(002):4-8

[2] Kane G. Don't forget the basics in digital transformation. MIT Sloan Management Review. 2017;**2017**(2): 15-23

[3] Bumann J, Peter MK. Action fields of digital transformation–a review and comparative analysis of digital transformation maturity models and frameworks. Digitalisierung und andere Innovationsformen im Management. 2019;**2**:13-40

[4] Unruh G, Kiron D. MIT Sloan Management review. Cambridge: Digital Transformation On Purpose; 2017. Available from: http://sloanreview.mit.edu/article/digital-transformation-on-purpose

[5] Maltaverne B. Digital transformation of Procurement: a good abuse of language?. 2017. Available from: https://medium.com/procurement-tidbits/digital-transformation-of-procurement-a-good-language-abuse-bfcf565b957c

[6] Vial G. Understanding digital transformation: A review and a research agenda. 1st edition. Managing Digital Transformation. 2021:13-66

[7] Kane GC, Palmer D, Phillips AN, Kiron D, Buckley N. Strategy, not technology, drives digital transformation. MIT Sloan Management Review and Deloitte University Press. 2015;**14**(1–25):1-29

[8] Kiron D, Kane GC, Palmer D, Phillips AN, Buckley N. Aligning the organization for its digital future. MIT Sloan Management Review. 2016;**58**(1): 1-30

[9] Maier AM, Moultrie J, Clarkson PJ. Assessing organizational capabilities: Reviewing and guiding the development of maturity grids. IEEE Transactions on Engineering Management. 2011;**59**(1): 138-159

[10] Hägg J, Sandhu S. Do or Die: How large organizations can reach a higher level of digital maturity. 2017:1-77

[11] Andriole SJ. MIT Saloan Management review; Five myths about digital transformation. USA: Learning Oreilly; 2017. Available from: https://learning.oreilly.com/library/view/five-myths-about/53863MIT58317/chapter001.html

[12] Paulk MC, Curtis B, Chrissis MB, Weber CV. Capability maturity model, version 1.1. IEEE Software. 1993;**10**(4): 18-27

[13] Anderson C, Ellerby W. Digital Maturity Model Achieving digital maturity to drive growth. 2018. Available at: http://www2.deloitte.com/content/dam/Deloitte/global/Documents/Technology-Media-Telecommunications/deloitte-digital-maturity-model.pdf [accessed August 16, 2019]. 2018

[14] Westerman G, Tannou M, Bonnet D, Ferraris P, McAfee A. The digital advantage: How digital leaders outperform their peers in every industry. MITSloan Management and Capgemini Consulting, MA. 2012;**2**:2-3

[15] Peyman A, Faraby N, Rossmann A, Steimel B, Wichmann K. Digital Transformation Report - Eine Empirische Studie. Köln: Neuland GmbH & Co. KG; 2014. Available from: https://www.wiwo.de

[16] Schäfer D, Rossmann A, Vogel R, Wichmann K. Digital Transformation

Report-Köln. 2015. Available from: https://www.neuland.digital

[17] Schumacher A, Erol S, Sihn W. A maturity model for assessing industry 4.0 readiness and maturity of manufacturing enterprises. Procedia Cirp. 2016;**52**:161-166

[18] Valdez-De-Leon O. Technology Innovation Management Review. A Digital Maturity Model for Telecommunications Service Providers. Vol. 6. Ottawa: Timreview; 2016. Available from: https://www.timreview.ca

[19] Wallner J. Digital readiness assessment. Leipzig. 2016. pp. 1-6

[20] Peter MK. KMU-Transformation. Als KMU die Digitale Transformation erfolgreich umsetzen. Forschungsresultate und Praxisleitfaden. Olten: FHNW; 2017. Available from: https://kmu-transformation.ch/digitale-ausgabe

[21] Schlaepfer R, Von Radowitz K, Koch M, Merkofer P. Digital Future Readiness - How do Companies Prepare for the Opportunities and Challenges of Digitalisation. Switzerland: Deloitte; 2017. Available from: https://www2.deloitte.com/content/dam/Deloitte/ch/Documents/consumer-business/ch-cip-en-swiss-transformation.pdf

[22] Iivari N, Sharma S, Ventä-Olkkonen L. Digital transformation of everyday life–how COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? International Journal of Information Management. Sri Lanka. 2020;**55**:102183

[23] Crisis 24. Sri Lanka: Nationwide Curfew Implemented March 20-23/update 5. 2020. Available from: https://crisis24.garda.com/alerts/2020/03/sri-lanka-nationwide-curfew-implemented-march-20-23-update-5 [Retrieved August 17, 2022]

[24] Farzan, F. 50 Dock-Workers Placed in Quarantine. Sri Lanka: Sri Lanka News - Newsfirst. 2020. Retrieved 25 October 2020. Available from: https://www.newsfirst.lk/2020/10/19/50-dock-workers-placed-in-quarantine/

[25] Welle, D. Sri Lanka's Food Shortages Fuelled by COVID, Economic Crisis. India: FRONTLINE: India's National Magazine; 2021. Retrieved 17 August 2022. Available from: https://frontline.thehindu.com/dispatches/sri-lanka-food-shortages-fuelled-by-covid-economic-crisis/article36293137.ece

[26] Günther WA, Mehrizi MH, Huysman M, Feldberg F. Debating big data: A literature review on realizing value from big data. The Journal of Strategic Information Systems. 2017; **26**(3):191-209

[27] Bharadwaj A, El Sawy OA, Pavlou PA, Venkatraman NV. Digital business strategy: Toward a next generation of insights. MIS Quarterly. 2013:**33**(3):471-482

[28] Charmaz K. Constructing Grounded Theory. 1st ed. London: SAGE; 2006. p. 202

[29] Dixon-Woods M. Using framework-based synthesis for conducting reviews of qualitative studies. BMC Medicine. 2011;**9**(1):1-2

[30] Atkinson P, Coffey A, Delamont S. Key themes in qualitative research: Continuities and changes. Rowman Altamira. 2003. pp. 1-183

[31] Noble H, Mitchell G. What is grounded theory? Evidence-based Nursing. 2016;**19**(2):34-35

[32] Hemachandra S, Sharkasi N. Digital transformation induced by the Covid-19 pandemic. In: Digital Marketing & eCommerce Conference. Cham: Springer; 2021. pp. 50-61

[33] Blackstone A. Qualitative and Quantitative Methods. Saylor Foundation, Washington, DC: University of Maine; 2012. Available from: https://saylordotorg.github.io/text_principles-of-sociological-inquiry-qualitative-and-quantitative-methods/index.html

[34] Porter ME. The Competitive Advantage: Creating and Sustaining Superior Performance. 1st ed. NY: Free Press; 1985

[35] Melacini M, Perotti S, Rasini M, Tappia E. E-fulfilment and distribution in omni-channel retailing: A systematic literature review. International Journal of Physical Distribution & Logistics Management. 2018;**48**(4):391-414. DOI: 10.1108/IJPDLM-02-2017-0101

[36] Troise C, Camilleri MA. The use of digital media for marketing, CSR communication and stakeholder engagement. In: Camilleri MA, editor. Strategic Corporate Communication in the Digital Age. Bingley: Emerald Publishing Limited; 2021. pp. 161-174. DOI: 10.1108/978-1-80071-264-520211010

Chapter 6

Consumers' Curbside Pickup and Home Delivery Shopping Behavior in the Post-Pandemic Era

Jia Li and Patrick Fisher

Abstract

Consumers' shopping channel options have moved beyond the traditional brick-and-mortar channel and into e-commerce channels such as curbside-pickup-from-store and home-delivery-from-store. The COVID-19 pandemic has substantially accelerated consumers' adoption of these e-commerce channels, particularly in their grocery shopping. Even allowing for the pandemic's end, grocery shoppers' reliance on e-commerce will stay and continue growing, calling for an urgent understanding of consumers' curbside pickup and home delivery shopping behavior in the post-pandemic era. This chapter offers the first comprehensive manuscript to help understand the status-quo and future of consumers' curbside pickup and home delivery shopping behavior. The unique collaboration between an academic scholar and a practitioner with rich industry experience provides practical insights and points of view with rigorous scientific support. Note that this chapter is beyond a review—a new digital-era shopping channel typology and framework is proposed; a new data analysis that compares the time consumers spend on shopping grocery online vs. offline is conducted; multiple predictions about grocery shoppers' new behavior in the curbside-pickup-from-store and home-delivery-from-store channels in the post-pandemic era are presented. While the manuscript focuses on the grocery industry, the insights can be applied to other retail sectors that also provide curbside-pickup-from-store and/or home-delivery-from-store services.

Keywords: curbside pickup, home delivery, e-commerce, consumer behavior, grocery shopping, retail channels, post-pandemic retailing, new normal

1. Introduction

Visiting a brick-and-mortar store (e.g., a local shopping mall or grocery store) used to be the only way for consumers to purchase goods. The advance of digital technology opened the door to online shopping, which has substantially reframed both people's shopping behavior and the competitive landscape of the retail industry. According to the latest U.S. Census Bureau's Annual Retail Trade Survey [1], the U.S. retail sales from e-commerce grew from 0.19% (=5/2582 billion) in 1998 to 3.60% (=142/3935 billion) in 2008 to 9.66% (=508/5255 billion) in 2018. Many cite

e-commerce as the cause of death for many iconic physical retailers, from books to clothing to electronics, etc., for example, Blockbuster (Year 2010), Borders Books (Year 2011), CompUSA (Year 2012), Golfsmith (Year 2016), The Limited (Year 2017), RadioShack (Year 2017), Toys R Us (Year 2018), and Barneys (Year 2019), just to name a few [2].

One retail sector, though, had largely been immune from the impact of e-commerce before the COVID-19 pandemic: the supermarket and grocery industry. Grocery is a trillion-dollar business for the U.S., constituting almost 5% of its GDP [3]. The competition in the industry has always been extremely fierce. As CNBC [4] reported, "The profit margins traditionally have been low in this business... Grocery is among the thinnest margins out there in retail. The average grocer probably gets a 2-, 2.5-, to 3 % type operating margin. That is very slim margin, and that is before interest and taxes."

However, the highly perishable nature of many grocery purchases and stickiness of grocery shoppers' habits have softened and delayed the impact of e-commerce on it compared to other retail sectors. Although the entry of new, online, players into the industry, Amazon, in particular, urged traditional grocers to test the waters on online grocery shopping services in the last decade, most parts of the grocery business operated the same in 2019 as they did in 2009 or 1999. The COVID-19 pandemic dramatically rocked the boat and accelerated the adoption and development of e-grocery. In general, e-grocery services in the U.S. include both curbside pickup and home delivery. The adoption and usage of both of these services increased rapidly during the pandemic. As a result, in 2020 e-grocery's percentage of the grocery market was 10.2%, up from 3.4% of the 2019 market [5]. E-grocery is expected to continue its growth after the pandemic. Redman predicted that e-grocery sales would climb to 21.5% of total grocery sales by 2025, calling for the immediacy of research on a deeper understanding of e-grocery, both curbside pickup and home delivery [6].

This chapter aims to provide a comprehensive document of consumers' curbside pickup and home delivery grocery shopping behavior from both academic research and industry practice perspectives. Section 2 first proposes a new generic retail shopping channel typology and framework, of which curbside-pickup-from-store and home-delivery-from-store are two components. The framework is then applied to the supermarket and grocery industry, and after that, grocery shoppers' behavior in the two channels is discussed. Section 3 presents how the COVID-19 pandemic has changed consumers' online grocery shopping behavior. Section 4 predicts how grocery shoppers might behave in the post-pandemic world, and what topics future research efforts should be focused on.

2. Curbside pickup and home delivery shopping behavior

2.1 A full Spectrum of shopping channels

Roughly speaking, a "shopping channel" is a source from which consumers buy goods (or services) from sellers. In old days, consumers had a single, offline shopping channel: visiting a **brick-and-mortar (B&M)** store. A digital or online channel is the means through which consumers can buy goods or services from a seller over the Internet. Initially, shopping via an online channel involves a shipment from an online seller's warehouse to a buyer's home, which we refer to as "**ship-to-home**" **(S2H)** channel.

Over time, other channel formats located between the B&M channel and the S2H channel have emerged, including:

- **Ship-to-store** (S2S): A consumer places an order via a retailer's website or app. The ordered product is shipped from the retailer's warehouse to a local brick-and-mortar store of the retailer. The consumer must visit the local store to pick up the product. Typically, the consumer needs to enter the store for pickup. We call this sub-type "**Ship-to-store-for-in-store-pickup**" (S2SFISP). But some retailers (e.g., Home Depot and Target) also make "**Ship-to-store-for-curbside-pickup**" (S2SFCP) available. Generally, with curbside pickup, retailers allow customers to pick up products without leaving their cars, typically at designated zones in on-site or nearby parking spaces.

  One key difference between S2SFISP and S2SFCP from a retailer's perspective is in the latter, the cross-sell and up-sell opportunities are nonexistent.

- **Home-delivery-from-store** (HDFS): A consumer orders online via the website/app of a retailer or a third-party service provider of a product that is available (and only available) in his/her selected local store. The product is delivered to the consumer's home, typically within hours, from the selected local store.

  Note that HDFS is different from S2H in terms of where an order is fulfilled—in HDFS, an order is fulfilled by a local brick-and-mortar store, while S2H orders are fulfilled by a warehouse, which is, more often than not, not locally located.

- **Pickup-from-store** (PFS): A consumer orders online a product that is available (and only available) in his/her selected local store. Instead of having the product delivered to the home, the consumer picks it up from the local store where the product is located.

  The key difference between PFS and S2S is the same as the one between HDFS and S2H, that is, whether the product availability and order fulfillment involve a local store or not. Similar to S2S, PFS also has two variances, "**curbside-pickup-from-store**" (CPFS) or "i**n-store-pickup-from-store**" (ISPFS). The former has become increasingly popular and is the dominant PFS format in the Supermarket and Grocery Stores industry.

- **Ship-to-third-place** (S23P): An order is fulfilled by, and shipped from a warehouse. However, instead of shipping to the consumer's home ("first place") or workplace ("second place"), the ordered product is shipped to an alternate location, which we also call a "third place"[1].

  Amazon's locker is an example of S23P. It is estimated that by the time of the COVID-19 outbreak, Amazon had about 15,000 lockers located in U.S. convenience stores, apartments, and universities [7].

- **Third-place-delivery-from-store** (3PDFS): After a consumer places an order online, the ordered product is delivered from a local store to a third place, where the consumer can pick it up.

[1] We reuse this term coined by Ray Oldenburg in his influential book *The Great Good Place* (1989). But it carries a different meaning in our context.

For example, Lowes Foods, a high-end regional grocer serving the southern U.S., is testing to provide grocery pickup services at various third places in North and South Carolina [8].

Figure 1 is a tree diagram that summarizes all the channels from which consumers can shop in the digital era. To our best knowledge, this is the first time such a comprehensive digital-era channel typology and framework is proposed. Where an order is fulfilled is a key factor in pinpointing the shopping channel formats—In B&M, PFS, 3PDFS, and HDFS, orders are fulfilled by a local store; in S2H, S2TP, and S2S, orders are fulfilled by a warehouse. As such, we avoid using the seemingly popular acronyms BOPIS (buy-online-pick-up-in-store) and BOPAC (buy-online-pickup-at-curbside). While we believe that the two terms are equivalent to ISPFS (in-store-pickup-from-store) and CPFS (curbside-pickup-from-store), respectively, we would like to use the latter to emphasize the "from store" part of them, since that makes them sharply differentiated from S2SFISP (ship-to-store-for-in-store-pickup) or S2SFCP (ship-to-store-for-curbside-pickup). In addition, it is worth pointing out that a local store that fulfills an online order is not necessarily an active store that also serves in-store shoppers. Retailers can also use a local dark store to fulfill online orders. A good example is the "ghost" kitchen [9].

In theory, all the general retail shopping channels in **Figure 1** can apply to grocery shopping. In the context, it may be helpful to also view those rich types of channel formats from a two-dimensional perspective, as illustrated in **Figure 2**. In the figure, the y-axis represents the necessity of the seller's local presence. As suggested in **Figure 1**, whether an order is fulfilled locally is a key factor in pinpointing today's shopping channel formats. On the other hand, the x-axis is the travel distance of a consumer to obtain the grocery, another critical decision factor of grocery shopping.

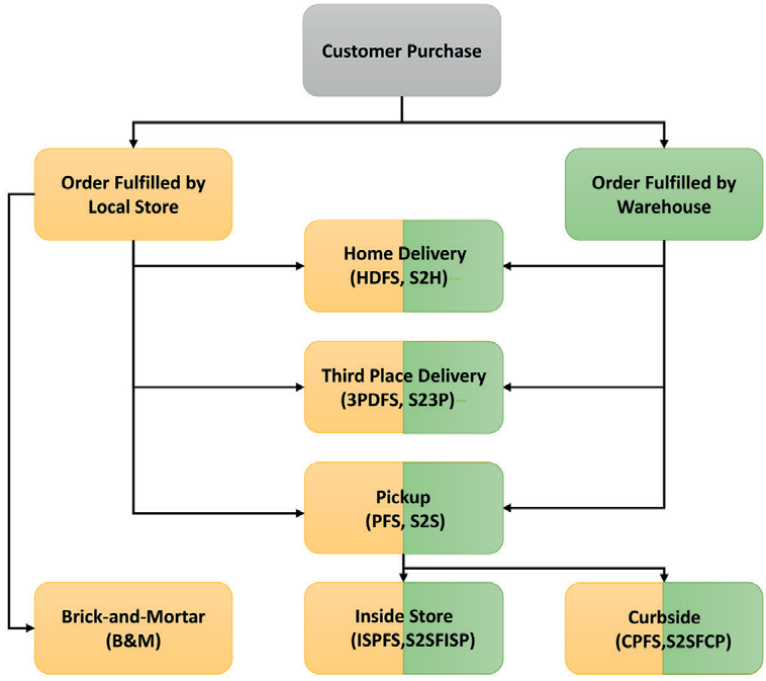

Figure 1.
A general retail shopping channel typology in the digital era. Source: built by the author.

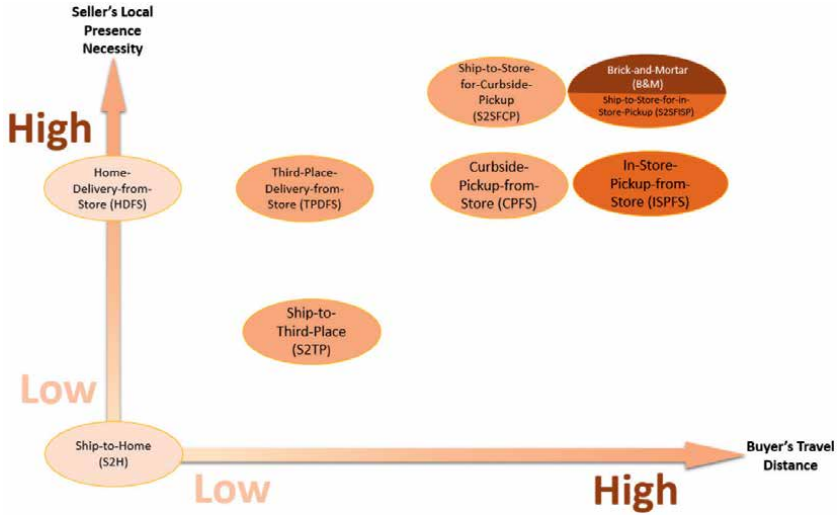

Figure 2.
A two-dimensional view of today's grocery shopping channels. Source: built by the author.

Note that the difference between B&M and PFS in the y-axis represents the existence of the dark store. Also note that in the figure, B&M and S2SFISP overlap and thus merge into the same box since they are identical in terms of both seller's local presence and buyer's travel distance.

In **Figure 2**, the boxes' color shade is also meaningful, which is used to represent consumers' actual "shopping" effort and time. This refers to the effort and time that a consumer spends on shopping the grocery, such as moving a product from the shelf to the shopping cart and unloading a product from the car to the pantry. In the figure, the darker a box is, the more shopping effort and time a consumer is involved to complete one grocery shopping. Note that the shopping effort and time are fundamentally different from the effort and time it takes a consumer to travel to a store in that the former is a function of household size (the larger a household, the more grocery products to load into a car, upload from the car, etc.) but the latter is not. Because of that, in **Figure 1**, B&M and S2SFISP are represented by two different color shades with B&M's one being darker, even though they are identical in both dimensions.

The discussion of the shopping effort and time above and **Figure 2** reveals that in shopping for groceries, consumers can incur two types of costs, which vary with their locations and size of household:

- **Travel Cost**: The gas and time cost associated with a consumer traveling to a brick-and-more store.

  This cost is dependent on location but independent of household size. For example, the travel cost of a household with 10 people whose house is next to a grocery store is demonstrably lower than a single-member household whose nearest grocery store is five miles away.

- **Shopping Cost**: The efforts and time a consumer spends on actual shopping.

Part of this cost, for example, physical loading or unloading of groceries, is independent of location but dependent on household size. When consumer shops for groceries in a store, although handling those bulky items such as toilet paper always requires effort, buying it for a household of 10 definitely requires more effort than for a single-member household.

E-commerce and any online-related shopping channels are able to transfer some of the time and effort costs from the shopper to the retailer. For example, any store pickup channels shift the loading-related shopping cost to a local store, and any home delivery channels shift both loading-related shopping and travel costs from the shopper to the retailer. Because of that, when applying to the grocery shopping context, it is also useful to reorganize the full spectrum of retail shopping channels in **Figure 3**, in which the x-axis and y-axis represent a consumer's travel cost and shopping cost, respectively. In the figure, "In-Store Pickup" includes S2SFISP and ISPFS, since both of them are identical from a consumer's perspective in terms of the two types of costs. Similarly, "Curbside Pickup" includes S2SFISP and CPFS, "Third-Place Pickup" includes S23P and 3PDFS, and "Home Delivery" includes S2H and HDFS. Li and Moul used this framework to examine the impact of e-commerce on grocery shoppers' channel choice, shopping frequency, and basket composition [10].

We hope that our newly proposed frameworks of grocery shopping channels above can help scholars and practitioners to better systematically understand and think of the increasingly sophisticated landscape of grocery shopping. Given that CPFS and HDFS currently dominate shoppers' choices, and are likely to remain so for the foreseeable future among all the e-commerce channels in the industry, we will focus on them for the rest of the chapter.

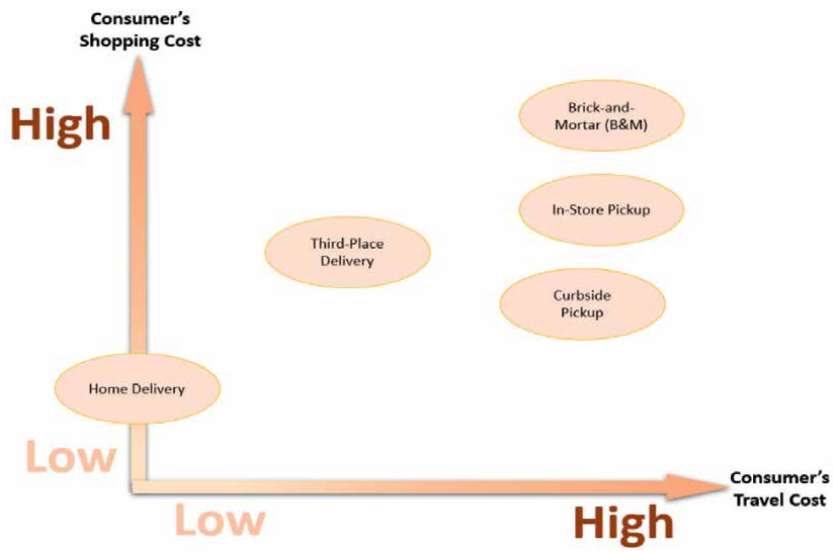

Figure 3.
Another two-dimensional view of today's grocery shopping channels. Source: built by the author.

2.2 Old and new competitors

E-commerce has not only brought new, online-related shopping channels to the Supermarkets and Grocery Stores industry but also created new competitors for grocery stores, or grocers, the traditional players in the industry. In the U.S., grocery stores used to compete with each other in specific localities. Interestingly, grocery stores tend to be regional enterprises, with very few located throughout the entire country, resulting in a highly fragmented U.S. grocery market. Over time, grocery stores have had to compete with new rivals, such as supercenters (e.g., Walmart Supercenter), Warehouse Clubs (e.g., Costco), Dollar Stores (e.g., Dollar General), Specialty Stores (e.g., Trader

Part 1

Store type		Main player	Number of stores
Traditional Grocery Store	Higher-end	Harris Teeter, Lowes Foods, Publix, The Fresh Market	345
	Lower-end	BI-LO, Food Lion, Piggly Wiggly	822
Supercenter		Walmart Supercenter, Super Target	180
Warehouse Club		Costco, Sam's Club, BJ's	62
Dollar Store		Dollar General, Dollar Tree, Family Dollar	2548
Specialty Store		Earth Fare, Sprouts Farmers Market, Trader Joe's, Whole Foods Market	64
Limited Selection Discounter		Aldi, Lidl	148
		Total Number of Main Players: 21	Total: 4169

Part 2

Store type		In-store shopping behavior		Online shopping behavior
		Median travel distance (in mile)	Median Dwell Time (in Minute)	Median Online Grocery Shopping Duration
Traditional Grocery Store	Higher-end	3.14 (65)	17.22 (88)	15.42 (107)
	Lower-end	2.94 (61)	17.04 (87)	14.21 (99)
Supercenter		5.52 (114)	21.74 (111)	13.56 (94)
Warehouse Club		7.62 (158)	23.29 (119)	14.42 (100)
Dollar Store		4.08 (85)	15.58 (80)	14.03 (98)
Specialty Store		5.77 (120)	19.56 (100)	14.72 (103)
Limited Selection Discounter		4.65 (96)	22.18 (114)	14.13 (98)
		Average: 4.82 (100)	Average: 19.52 (100)	Average: 14.36 (100)

Note: For each column, the number in a bracket represents the index (%) vs. the average of the column. For example, for the first column, (65) means the median travel distance (in miles) of the higher-end traditional grocery store is 65% of the average median travel distance across all store types.
Source: Built by the author.

Table 1.
The near-complete competitive landscape of the Carolinas (North Carolina and South Carolina) grocery market.

Joe's), and Limited Selection Discounter (e.g., Aldi), resulting in a highly competitive and saturated grocery market even before the advent of the Internet.

Using data from multiple sources[2], **Table 1** shows the near-complete competitive landscape of the Carolinas (North Carolina and South Carolina) grocery market in the U.S. This offers a vivid snapshot of the highly competitive and highly segmented U.S. grocery market. Note that the companies included in the table are very much inclusive, resulting in a less than 1% accumulated market share from all unlisted companies (most of them are small, family-owned grocery stores). All the data points in the table were built upon all stores of the listed companies in the two states, rather than from a sample of stores.

Methodology: This subsection discusses the methodology and provides details of the **Table 1** building. The number of stores information was collected from individual companies and then cross-checked with Reference USA [11], a leading database for business location data in the U.S. There are a vast number of dollar stores in the market; its market share in the grocery market can be even more surprising—in the Triad area of North Carolina, for example, the market share of Dollar General, Dollar Tree, and Family Dollar collective was more than 5% in 2019 [12]. Americans turning to dollar stores for groceries has been a national trend [13]. The information about travel distance to store from home and in-store dwell time was built upon the SafeGraph's Patterns database [14], which tracks U.S. consumers' visits to millions of points of interest (POIs) via their mobile devices. Specifically, "median travel distance" was calculated as the median of all distance (in miles) between a store and a shopper's home, and "median dwell time" is defined as the median of the minimum time (in minutes) each individual shopper spends in a store. Dwell time is important to retailers—research shows a 1% increase in dwell time resulted in a 1.3% increase in sales [15]. As far as we know, this is the first time that a comprehensive comparison of consumers' grocery shopping travel distance and dwell time across different types of stores from non-survey data is presented.

The data show that a warehouse club has the largest geographic coverage in terms of in-store shopping, more than double the coverage of a traditional grocery store. Among all the dwell time data points, what is most notable is that consumers on average spend a relatively long time in an Aldi or Lidl, even longer than they spend in a Walmart Supercenter or Super Target. This suggests that those limited selection discounter's "treasure hunt strategy" (e.g., Lidl consistently rotates the availability and promotion of various nonperishable goods) has been quite successful [16]. Pooling those numbers together, we see that the Carolinas market has one store for every 3700 (=15.6 millions/4169) people where they can buy groceries[3], and a consumer typically does not need to travel far (in U.S. standard) to obtain their groceries.

The competition in the Internet era has become even more intensive. The industry's low margin did not stop the online retail giant Amazon from escalating the national food fight. The incumbent players in the industry have also evolved. By this time, all the store types aforementioned have offered pickup-from-store and home-delivery-from-store. This means that those companies are competing not only offline but also online. The last column of **Table 1** shows "median online shopping duration," the counterpart of dwell time when consumers shop online. To calculate it, we applied

[2] To avoid the possible bias from the COVID-19 pandemic, we use the data from the year immediately before the pandemic, that is, 2019, to build the table, even the same data during the pandemic is also available to us.

[3] North Carolina and South Carolina have a collective population of 15,557,813 as of 2020.

Semrush Pro, a popular paid online keyword research and competitor analysis tool, to a sampling of retailers from **Table 1** that have online grocery shopping available via Instacart.com[4]. We chose to look at Instacart.com since not all consumers who visit the web or app properties of a mass retailer (e.g., Walmart.com or the Target app) are exclusively grocery shopping[5]. Semrush Pro tracks the real-time traffic of numerous websites including Instacart.com. One key factor in comparing online shopping duration to in-store dwell time is consumers tend to shop more quickly online. In fact, the data show a more than 25% (= (19.52–14.36)/19.52) time reduction. Given the strong correlation between time spent on shopping (whether dwell time in stores or online shopping duration) and firm performance, this should have a big implication to grocers. We will talk more about this when we discuss consumer behavior in the post-pandemic era.

To conclude, we have applied a creative method to conduct a new data analysis that compares the time consumers spend on shopping grocery online vs. offline. This is in addition to the new digital-era shopping channel typology and framework we proposed in Section 2.1. As such, this chapter is beyond a review—it not only provides a comprehensive review of the current advances of those important retail channel formats but also offers a set of new findings.

Competitor's Geographical Impact in the Digital Era: Stores' new pickup-from-store and/or home-delivery-from-store services also have a strong impact on their geographical coverage. A physical store's geographical coverage used to be highly limited. Consistent to our findings in **Table 1**, Quelch and Carlson (2011) stated that a grocery store generally serves customers who live within a one- to three-mile radius [17]. Li and Moul used real sales and entry data from multiple grocery stores to estimate that the opening of a new store has a significant impact on the in-store sales of rivals located only within 1.5 miles [18]. A study by Ellickson and Grieco (2012) shows that even the impact of Walmart's expansion into groceries is highly localized, the entry of a new Walmart Supercenter significantly affects existing grocery stores only within a two-mile radius of its location [19].

Now with pickup-from-store and home-delivery-from-store, consumers can order from a store that is farther from home (e.g., In the Charlotte, NC area, a consumer can order through home-delivery-from-store from a retailer located 33 miles away from their home and receive the order within an hour for an additional $5 "long-distance service fee."). A study by Li and Moul shows that an existing store adding curbside-pickup-from-store has a significant geographic impact on the in-store sales of direct competitors' stores up to eight miles [18].

It is worth emphasizing that in such an increasingly saturated and competitive market, grocers should neither underestimate nor overestimate who their direct competitor is. Underestimation is a less urgent issue, given grocers have a sense of the other B&M players in their regions and localities. However, they ought not to overestimate this competition. Taking the higher-end grocers in **Table 1** as an example, while Walmart Supercenters certainly have sales impacts on their stores, we advocate that those higher-end grocery stores should compete to Walmart Supercenters differently from their direct competitors that belong to the same store-type category. In general, any company competing in this market should choose proper upper and lower bounds of their direct competitors, then focus their marketing dollars on

[4] Because of that, the calculation does not include Walmart, Trader Joe's, and Whole Foods Markets.

[5] But we did check out those retailers that provide a dedicated URL for online grocery shopping, and the results were consistent.

competing with rivals in—and only in—the identified range. Retailers cannot, and should not, compete with everyone in the horizon, for example, Walmart's execution of everyday low price (EDLP) is not a pricing model that every retailer can successfully execute. Better understanding the consumer segments (behavioral and demographic) in the market, properly identifying the business opportunity associated with these segments, and focusing resources on positioning the retailer with high opportunity segments, while basic, are still the fundamental principles of success in the Supermarket and Grocery industry.

2.3 E-commerce grocery shopper behavior

When purchasing a product, consumers go through a decision-making process, which calls for distinct phases. The number of phases actually entailed is dependent on the consumer's level of involvement with the product. Kotler and Keller [20] and Dickson and Sawyer [21] show that, in general, consumers are "low-involved" in their grocery shopping, resulting in, say, spending less than 12 seconds per item when they are in a grocery store.

As suggested in **Table 1**, e-commerce and new online-related channels substantially impact consumers' grocery shopping behavior. Ample research has been done to understand consumers' online grocery shopping behavior. In this subsection, we will briefly review the research progress in this area.

Many studies have been conducted to understand the determinants of consumer purchase intention toward online grocery shopping among different demographics (e.g., [22, 23]), or in different countries, for example, China [24, 25], India [26], Germany [27], Korea [28], Malaysia [29], Netherlands [30], Pakistan [31], Portugal [32], Thailand [33], U.K. [34], U.S. [35], and Vietnam [36].

Price has consistently been one of the most important factors in a customer's decision-making process of choosing where to do grocery shopping. Many American households shop at several grocery stores on a weekly basis to get the best prices for the items that they had on their shopping lists. Interestingly, while the search cost rationale predicts that consumers can be more price sensitive online than offline due to the low search cost, Chu et al. used an actual grocery shopping dataset to show that the same households exhibited lower price sensitivities when they shopped online than when they shopped offline [37]. The result was robust, holding for both large basket-share categories and small basket-share categories, for consumer-packaged goods and nonpackaged goods, for categories that are more likely to be purchased online because of their bulkiness or heaviness, and for categories that are more likely to be purchased offline because of their "sensory" nature. Given that the data used by Chu et al. [37] were from "the only successful online store" in the market back to early 2000's, it warrants a study to verify the results using newer data.

The delivery and service fees associated with pickup-from-store and home-delivery-from-store can also affect consumer behavior. Prior to the pandemic, those associated fees deterred a high number of shoppers because their trips to the physical grocery store were not an inconvenience and could be easily integrated into a part of their regular routines. Whether it was driving to work, school, or other errands that the shoppers took daily, adding another stop, in the consumer's decision-making process, was not valued in the same way as leaving their house only to go grocery shopping because the original driving is a sunk cost. Lewis (2006) empirically studied the effects of shipping fees on customer acquisition, customer retention, and average

expenditures using data from an online grocer [38]. He found that shipping fees greatly influenced order incidence rates and graduated shipping fees significantly affected average expenditures. The various fee structures and resulting consumer behavior change may have other farther-reaching effects. Belavina et al. used a theoretical model to predict that grocery and food service subscriptions incentivize smaller and more frequent basket orders, which reduced food waste and created more value for the customer. In turn, the subscription model resulted in higher revenues, lower operational costs for the retailer, and potentially higher adoption rates for the grocers. These advantages, however, were countered by greater delivery-related travel and expenses, which were also moderated by area geography and routing-related scale economies. The subscription also led to lower food waste–related emissions but to higher delivery-related emissions. Pooling the two contradicting effects together, the paper suggests that, based on geographic and demographic data, the subscription model is almost always environmentally preferable because lower food waste emissions dominate higher delivery emissions [39].

Studies also focus on how and why consumers may choose different product alternatives when they shop online. Researchers are particularly interested in how online shopping alters consumers' healthy food choices (e.g., [35, 40–43]). For example, Huyghe et al. [40] suggested that consumers chose relatively fewer unhealthy alternatives in the online shopping channel. This is because the e-commerce channel presents products symbolically, which decreases the products' sensory stimuli, which in turn diminishes consumers' desire to seek instant gratification of those unhealthy alternatives. Zatz et al. [35] found something similar--consumers who ordered their groceries online spent less money on junk food compared to when they shopped in person.

Consumers' different product choice behavior, when they shop online, can affect a retailer's assortment strategy. For example, using data from an online grocery delivery service, Borle et al. [44] showed that a reduction in assortment reduced overall store sales, a result that contrasted with the conclusions of several previous academic and practitioner studies conducted offline that suggested grocery retailers could reduce product assortment with little or no loss in sales. Nenycz-Thiel et al. [45] found that the online environment was, in general, beneficial for private labels. Data from multiple product categories showed consumers tended to buy more private label products online than offline.

Most existing research, however, has not separately examined pickup-from-store and home-delivery-from-store. The data used by the research typically come from a home-delivery-from-store setting. The understanding of pickup-from-store is important but extremely lagging. Curbside-pickup-from-store is and will stay as the larger e-commerce channel in grocery. Analysis of the survey's data found that while pandemic restrictions were in effect, 69% of online orders were fulfilled in the store via pickup and predicted that, post-COVID-19, a full 75% of online orders will be fulfilled through pickup services [5]. It is expected that delivery will take considerable time to surpass pickup and that the former would only overtake the latter in major markets. Our extensive literature search only yields two papers that specifically examine curbside-pickup-from-store. Gielens et al. (2021) found that the different ways of implementing home-delivery-from-store, in-store fulfillment (pickup at existing stores), near-store fulfillment (pickup at outlets adjoining stores), and stand-alone fulfillment (pickup at free-standing locations), could affect consumers' spending [46]. Li and Moul built near-complete competitive environments in multiple markets and used brick-and-mortar store and curbside pickup service entry events in those

markets to qualify the impact of curbside-pickup-from-store on competing retailers' sales performance [18].

3. How did the pandemic change grocery shopper behaviors?

The unprecedented COVID-19 pandemic has altered how consumers behave in many ways (e.g., [47, 48]), and their grocery shopping behavior is no exception. In this section, we will discuss the impact of the pandemic on groery shopping behavior from a 5-W framework, **w**here to buy, **w**hen to buy, **w**ho is buying, **w**hat products to purchase, and ho**w** much money and time is devoted.

Where: This change is obvious, as already noted in the first section. During the lockdown period of spring 2020, many households that were required to not go to their workplaces also avoided other places, even those deemed as "essential businesses," such as the grocery store. Shopping for groceries online became a "healthy" decision for consumers because it meant that they did not have to physically visit a store and potentially expose themselves and their families to the virus to stock their pantries. It is reported that 45% of consumers shopped online for groceries more during the pandemic than before the pandemic—46% used home-delivery-from-store more, and 40% used curbside-pickup-from-store more [49].

In response, since the onset of COVID-19, businesses of all sizes, from start-up e-commerce to the largest retailer in the world, announced different types of delivery innovations—from ultrafast delivery (15 minutes or less) to delivering directly into a household's refrigerator (Walmart). Equally notably, most, if not all, retailers rushed to get home-delivery-from-store and curbside-pickup-from-store services available to more of their stores. For example, Food Lion, a grocer that operates over 1000 stores in 10 Southeastern and Mid-Atlantic states, tripled its delivery footprint in 2020 alone [50].

After the U.S. stay-at-home orders were lifted and consumers returned to in-store shopping, studies (e.g., [49]) found that while grocery stores remained to be the top choice of store format for in-store grocery shoppers, other store types, such as warehouse clubs and limited selection discounters, gained popularity during the pandemic. For example, a survey study in Ref. [49] shows that around a third of the consumers polled said they were shopping less at grocery stores (30%) vs. pre-pandemic. This was likely due to some shoppers desiring fewer trips with bulk items and other shoppers desiring less "traffic" while they shop.

When: Prior to the pandemic, Saturdays are prime time for grocery shoppers. Approximately 41 million Americans choose this day to do their weekly shopping [51]. During the pandemic, the increased flexibility due to work-from-home and the safety concerns led to a much more diverse shopping time.

Consumers also shopped in stores significantly less frequently during the pandemic. Pre-COVID-19, an average U.S. household took 2.7 trips to the grocery store in a typical week. The 2020 Deloitte Fresh Food Consumer Survey suggested that the number of consumers who shopped for fresh food multiple times a week dropped by half from 2019 to 2020 [52].

Who: Pre-COVID-19, the average 2.7 trips a U.S. household took to the grocery store in a typical week were split between a primary shopper and a secondary shopper. Traditionally 65% of the primary shoppers are female [53]. Since the start of the pandemic, 36% of households made some change in who did the shopping. Of those, the majority (24%) reduced the number of shoppers going into the store

to just one person [54]. According to Reiley [55], more men are claiming to be the primary shopper during the pandemic, and "they do buy different things and buy differently."

Among those who adapted online grocery purchases due to the pandemic, two research papers, one using data from the U.S. [56] and the other using data from Finland [57], identify similar demographic and household characteristics of these adopters—higher income, bigger health concerns or constraints. Specifically, Shen et al. [56] and Eriksson and Stenius [57] respectively suggest that a household with earning USD100,000+ in U.S. or EUR50,000+ in Finland is more likely to be an adopter. Both papers are also consistent in that women may more likely be adopters than men.

What: The pandemic has generated a lot of supply chain issues. Even putting aside the behavior alteration caused by the supply chain shortages, we have observed other behavior changes regarding what to buy. Interestingly, two seemly contradicting behavior change patterns have been reported.

On one hand, it is observed that during the pandemic consumers tend to consider a smaller choice. In the COVID-19 period, consumers are more likely to have a list of critical tried-and-true items and are less inclined to browse and let serendipity guide them to something new. In response to that (as well as addressing the supply chain challenges), companies have chosen to produce and ship more of the top-selling products, and/or the top-selling varieties of a particular product, pushing off the launch of different flavors or spinoffs until sample stations can return. For example, Frito-Lay said that, when stay-at-home orders started going into effect in March 2020, it cut its number of unique stock-keeping units (SKUs) by about 21% to get more products into the market faster [55]. This "narrower range" phenomenon is not just a brick-and-mortar constriction. As the pandemic accelerated the shift to online shopping, the number of packaged food products available to purchase on the Internet fell 21% globally from January to May 2020. This phenomenon was not unique to the US, as nine out of the 10 biggest countries by retail sales saw a drop in the number of unique SKUs available online [55].

On the other hand, some research showed that consumers' variety-seeking behavior increased during the pandemic. Specifically, by analyzing a panel dataset containing over 14 million household-level transactions from grocery stores across eight U.S. states, Choi et al. found that U.S. consumers' variety-seeking behavior increased at UPC level, brand level, and manufacturer level for the dominant number of product categories (In addition to that, they also found that liberals and conservatives exhibited different variety-seeking change patterns during the pandemic) [58]. Note their results were obtained from multiple perishable product categories such as fresh eggs and produce, so stockpiling or hoarding should not jeopardize their conclusion. This puzzling result can be explained by the psychological reactance theory, which posits that an individual will engage in a strong emotional and behavioral attempt to restore freedom when their actions and choices are deprived [48, 59].

Another interesting observation about what shoppers bought during the pandemic is that consumers, budget-minded consumers in particular, embraced more-affordable private-label brands. In turn, shelf space at retailers became more competitive and presumably squeezed out shelf space for smaller and newer brands.

How Much: With consumer concerns on the rise, so are grocery bills. This has been confirmed by many studies (e.g., [52, 54, 55]). For example, as Reiley [55] pointed out, 44% of shoppers reported spending more money on groceries each visit as a result of COVID-19. Households' average weekly grocery spend surged from

$121 at the beginning of 2020 to $161 in late March. The spending fell to around $126 per week by April as shoppers eased on excessive buying, but was still higher than at the beginning of the year. The increased spending on groceries is consistent to the observation that home cooking became a popular alternative to restaurant services in many households. This was also probably due to the fact that many consumers were increasing the amount of money spent per trip and simultaneously decreasing the amount of time spent in the store.

4. Grocery shopping behavior predictions for the post-pandemic era and potential areas for future research

Some shopping behavior changes we discussed in the last section are temporary, but some will become permanent as they continue in the post-pandemic era. In this section, we will attempt to lay out some important behaviors that we expect to observe throughout the e-commerce grocery shopper journeys post the pandemic.

4.1 The continuing adoption/use of curbside pickup and home delivery services

Foremost, post-pandemic grocery shoppers will keep using or adopting the curbside-pickup-from-store and home-delivery-from-store services. While neither of these services were new, the pandemic has undoubtedly accelerated their adoption and built up the momentum for them to become a major part of the consumers' grocery shopping journey. Redman predicted that in the U.S., e-grocery sales would climb to 21.5% of total grocery sales by 2025 [6]. Shopping via those e-commerce channels will be one major pandemic-driven service feature that will become a permanent and bigger part of grocery retailing. This will make Section 2 of this discussion highly relevant and valuable to understanding grocery shopping behavior in the post-pandemic era. Admittedly, all the research discussed in Section 2 uses pre-COVID data, which may lead to a more conservative estimated magnitude than in the post-pandemic era. As such, we call for new studies to use post-COVID data to validate their conclusions.

Both curbside-pickup-from-store and home-delivery-from-store will continue growing post-pandemic. The latter will continue to ripen at a fast pace. However, we believe that between the two, curbside-pickup-from-store will persist as the bigger e-commerce channel for grocers. The home-delivery-from-store volume will only surpass curbside-pickup-from-store in major markets. In addition to the high costs associated with delivering, which will be a nearly insurmountable hurdle for most markets in the U.S., consumers' mobility patterns will also play a defining role. One key consumer behavior post-pandemic will be households traveling outside of the house again at near pre-pandemic rates. Not all shopper movement behavior will be the same, but we predict that households that are looking to travel outside of their home will be the determining factor for the stickiness of curbside pickup service.

4.2 Moving from 3rd-party service to 1st-party service

A large number of grocers had set up curbside-pickup-from-store and home-delivery-from-store services pre-pandemic. However, in many of those cases, grocers did not offer customers their own, 1st-party e-commerce shopping experience. The actual service was provided by 3rd-party marketplaces, with Instacart ultimately becoming

the largest. That was primarily because grocers' resources (internal employees, budget, etc.) prevented them from delivering an experience that was even remotely consistent to the quality that they delivered in their physical footprint. Additionally, pre-pandemic the e-commerce shares of many food retailers were well below 10% of their total sales, which resulted in these retailers not acting on the significant investment needed to establish a 1st party e-commerce shopping experience.

As the pandemic went on and kept being extended, grocers rushed to establish their own e-commerce shopping channels. Those that had not made investments in developing their own e-commerce shopping experience before were beholden to those marketplaces, not only for the technology and human capital infrastructure but also for the data. Grocers realized that they did not understand their own online customers since their agreements with 3rd party marketplaces resulted in the grocers not having access to those shopper's purchasing and customer journey data. Moreover, because of the e-commerce channel outsourcing, a grocer lost the ability to bring forward their brand proposition and brand reach to their current or future online shoppers.

The pain point of not being able to access their customers' data sped up many grocers' pace to develop and implement proprietary e-commerce channels. At this time, many grocers offer dual e-commerce shopping experiences to their customers through 1st-party and 3rd-party shopping options. We predict that post the pandemic, grocers will "push" their customers to use their own e-commerce channels and will battle with those 3rd-party marketplaces about who owns customer data. The ability to measure and react to consumer behavior using customer data will be an extremely important part of retailers successfully navigating the post-pandemic era. To that end, the future will hold more shoppers transitioning away from 3rd-party marketplaces to the retailers that they were loyal to before the pandemic and new retailers that they trialed during the pandemic and developped repport.

4.3 Impulse and explorative shopping behavior in the e-commerce channels

The growth of curbside-pickup-from-store and home-delivery-from-store is a great opportunity for grocers. However, it also poses new challenges to them (and manufacturer brands) at the same time. As shown in **Table 1**, consumers spend significantly less time to complete grocery shopping online compared to offline. The less time they spend, the less money they spend. This is probably because, as was discussed in Section 3, consumers are more likely to have and stick to a shopping list when they shop grocery online. Without all the powerful in-store instruments, such as calculated floor plan design and sampling stations, grocers need to find innovative ways to encourage their customers to extend their time spent on the retailer's website/app.

In a similar vein, consumers have done much less impulse purchasing when they do grocery shopping online. Grocers used to be big beneficiaries of consumers' impulse purchasing behavior such as purchasing wine displayed on promotional end caps or adding a candy bar to the basket in the check-out lane. Before the pandemic, consumers made three impulse buys a week, and 70% identified food as the main category [60]. Even worse, at this point in either curbside-pickup-from-store or home-delivery-from-store cross-sell and up-sell opportunities are virtually nonexistent (which was one of the reasons why grocers hesitated to invest in them pre-pandemic). It would be a tremendous missed opportunity for grocers to neglect impulse sales and cross-sell/up-sell opportunities after investing millions of dollars to set up their curbside-pickup-from-store or home-delivery-from-store infrastructure. Without

them, the brand experience, discovery, and personal connection would all disappear. The e-commerce channels may turn the store into just a warehouse. Because of that, we call for more research that can help grocers engage their consumers for more online impulse and explorative shopping behavior.

We believe that data and new development in technology will play a critical role here. The traditional search technique based on keywords and the traditional recommendation system based on, say, association rule technique, is not helpful. We need a new, smarter search engine or recommender that can not only "explore" but also "exploit." Consumer data will be the building block for any of those developments, which provides additional rationales for why grocers would like to set up their own e-commerce channels.

4.4 (Un)healthy food choices in the e-commerce channels

As discussed, consumers buy fewer new brands and products when they shop grocery via an e-commerce channel. Consumers are more likely to order what they have ordered before. Using Instacart data, Chintala et al. have shown that e-commerce shoppers on Instacart tend to have a 95% chance of purchasing the exact same brand/item once it has been included in at least five previous baskets [61]. If a consumer has ordered healthy products before, they are more likely to order them again. But if a consumer has ordered unhealthy products before, their adverse effect can also be reinforced. We expect to see more disparities in healthy vs. unhealthy food choices post-pandemic.

The current marketing tools and techniques could make the disparity even worse. Taking targeted marketing as an example. If purchasing habits are healthful, a consumer will be targeted with products that fit that pattern; if purchases lean in the other direction, so will targeted marketing. While a technique such as collaborative filtering is very suitable to be used in Netflix's recommendation system, which recommends movies based on a person's tastes in movies predicted from his/her past movie consumption, it will only reinforce a consumer's unhealthy eating patterns if used by a grocer in its recommendation system. The development and application of new techniques to grocery e-commerce channels are warranted.

4.5 Trip consolidation vs. disaggregation

Pre-pandemic, consumer grocery shopping trips are most frequently segmented by the number of items within the purchase, resulting in pantry stock-up trips, fill-in trips, special purpose trips, and quick trips [62]. Among them, pantry stock-up trips are grocery shopping trips with the largest total number of items within the basket. A pantry stock-up trip typically consists of products that are from categories and subcategories that are mostly defined as planned. A relevant example of this would be toilet paper. Most households do not increase or decrease the amount of toilet paper that they use as it is mostly dependent on the average number of people within a household over the course of any given day. Because of this, a household could estimate the amount of toilet paper that they may need over a period of time.

With the fast development of online grocery shopping, consumers will also develop their strategies of mixing up online and offline channels to optimize their grocery shopping experience, for example, using curbside-pickup-from-store and/or home-delivery-from-store services for bulky or other shelf-stable items, and using Brick-and-Mortar for fresh foods such as meats and produces. As a result, we expect

to observe both trip consolidation and trip disaggregation at the same time in the post-pandemic future. For example, consumers are likely to continue pandemic buying stock-up behavior, leading to less-frequent stock-up trips with even larger number of items within a trip. At the same time, consumers will probably run other types of grocery shopping trips more frequently for their perishable goods needs.

In response to that, even before the pandemic, but increasing since then, service providers and retailers have started to offer some form of automated replenishment of these items. This trend has much bigger implications for the grocery industry post-pandemic. For example, this trend will have a big impact on the current grocery store floor plan, which typically includes a large center aisle section full of shelf-stable items. The size (most commonly measured in square feet) of the center store section will shrink because of the automated replenishment and those e-commerce channels. In addition, only sending specific items would most likely (depending on the total cost of the item) not be profitable to the retailer, and by excluding the consumer from the "purchase" removes the possibility for the consumer to add other products, either planned items or impulse purchases introduced along the e-commerce check out process to the basket that may make the overall basket's profitability go from negative to positive. Because of that, in the post-pandemic future, it is important to look beyond auto replenishment as the product shows up on the consumer's doorstep every x number of days/weeks.

4.6 Shopping behavior affected by fee structure or labor supply

As we have discussed in Section 2.3, the delivery and service fees associated with curbside-pickup-from-store and home-delivery-from-store can also affect consumer behavior. In fact, pre-pandemic many consumers avoided e-commerce groceries, especially home-delivery-from-store, because of the perceived high cost of service fees associated with inherent convenience, as well as the new phenomenon of tipping your delivery driver.

In the post-pandemic period, we expect that grocers will continue exploring various fee structures for their own e-commerce channels, while they also try to move their customers there from a 3rd-party channel. One way that some grocers have tried is to find a fee structure to alleviate the pressures created by an unstable labor supply, specifically around fulfilling consumers' curbside and delivery orders. For example, some grocers have incentivized consumers to select different curbside pickup or delivery time slots based on the service fees associated with those slots. It is well-documented that consumers undervalue their time and overvalue the cost of a service/delivery/fulfillment fee that has historically not been a part of the total receipt of their shopping trip. Because of this, a consumer's behavior of when they would like to have their order ready and what fulfillment methodology that they chose to utilize could be significantly influenced by the retailer or marketplace. In addition to the variability of the cost of various time slots across potential windows of fulfillment, some grocers have also begun to incentivize shoppers to increase their overall basket spend by offering free shipping on their shortest window of fulfillment. By doing this, customers are introduced to a new opportunity of impulse buying that does not have to be prefaced with the retailer prompting them with a set of items hoping that one of them will satisfy a need that they did not realize that they had prior to starting their shopping trip. The plethora of subscription models and fee structures that are emerging (and fast-changing) will be very much worth the research endeavor.

5. Conclusion

Accelerated by the COVID-19 pandemic, curbside-pickup-from-store and home-delivery-from-store are growing explosively into the new normal and the post-pandemic era beyond that. Curbside pickup will remain the larger option between the two, while home delivery is ripening quickly. This chapter not only provides a comprehensive review of the current advances of those important retail channel formats but also offers a set of new points of view, such as a set of new shopping channel typologies and frameworks, as well as making a list of predictions of their future directions. We hope that our discussion is of help to both scholars and practitioners to better understand the fast-evolving consumer behavior beyond the pandemic.

Thanks

The authors are indebted to Yian Li and Molly Fisher for their great support. This chapter has also benefited from valuable comments by Roger Beahm and Michelle Steward. The first author appreciates the financial support from Wake Forest University School of Business and Wake Forest University Open Access Publishing Fund.

Author details

Jia Li[1*] and Patrick Fisher[2]

1 Wake Forest University School of Business, Winston-Salem, NC, USA

2 Intrics Retail Strategy and Consulting, Richmond, VA, USA

*Address all correspondence to: lijia@wfu.edu

IntechOpen

References

[1] U. C. Bureau. Annual Retail Trade Survey Supplemental E-commerce Tables. 2020. Available from: Census.gov. https://www.census.gov/data/tables/2020/econ/arts/supplemental-ecommerce.html

[2] "List of Defunct Retailers of the United States," Wikipedia. 2022. [Online]. Available from: https://en.wikipedia.org/w/index.php?title=List_of_defunct_retailers_of_the_United_States&oldid=1092477281

[3] Redman R. Online grocery to more than double market share by 2025. Supermarket News. 2020. Available from: https://www.supermarketnews.com/online-retail/online-grocery-more-double-market-share-2025

[4] Reagan C. What's behind the rush into the low-margin grocery business. 2013. Available from: https://www.cnbc.com/id/100794988

[5] "eGrocery Transformation: Market Projections and Insight into Online Grocery's Elevated Future," Mercatus. Available from: https://info.mercatus.com/online-grocery-shopper-consumer-behavior?_ga=2.50433130.296191318.1654268320-545170015.1654268320

[6] Redman R. "E-Commerce to Account for 20% of U.s. Grocery Market by 2026," Supermarket News. Available from: 2021. https://www.supermarketnews.com/online-retail/e-commerce-account-20-us-grocery-market-2026

[7] "Amazon Wants to Double Its Locker Program Over the Next Year," GRA, 2019. Available from: https://www.gra.world/amazon-wants-to-double-its-locker-program-over-the-next-year/

[8] Silverstein S. "Lowes foods brings grocery pickup lockers to office buildings," Grocery Dive. Available from: https://www.grocerydive.com/news/lowes-foods-brings-grocery-pickup-lockers-to-office-buildings/601596/

[9] Glorioso C, Givens A, Stulberger E. "I-team: Restaurants use false identities on food delivery websites". NBC New York. Available from: https://www.nbcnewyork.com/news/local/seamless-restaurant-grubhub-fake-eatery-unregulated-kitchen-investigation-i-team-new-york-city/2013699/

[10] Li J, Moul C. "Impact of E-commerce on grocery shoppers' channel choice, Shopping Frequency, and Basket-Composition," Working Paper. 2019

[11] "Data Axle Database." Available from: https://www.data-axle.com/what-we-do/reference-solutions/

[12] Brasier J. Fresh data: Breaking down grocers' market share in Greensboro/Hp, Winston-Salem Metros. Triad Business Journal. 2018. Available from: https://www.bizjournals.com/triad/news/2018/04/02/fresh-data-breaking-down-grocers-market-share-in.html

[13] Griffin E. Americans turning to dollar stores for groceries. 2021. Available from: https://www.wtoc.com/2021/09/05/americans-turning-dollar-stores-groceries/

[14] "SafeGraph's Patterns Database." Available from: https://www.safegraph.com/

[15] Biggar E, McAdams D. "Time is money - Shoppers buy more when they stay longer," 2007. Available from: https://fliphtml5.com/olpx/fgfr/basic/

[16] Troy M. Lidl gets physical. Retail Leader. Available from: https://retailleader.com/lidl-gets-physical/

[17] Quelch J, Carlson C. Reed supermarkets: A new wave of competitors. Harvard Business School Case. Available from: https://hbsp.harvard.edu/product/4296-PDF-ENG/

[18] Li J, Moul C. Grocery and E-commerce: Channel-specific impacts of brick-and-mortar entry and new competing Curbside services. Available from: http://ssrn.com/abstract=4235396

[19] Ellickson PB, Paul LE. Wal-Mart and the geography of grocery retailing. Journal of Urban Economy. 2013;**75**:1-14

[20] Kotler P, Keller K. Marketing Management. 15th ed. Boston: Pearson; 2014

[21] Dickson PR, Sawyer AG. The Price knowledge and search of supermarket shoppers. Journal of Marketing. 1990;**54**(3):42-53. DOI: 10.2307/1251815

[22] Etumnu C, Widmar NO, Foster K, Ortega D. What Drives Online Grocery Shopping? Atlanta: GA; 2019. p. 26

[23] Van Hove L. Consumer characteristics and E-grocery services: The primacy of the primary shopper. Electronic Commerce Research. 2022;**22**(2):241-266. DOI: 10.1007/s10660-022-09551-x

[24] Wang O, Somogyi S. Consumer adoption of online food shopping in China. British Food Journal. 2018;**120**(12):2868-2884. DOI: 10.1108/BFJ-03-2018-0139

[25] van Ewijk BJ, Steenkamp J-BEM, Gijsbrechts E. The rise of online grocery shopping in China: Which brands will benefit? Journal of International Marketing. 2020;**28**(2):20-39. DOI: 10.1177/1069031X20914265

[26] Siddiqui M, Tripathi S. Grocery retailing in India: Online mode versus retail store purchase. International Business Research. 2016;**9**:180. DOI: 10.5539/ibr.v9n5p180

[27] Seitz C, Pokrivcak J, Tóth M, Plevný M. Online grocery retailing in Germany: An explorative analysis. Journal of Business Economics and Management. 2017;**18**:1243-1263. DOI: 10.3846/16111699.2017.1410218

[28] Lee D, Jeong H, Cho J, Jeong J, Moon J. Grocery shopping via T-commerce in Korea: New Shopping Channel adoption behavior based on prior E-commerce experience. International Food Agribus Management Review. 2015;**18**(2):16

[29] Chin S-L, Goh Y-N. Consumer purchase intention toward online grocery shopping: View from Malaysia. Global Business and Management Research: An International Journal. 2017;**9**(4s):221-238

[30] Zhu Q, Semeijn J. Antecedents of Customer Behavioral Intentions for Online Grocery Shopping in Western Europe. In: Foscht T, Morschett D, Rudolph T, Schnedlitz P, Schramm-Klein H, Swoboda B, editors. European Retail Research: 2013. Wiesbaden: Springer Fachmedien; 2015. pp. 1-19. DOI: 10.1007/978-3-658-07038-0_1

[31] Khan MA, Rizvi M, Zubair SS. Prospects for online grocery shopping in Pakistan. Governance and Management Review. 2019;**4**(2):16

[32] Gomes Rola M. Consumer behavior: Online grocery shopping in Portugal. 2015. Available from: https://run.unl.pt/handle/10362/15696

[33] Driediger F, Bhatiasevi V. Online grocery shopping in Thailand: Consumer acceptance and usage behavior. Journal of Retailing and Consumer Services. 2019;**48**:224-237. DOI: 10.1016/j.jretconser.2019.02.005

[34] Elms J, de Kervenoael R, Hallsworth A. Internet or store? An ethnographic study of consumers' internet and store-based grocery shopping practices. Journal of Retailing and Consumer Services. 2016;**32**:234-243. DOI: 10.1016/j.jretconser.2016.07.002

[35] Zatz LY et al. Comparing shopper characteristics by online grocery ordering use among households in low-income communities in Maine. Public Health Nutrition. 2021;**24**(15):5127-5132. DOI: 10.1017/S1368980021002238

[36] Sathiyaraj S, Kumar AS, Subramani AK. Consumer perception towards online grocery stores, Chennai. Zenith International Journal of Multidisciplinary Research. 2015;**5**(6):24-34

[37] Chu J, Chintagunta P, Cebollada J. Research note—A comparison of within-household Price sensitivity across online and offline channels. Marketing Science. 2008;**27**(2):283-299. DOI: 10.1287/mksc.1070.0288

[38] Lewis M. The effect of shipping fees on customer acquisition, customer retention, and purchase quantities. Journal of Retailing. 2006;**82**(1):13-23. DOI: 10.1016/j.jretai.2005.11.005

[39] Belavina E, Girotra K, Kabra A. Online grocery retail: Revenue models and environmental impact. Management Science. 2017;**63**(6):1781-1799. DOI: 10.1287/mnsc.2016.2430

[40] Huyghe E, Verstraeten J, Geuens M, Van Kerckhove A. Clicks as a healthy alternative to bricks: How online grocery shopping reduces vice purchases. Journal of Marketing Research. 2017;**54**(1):61-74. DOI: 10.1509/jmr.14.0490

[41] Hollis-Hansen K, Seidman J, O'Donnell S, Epstein LH. Episodic future thinking and grocery shopping online. Appetite. 2019;**133**:1-9. DOI: 10.1016/j.appet.2018.10.019

[42] Ikonen I, Sotgiu F, Aydinli A, Verlegh PWJ. Consumer effects of front-of-package nutrition Labeling: An interdisciplinary Meta-analysis. Journal of the Academy of Marketing Science. 2020;**48**(3):360-383. DOI: 10.1007/s11747-019-00663-9

[43] Coffino JA, Udo T, Hormes JM. Nudging while online grocery shopping: A randomized feasibility trial to enhance nutrition in individuals with food insecurity. Appetite. 2020;**152**:104714. DOI: 10.1016/j.appet.2020.104714

[44] Borle S, Boatwright P, Kadane JB, Nunes JC, Galit S. The effect of product assortment changes on customer retention. Marketing Science. 2005;**24**(4):616-622. DOI: 10.1287/mksc.1050.0121

[45] Nenycz-Thiel M, Romaniuk J, Dawes J. Is being private better or worse online? private labels performance in online grocery channel. In: Martínez-López FJ, Gázquez-Abad JC, Gijsbrecht E, editors. Advances in National Brand and Private Label Marketing. Cham: Springer International Publishing; 2016. pp. 63-65. DOI: 10.1007/978-3-319-39946-1_7

[46] Gielens K, Gijsbrechts E, Geyskens I. Navigating the last mile: The demand effects of click-and-collect order fulfillment. Journal of Marketing. 2021;**85**(4):158-178. DOI: 10.1177/0022242920960430

[47] Jia J, Li J, Liu W. Expectation-based consumer purchase decisions: Behavioral Modeling and observations. Forthcoming at Marketing Letters

[48] Li J, McCrary R. Consumer communications and current events: A cross-cultural study of the change in consumer response to company social media posts due to the Covid-19 pandemic. Journal of Marketing Analysis. 2022;**10**(2):173-183. DOI: 10.1057/s41270-021-00138-3

[49] "New Acosta Report Details the Evolving Impact of COVID-19 on Consumer Behavior," 2021. Available from: https://www.acosta.com/news/new-acosta-report-details-the-evolving-impact-of-covid-19-on-consumer-behavior/

[50] Kleckler A. Food Lion Triples Delivery Footprint," Progressive Grocer. 2020. Available from: https://progressivegrocer.com/food-lion-triples-delivery-footprint/

[51] Lake R. Grocery shopping statistics: 23 fun size facts to know. CreditDonkey. 2016. Available from: https://www.creditdonkey.com/grocery-shopping-statistics.html

[52] Renner B, Baker B, Cook J, Mellinger J. The future of fresh: Patterns from the pandemic. DELOITTE Consum. Ind. Cent., p. 16

[53] Tighe D. Grocery shopping responsibility share in the United States by gender 2018. 2020. Available from: https://www.statista.com/statistics/817500/grocery-shopping-responsibility-share-us-by-gender/

[54] "Consumer Surveys: A Continued Look at COVID-19's Impact on Food Purchasing, Eating Behaviors and Perceptions of Food Safety," Food Insight, 2021. Available from: https://foodinsight.org/consumer-surveys-covid-19s-impact/

[55] Reiley L. Bigger Hauls, Fewer Choices: How the Pandemic Has Changed Our Grocery Shopping Habits Forever. Washington Post, 2020. [Online]. Available from: https://www.washingtonpost.com/road-to-recovery/2020/09/01/grocery-shopping-coronavirus-impact/

[56] Shen H, Namdarpour F, Lin J. Investigation of online grocery shopping and delivery preference before, during, and after Covid-19. Transparent Research Interdisciplinary Perspectives. 2022;**14**:100580. DOI: 10.1016/j.trip.2022.100580

[57] Eriksson N, Stenius M. Online grocery shoppers due to the Covid-19 pandemic - an analysis of demographic and household characteristics. Procedia Computer Science. 2022;**196**:93-100. DOI: 10.1016/j.procs.2021.11.077

[58] Choi A, Lu S, Li J, Vassallo J. The Impact of Political Ideology on Consumers' Variety Seeking Behaviour in the Face of a Global Pandemic. Sydney: University Of Sydney; 2022

[59] Brehm JW. A Theory of Psychological Reactance. Oxford, England: Academic Press; 1966

[60] Farber E. Online impulse buys: The newest item on the grocery industry's list. Grocery Dive. 2020. Available from: https://www.grocerydive.com/spons/online-impulse-buys-the-newest-item-on-the-grocery-industrys-list/589763/

[61] Chintala SC, Liaukonyte J, Yang N. Browsing the Aisles or Browsing the App? How Online Grocery Shopping Is Changing What We Buy. Working Paper. 2022

[62] SymphonyIRIGroup. The CPG Basket: Fostering Growth in a Time of Conservation. 2011. [Online]. Available from: https://www.supermarketnews.com/sites/supermarketnews.com/files/uploads/2012/01/T_TDecember2011CPGBasket.pdf

Section 2

Digitalization of Consumer Behavior in Tourism Sector

Chapter 7

Discussion of Purchasing Virtual Digital Nature and Tourism

Hiroko Oe and Yasuyuki Yamaoka

Abstract

This chapter discusses the potential and prospects of consumers purchasing virtual digital nature and smart tourism. During the lockdown period, people experienced a trend toward increased subjective well-being as a result of their familiarity with the digital nature. In order to academically validate these experiences, this study examines how interaction with nature in the digital environment stimulates new consumer behavior in post-pandemic life. The study will apply structural equation modeling (SEM) to 300 data collected through a questionnaire to develop the discussion, with a particular focus on the mediating effects of digital forest bathing. The results show that digital forest bath ing has a mediating effect in stimulating people's environmentally oriented behavior, and that the more active they are in digital space and interact with others, the more consumers enjoy interacting with nature in cyberspace and, in turn, the more willing they are to commune with digital nature through smart tourism. This can be expected to provide an effective reference for marketing strategies that contribute to the promotion of smart tourism in the age of symbiosis with COVID.

Keywords: nature, digital well-being, smart tourism, purchase intention, a quantitative approach, consumer behavior, post-COVID era

1. Introduction

1.1 Background of the study

During the lockdown, those of us who felt trapped seemed to be more willing than ever before to share our experiences of interaction in digital space and to engage with nature in virtual space. This seems to suggest, once again, that it is worth discussing the impact of our engagement with nature in digital space on our physical and mental health. Moreover, furthermore, the interest and fascination with virtual contact with nature in cyberspace suggest the possibility of smart tourism with interaction with digital nature at its core.

It is said that there is a program hidden in our DNA. This is known as "biophilia" and became more widely known when the renowned biologist E.O. Wilson described it as an innate fascination with life and vital activity [1]. The possibilities and prospects for virtual engagement with nature and smart tourism, which this chapter

focuses on, are easier to understand if the discussion is based on this concept of biophilia. No matter how urban our lives are, an encounter with nature can stop us in an instant. According to Wilson, biophilia is defined as the accumulation of genes as a result of early humans struggle to survive in the wild, interwoven with the wisdom and experience to interpret sounds and smells, to know what to do when the weather changes and to survive [2].

1.2 Research gap and aim of the study

Today, our daily life consists of a combination of the physical and cyber environment. It is well known that contact with nature has a positive impact on our well-being, and the restrictions on behavior caused by blockades brought about by COVID have had a significant impact on various industrial and economic sectors.

And the "New Normal" transition is also creating new business opportunities for socio-economic activities. The field of digital tourism, which this chapter discusses, is one genre that is expected to flourish. Originally, contact with nature was suggested to support emotional well-being, reduce stress, improve concentration, and ease heart rate and hypertension [3]. This is where the theme of interaction with nature, not only in real contexts but also virtually, contributes to the creation of new business opportunities.

Already, online fitness packages, health promotion programs, cooking, and language learning are examples of online businesses that companies are entering and users are beginning to enjoy the benefits of these services. We are beginning to see the products of virtual experiences in cyberspace.

Under this circumstance, digital tourism is attracting the interest of researchers and practitioners as a potential field, but there are still not many examples of in-depth examinations based on the attitudes and expectations of actual consumers.

This chapter explores how digital forest bathing and other digital behaviors and interactions affect people's affinity for virtual nature and how they influence their purchasing intentions for smart tourism.

2. Literature review

2.1 Digital nature: digital activities and connectedness in cyberspace

Digital nature is a promising and stimulating alternative to real nature for people with limited access to green spaces or who are housebound, such as during the global lockdown of COVID-19 [4]. A digital nature video and overall leisure activities of adults in the USA and their relationship to mental health were investigated based on a mixed analytical approach and revealed a positive impact of physical nature engagement on the subjective well-being of the participants [5]. On the other hand, when it comes to physical contact with nature, living far from nature is a significant predictor of loneliness scores, and short-term contact with nature does not significantly improve loneliness [6].

It has been suggested that contact with nature is important for mental and social well-being [7, 8] but that a certain "quantity" of interaction with nature is necessary, and that interaction with nature in digital space has a positive impact on people's well-being. This suggests that digital nature has great potential as a complementary strategy for people who are less mobile and have less frequent

contact with nature or interactions with others, or for older people with mobility difficulties [9–11].

2.2 Forest bathing in cyberspace: visual stimuli only vs. combined visual and auditory stimuli

There is some debate about how interaction with digital nature materials contributes to well-being and mental health, including the differing effects of visual information (videos and photographs) and auditory information (sounds) [12]. Following the format of Song et al.'s [12] experiment, in the present study, a video of a forest stream was used as visual stimuli (**Figure 1**). Subjects participated in the experiment by viewing the experimental photographs in a free and relaxed atmosphere through a PC they were familiar with and were using regularly.

Next, they were given combined auditory stimuli, such as the rustling of trees in the wind and the murmur of a babbling brook. The stream sounds were made from high-resolution sound recordings. As with the visual stimuli, each subject received the composite stimuli through the screen and speakers of a familiar PC. Prior to the experiment, 10 participants were randomly selected as volunteers to listen to the participants' sensory evaluation of the intensity of the sound, which confirmed that they found this sound "easy to listen to."

The composite stimulus here, that is, the combined visual and auditory stimulus, was provided as a control stimulus with the option of quietly viewing a gray image without forest-derived stimuli. The study sought to ascertain subjective ratings of visual stimuli only vs. composite stimuli via (1) the evaluation of visual stimuli only vs. combined stimuli, and (2) the impact of the combined stimuli on the subject's transformation to environmentally oriented behavior. These were studied in a comparative manner.

2.3 Potential of digital nature for smart tourism

There is some debate about how interaction with digital natural materials contributes to well-being and mental health, including the different effects of visual information (videos and photos) and auditory information (sounds) [13]. This study states that when people's behavior was constrained in the COVID-19 era, online communities and gaming activities became more active and the impact of COVID-19

Figure 1.
Visual stimulation image.

significantly changed people's lifestyle and behavior in the digital space. Oe [9] found that this feeling of connectedness with others led to positive impacts of cyberspace activities, and in the light of the behavior of digital natives, they valued the positive impacts of online gaming and other activities. In addition, digital natives are more likely to be more active if they can play online games in digital space, which has a positive impact on their efforts in light of digital native behavior, such as the healing of loneliness and emotional support from the new interactions created in the gaming community.

It is also known that in the COVID-19 era, there was an increased tendency to interact with nature and share videos and photos of transposed natural landscapes on social networking sites [14]. Furthermore, it has been found that people are more likely to engage in physical gardening and enjoy interacting with nature in neighborhood green spaces than before the pandemic [15].

So, can virtual tourism or digital nature smart tourism, with interaction with nature in digital space at its core, gain consumer support? And what segments of the population have affinity and purchasing intentions?

Pai et al. [16] and Ye et al. [17] discussed the role of smart tourism technology as one of the triggers to enhance the values of smart tourism experiences from a sustainable context. On the other hand, Dabeedooal et al. [18] highlighted that smart tourism can be a pillar of sustainable urban development; as Kontogianni & Alepis [19] stated, smart tourism is one of the popular topics in the tourism and hospitality sector. However, not many studies have examined the antecedents and behavioral patterns of smart tourism purchasing behavior of citizens and consumers based on empirical data.

2.4 Analytical framework with scale

Two factors, (i) respondents' environment-related activities in digital space, and (ii) virtual connections with others, were positioned as hypothetical antecedents, and the degree to which these two factors evoked respondents' "environment-oriented behavior" (direct effect) was examined (**Figure 2**). Next, as a mediating effect, respondents were asked to experience digital forest bathing indirectly, and the extent to which the degree of appreciation of digital forest bathing determined respondents' purchase intention was examined quantitatively (**Figure 3**).

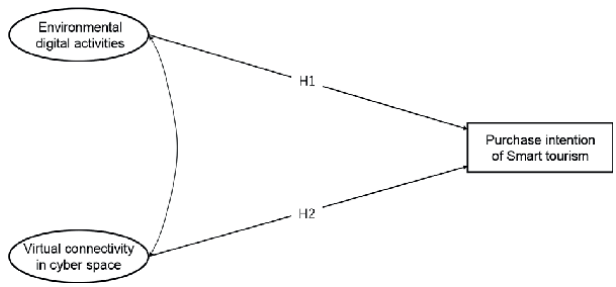

Figure 2.
Conceptual framework of the direct model.

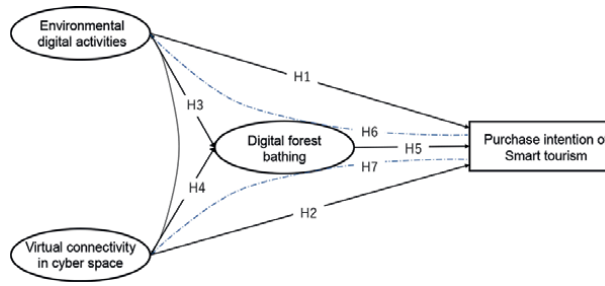

Figure 3.
Conceptual framework of digital forest bathing model.

3. Methodology

3.1 Survey design and data collection

This study will use quantitative methods to test whether digital space activities and digital forest bathing influence citizens' purchase intention of smart tourism through a hypothetical route. As shown in **Figure 3**, the impact is examined using the relaxing effect of digital forest bathing as a mediating variable. A total of 300 valid responses were obtained to be used in the analysis, taking into account a balance of gender, age group, etc. The observed variables used in the model for hypothesis testing were shared from questionnaires obtained from previous studies and collected through a five-point Likert scale choice [20].

A questionnaire survey of individuals in Japan was conducted and validated. While there is an accumulation of studies focusing on digital forest bathing and human interaction with nature in cyberspace (mainly based on data sets from areas of developed economies), the latest data sets are in Japan, the birthplace of forest bathing (i.e., with restrictions on physical behavior due to COVID-19).

In the metropolitan area around Tokyo, the geographical distance to the deep forest is far, and it takes about two and a half hours one way to reach places, such as Okutama Forest, a well-known forest bathing area in the suburbs, which poses access issues. The questionnaire was translated into Japanese and subsequently finalized by two bilingual experts, following the process recommended by Brislin [21]. Three university professors and four volunteer Japanese citizens participated in the pilot test and the wording of the survey items was refined to improve the overall quality. The content was refined by improving the order of questions and wording. In the end, the survey reached 300 reciprocal respondents, with a balanced collection of gender, place of residence, work history, and annual income. The survey itself was conducted online, in view of the COVID-19 situation.

3.2 Measures

3.2.1 Independent variables and dependent variables

Measurements were made on the scale developed by Shen et al. [5] and Kryshtanovskaya and Lavrov [6], which is based on five items, including virtual activities and connectedness with others (two latent factors). Each factor consisted of

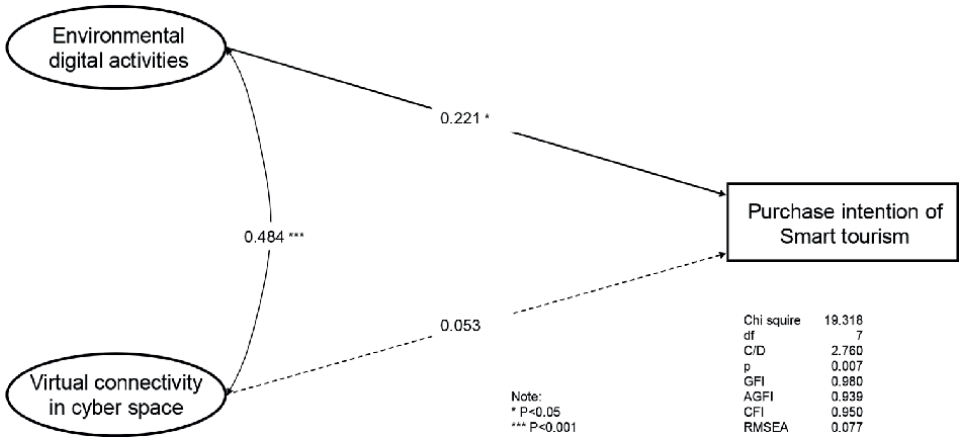

Figure 4.
SEM result of the direct model.

five observed variables. The mediating variable (digital forest bathing) was considered two observed variables, based on the work of Song et al. [12]. Cronbach's alpha was employed as an indicator to test reliability, with each variable showing a desirable value of 0.8 or higher, indicating strong internal consistency.

The explained variables of the model consist of measures of the purchase intention of smart tourism of the subjects [22]. All items were measured on a five-point Likert scale. The scale ranged from "strongly disagree = 1" to "strongly agree = 5."

3.2.2 Data analysis

After cleaning the obtained data, the model was validated by semi-structural equation modeling using AMOS ver26. The model measured the impact of each factor on purchase intention of smart tourism through two patterns—a model measuring only the direct effect (**Figures 3** and **4**), which measures the impact of the antecedents on purchase intention of smart tourism using citizens' satisfaction with digital forest bathing as a mediating effect.

4. Findings and analysis

4.1 Data profile

Prior to detailed analysis, it is necessary to examine the profile of the data set obtained. It was shown that a balanced data set was recovered by attribute (**Table 1**).

4.2 Hypothesis testing

4.2.1 Validation of variables

Once the indicators for the classification of respondents by personality have been completed and the procedures have been confirmed, it is time to test the hypotheses.

	Frequency	Percent	Cumulative percent
Male	150	50.0	50.0
Female	150	50.0	100.0
Total	300	100.0	
20s	60	20.0	20.0
30s	60	20.0	40.0
40s	60	20.0	60.0
50s	60	20.0	80.0
60s	60	20.0	100.0
Total	300	100.0	
Unmarried	147	49.0	49.0
Married	153	51.0	100.0
Total	300	100.0	
Grad School	11	3.7	3.7
University	149	49.7	53.3
College	66	22.0	75.3
Highschool or under	74	24.7	100.0
Total	300	100.0	
Under $20,000	138	46.0	46.0
$20001–50,000	115	38.3	84.3
$50001–90,000	34	11.3	95.7
Upper $90,001	13	4.3	100.0
Total	300	100.0	

Table 1.
Demographic profile.

First, the consistency and rationality of the latent factors included in the model for analysis will be checked. For this purpose, factor analysis is conducted on the observed variables for purchase intention of smart tourism and antecedents. **Table 2** shows a descriptive analysis result of the data set.

A factor analysis was conducted and four factors were generated (**Table 3**). EDA means environmental digital activities, DFB means digital forest bathing, and VCC means virtual connectivity in cyberspace.

Once the process of ascertaining how each item can explain its own construct was completed, the next examination was conducted to identify whether the constructs were valid and reliable. The composite reliabilities (CRs) and average variance extracted (AVE) from the constructs were computed by statistical procedure [23]. These were estimated and are presented in **Table 4**.

As **Table 4** shows, the minimum CR and AVE values are lower than 0.7 [24] and 0.5 [25]. The square root of the AVE of each element, that is, the average variance (AV) is greater than the Pearson correlation coefficient between that construct and the other constructs. This means that the discriminant validity of the variables used here was confirmed. The value of Cronbach's alpha (CA) for each configuration is greater than 0.6,

	N	Min	Max	Mean	Std. deviation
EDA1:I spend more time surfing the internet, YouTube, and social networking sites than I used to	300	1	5	2.98	1.251
EDA2:I spend more time playing online games than I used to	300	1	5	2.14	1.219
EDA3: During the lockdown, I watch more environment-related videos	300	1	5	2.05	1.129
VCC1: I have become more active in virtual socializing, for example, ZOOM, online events	300	1	5	1.96	1.103
VCC2: I enjoy more virtual connectedness and communication in cyberspace than before COVID	300	1	5	2.92	1.123
DFB1: Watching the video helped me to relax	300	1	5	3.43	1.034
DFB2: Seeing beautiful nature photos or listening to the forest sounds make me feel better	300	1	5	3.54	0.941
PIS: Purchase intention of smart tourism	300	1	5	3.33	1.115

Table 2.
Descriptive analysis.

	Component		
	1	2	3
EDA1	0.835	0.107	0.029
EDA2	0.760	0.079	0.221
EDA3	0.710	0.134	0.087
DFB1	0.007	0.939	0.055
DFB2	0.044	0.935	0.070
VCC1	0.012	0.046	0.910
VCC2	0.397	0.087	0.616

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in four iterations.

Table 3.
Factor analysis.

which is the lowest acceptable value, meaning that, from here, the configuration of each variable is consistent [23, 26]. Correlation analysis was performed to check for the presence of multicovariances between the relevant factors comprising structural equation modeling (SEM). In other words, high correlations are not suitable for feeding into SEM, as they indicate multicollinearity between variables. The correlation coefficient should ideally not be higher than 0.7 [27]. Thus, the results of the convergent and discriminant validity test show that all values meet the relevant requirements and the constructs are reliable and consistent, so we can move to the next step of SEM analysis [23].

4.2.2 Model of no-mediation

Three contrasting models, no-mediation, partial mediation, and full mediation, were constructed to test the mediating effect. The control variables were also included

	N	Mean	SD	CA	CR	AVE	EDA	DFB	VCC
EDA	300	2.389	0.884	0.799	0.813	0.593	**0.770**		
DFB	300	2.442	0.833	0.813	0.746	0.604	0.100	**0.777**	
VCC	300	3.385	0.908	0.711	0.935	0.878	0.563**	0.177**	**0.937**

Values bold on the main diagonal are the square rooted of AVEs.
SD: deviation; CA: Cronbach alpha; CR: Composite reliability; and AVE: average variance standard.
**p < 0.05.*
***p < 0.01.*

Table 4.
Convergent and discriminant validity test.

To		From	Std. regression weights	p
PIS	←	EDA	0.221	*
PIS	←	VCC	0.053	0.479
EDA	←	VCC	0.484	**

**p < 0.05.*
***p < 0.001.*

Table 5.
Path coefficient of the direct model.

in the estimation with paths to the mediator and dependent variables [28, 29]. **Figure 4** shows the SEM results of the unmediated model, which includes three dependent variables—environmental digital activity, virtual connectivity in cyberspace, and purchase intention of smart tourism, hereafter referred to as EDA, VCC, and PIS. The results showed that the standard regression coefficient for the path of EDA and PIS was 0.221 ($p < 0.05$), while the path of VCC and PIS was 0.053 ($p > 0.05$). The covariance between VCC and EDA was 0.484 ($p < 0.001$). This implies that the latter path is not significant. The fitting index for this SEM model was GFI = 0.980 (>0.9), indicating a good model fit [26]. Also, **Table 5** shows the path coefficient of the direct model. In this direct model, hypothesis H1 was supported but not H2.

4.2.3 Model of partial mediation

As a mediating effect, digital forest bathing was placed in the center of the figure, hereafter referred to as DFB. The results show that the path from EDA to DFB was 0.649 ($p < 0.001$) and the path from VCC to DFB is highly significant at 0.476 ($p < 0.001$). Next, the path from DFB to PIS was 0.875 ($p < 0.001$). In other words, hypotheses H3, H4, and H5 are adopted. However, both paths of EDA to DFB and VCC to DFB were 0.085 ($p > 0.05$) and 0.017 ($p > 0.05$), respectively (**Figure 4**). This implies that both paths were not significant. Thus, H1 and H2 were rejected.

4.2.4 Model of full mediation

We followed the procedures outlined in Yu et al.'s [30] recent work, examining direct effects using SEM. The direct effects of EDA and VCC on BC were examined through DFB. **Figure 5** shows our research SEM model. **Table 6** shows the standardized regression weight, p-value, and percentile confidence level (PC) of 95% for all the direct

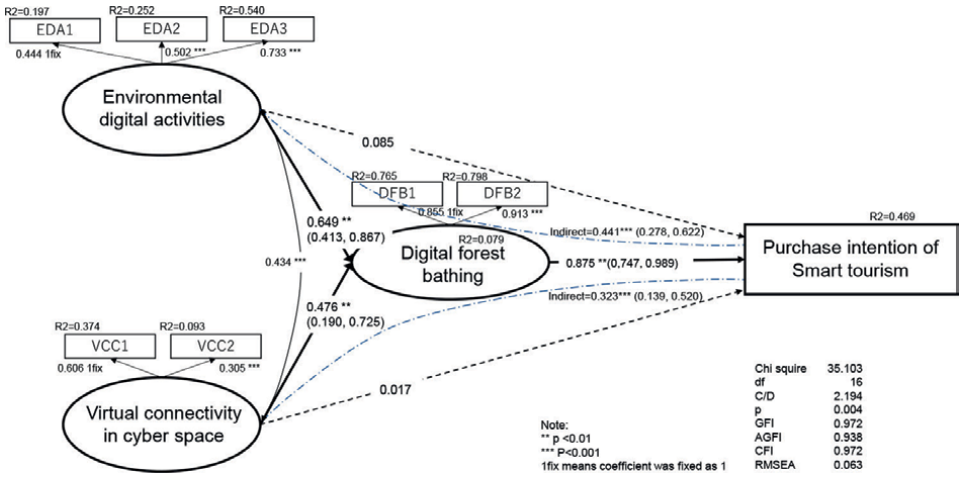

Figure 5.
SEM digital environment model of mediating effect (all samples).

and indirect paths, which were based on 5000 bootstrap samples, for the direct effects perceived. The indirect effect of the path EDA to DFB to PIS shows 0.441 ($p < 0.001$, PC = 0.278 to 0.622) and VCC to DFB to PIS shows 0.323 ($p < 0.001$, PC = 0.139, 0.520). This implies that both paths are significant. Thus, H6 and H7 were supported.

Observing the goodness of fit of the SEM research model presented in **Figure 5**, the goodness of fit index (GFI) is 0.972 (>0.9) and the adjusted goodness of fit index (AGFI) is 0.938 (>0.9). The root mean square error of approximation (RMSEA) is

			All samples		
To		**From**	**Std. regression weights**	**p**	**95% PC**
DFB	←	EDA	0.649	**	0.413, 0.867
DFB	←	VCC	0.476	**	0.190, 0.725
PIS	←	DFB	0.875	**	0.747, 0.989
PIS	←	EDA	0.085	0.582	
PIS	←	VCC	0.017	0.904	
EDA1	←	EDA	0.444	**	0.290, 0.570
EDA2	←	EDA	0.502	**	0.365, 0.644
EDA3	←	EDA	0.733	**	0.626, 0.844
VCC1	←	VCC	0.606	**	0.430, 0.774
VCC2	←	VCC	0.305	**	0.167, 0.409
DFB1	←	DFB	0.855	**	0.763, 0.920
DFB2	←	DFB	0.913	**	0.858, 0.955
VCC	←	EDA	0.434	**	0.270, 0.574
			Indirect effects		
PIS	←	EDA	0.441	**	0.278, 0.622
PIS	←	VCC	0.323	**	0.139, 0.520

		All samples		
To	**From**	**Std. regression weights**	**p**	**95% PC**
R2	EDA	0.000		
	VCC	0.000		
	DFB	0.079		
	PIS	0.469		
	EDA1	0.197		
	EDA2	0.252		
	EDA3	0.540		
	VCC1	0.374		
	VCC2	0.093		
	DFB1	0.765		
	DFB2	0.798		
Fit indexes	Chi squire	35.103		
	df	16		
	C/D	2.194		
	p	0.004		
	GFI	0.972		
	AGFI	0.938		
	CFI	0.972		
	RMSEA	0.063		

df: degree of freedom, C/D: Chi-square/df, p: provability, GFI: Goodness of fit index, AGFI: Adjusted goodness of fit index, CFI: Comparative fit index, and RMSEA: Root mean square error of approximation.
Squared multiple correlations (SMC) in SPSS AMOS were used as R2.
1 fix means coefficient was fixed as 1.
95% PC means percentile confidence level of 95%.
**p < 0.01.*
***p < 0.001.*

Table 6.
Path coefficient of the SEM research model.

0.063 (<0.10), which is better than the specified value [26, 28]. In summary, the fit of the model is excellent.

4.3 Discussion

The SEM model of the "Digital Environment-Mediated Effects Model" for the two groups of introverted and extroverted samples shows that the GFI of the model, including the chi-square/degree of freedom, is above the desired level, and it can be evaluated that a model consisting of reliable measures has been presented.

As analyzed and discussed above, the hypothesized SEM model of digital environment effects on purchase intention of smart tourism can be assessed as presenting a model and scale consisting of reliable measures, as the indicators of goodness of fit, including chi-square/degrees of freedom, are above the desired level. And interestingly, even though the direct effect linked from EDA and VCC to PIS is

nonsignificant, when looking at the indirect effect through DFB, which is set as the mediating effect, both paths to PIS are significant. In other words, the results show that simple engagement with the environment and connection with others in the digital space does not foster interest in smart tourism, but familiarity with digital forest bathing stimulates people's interest and interest in smart tourism and stimulates their willingness to buy.

5. Conclusion

5.1 Theoretical contribution

Focusing on the mediating effects of digital forest bathing, this study quantifies the impact of people's behavior and interactions in digital spaces on enhancing their purchase intention of smart tourism. As a rule of thumb, people tend to become more familiar with the digital nature and experience subjective well-being during the lockdown period of COVID-19 behavioral restrictions. This study quantitatively reveals the pathways through which people's behavior in digital spaces and digital forest bathing stimulates their interest in the digital environment and their willingness to purchase smart tourism.

The greatest contribution of this study is that it quantified the pathways through which people's behavior in digital spaces, through the mediating effect of digital forest bathing, leads to people's willingness to purchase digital tourism, and proposed practical measures and models.

5.2 Practical contributions

The results of this study are unusual in that they show the potential of forest bathing to provide a sense of well-being and stimulate their intention to enjoy digital tours, even in places where there are no forests. For example, it suggested the possibility of increasing subjective well-being through contact with DIGITAL nature through digital forest bathing, through tourism in cyberspace and the purchase of smart tourism to improve the health of elderly people living alone and people with mobility difficulties in the aging society of the future.

This also suggests new business opportunities for tourism businesses that have suffered disruptive impacts due to COVID. In this sense, the practical contribution of this study is also to propose supporting information for the development of smart tourism strategies.

5.3 Future research tasks and limitations

Although the study obtained results with a high potential for theoretical and practical contribution as described above, the authors are aware of several limitations. First, the size of the data set used for the analysis was not large, and the demonstration discards psychological aspects, such as the definition of smart tourism, the implementation of the technology, and the readiness of citizens for the technology. In the future, we plan to collect larger data sets to confirm and further refine the feasibility of the implementation of the number-r models and measures proposed by this study.

DOI: http://dx.doi.org/10.5772/intechopen.105869

Author details

Hiroko Oe* and Yasuyuki Yamaoka
Business School, Bournemouth University, Bournemouth, UK

*Address all correspondence to: hoe@bournemouth.ac.uk

References

[1] Wilson EO. Biophilia. Cambridge, MA: Harvard University Press; 1984

[2] Schiebel T, Gallinat J, Kühn S. Testing the biophilia theory: Automatic approach tendencies towards nature. Journal of Environmental Psychology. 2022;**79**:101725

[3] Prati G, Mancini AD. The psychological impact of COVID-19 pandemic lockdowns: A review and meta-analysis of longitudinal studies and natural experiments. Psychological Medicine. 2021;**51**(2):201-211

[4] Gunasekeran DV, Tseng RMWW, Tham YC, Wong TY. Applications of digital health for public health responses to COVID-19: A systematic scoping review of artificial intelligence, telehealth and related technologies. NPJ Digital Medicine. 2021;**4**(1):1-6

[5] Shen X, MacDonald M, Logan SW, Parkinson C, Gorrell L, Hatfield BE. Leisure engagement during COVID-19 and its association with mental health and wellbeing in US adults. International Journal of Environmental Research and Public Health. 2022;**19**(3):1081

[6] Kryshtanovskaya OV, Chernavin YA, Lavrov IA. Digital generation: Mechanisms of socialization and social prospects. In: Proceedings of the International Scientific Conference "Smart Nations: Global Trends In The Digital Economy". Cham: Springer; 2022. pp. 346-354

[7] Sandifer PA, Sutton-Grier AE, Ward BP. Exploring connections among nature, biodiversity, ecosystem services, and human health and well-being: Opportunities to enhance health and biodiversity conservation. Ecosystem Services. 2015;**12**:1-15

[8] Zhang Y, Mavoa S, Zhao J, Raphael D, Smith M. The association between green space and adolescents' mental well-being: A systematic review. International Journal of Environmental Research and Public Health. 2020;**17**(18):6640

[9] Oe, H, Discussion of digital gaming's impact on players' well-being during the COVID-19 lockdown. arXiv preprint arXiv: 2020;**2005**:00594

[10] van Houwelingen-Snippe J, van Rompay TJ, de Jong MD, Ben Allouch S. Does digital nature enhance social aspirations? An experimental study. International Journal of Environmental Research and Public Health. 2020;**17**(4):1454

[11] van Houwelingen-Snippe J, Allouch SB, van Rompay TJ. 'That is a place where I would want to go': Investigating digital nature to enhance social wellbeing among older adults. Ageing & Society. 2022:1-24

[12] Song C, Ikei H, Miyazaki Y. Effects of forest-derived visual, auditory, and combined stimuli. Urban Forestry & Urban Greening. 2021;**64**:127253

[13] Zhao J, Xu W, Ye L. Effects of auditory-visual combinations on perceived restorative potential of urban green space. Applied Acoustics. 2018;**141**:169-177

[14] Quirk MA. Island time in lockdown: Animal crossing: New horizons' slow culture and its Shinto source. Journal of Religion, Media and Digital Culture. 2021;**10**(3):428-444

[15] Mostajeran F, Krzikawski J, Steinicke F, Kühn S. Effects of exposure to immersive videos and photo

slideshows of forest and urban environments. Scientific Reports. 2021;**11**(1):1-14

[16] Pai CK, Liu Y, Kang S, Dai A. The role of perceived smart tourism technology experience for tourist satisfaction, happiness and revisit intention. Sustainability. 2020;**12**(16):6592

[17] Ye BH, Ye H, Law R. Systematic review of smart tourism research. Sustainability. 2020;**12**(8):3401

[18] Dabeedooal YJ, Dindoyal V, Allam Z, Jones DS. Smart tourism as a pillar for sustainable urban development: An alternate smart city strategy from Mauritius. Smart Cities. 2019;**2**(2):153-162

[19] Kontogianni A, Alepis E. Smart tourism: State of the art and literature review for the last six years. Array. 2020;**6**:100020

[20] Nakano K. A measurement scale for the Type A behavior pattern in women. The Japanese Journal of Psychology. 1995;**66**(2):121-126

[21] Brislin RW. Back-translation for cross-cultural research. Journal of Cross-Cultural Psychology. 1970;**1**(3):185-216

[22] Oe H, Yamaoka Y. Discussion of citizen behavioural change using the nudge effect: A perspective based on social policy interventions. International Journal of Sociology and Social Policy. 2021. DOI: 10.1108/IJSSP-08-2021-0210

[23] Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research. 1981;**18**:39-50

[24] Urbach N, Ahlemann F. Structural equation modeling in information system research using partial least squares. Journal of Information Technology Theory Application. 2010;**11**:5-40

[25] Leontitsis A, Pagge J. A simulation approach on Cronbach0s alpha statistical significance. Mathematics Computer. Simulation. 2007;**73**:336-340

[26] Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis. Upper Saddle River, USA: Prentice Hall; 2010

[27] Ratner B. The correlation coefficient: Its values range between +1/−1, or do they? Journal of Target Measurement. 2009;**17**:139-142

[28] Hayes AF. An index and test of linear moderated mediation. Multivariate Behavioral Research. 2015;**50**:1-22

[29] Jyoti J, Rani A. Role of burnout and mentoring between high performance work system and intention to leave: Moderated mediation model. Journal of Business Research. 2019;**98**:166-176

[30] Yu C, Wang Y, Li T, Lin C. Do top management teams' expectations and support drive management innovation in small and medium-sized enterprises? Journal of Business Research. 2022;**142**:88-99

Chapter 8

A Federated Learning-Based Civil Aviation Passenger Value Analysis Method and MaaS Construction Considerations in the Epidemic Background

Sien Chen

Abstract

Airline customer demand has plummeted since the COVID-19 pandemic, with about two-thirds of the world's fleet grounded. Under such circumstances, the airline needs to adjust its market strategy. Mining the value of passengers and providing differentiated services for passengers with different values are key to the differentiated competition of airlines. In the case of ensuring data privacy, this study introduces a privacy-preserving federated learning method, which combines airline internal data with external operator data, comprehensively considers multiple dimensional characteristics of passengers. This study compares a unilateral model using airline data with a joint model combining airline internal data and operators through federated learning. The result shows that the joint model based on federated learning is more accurate than the unilateral model. Based on this result, this study puts forward the thinking about passenger mining and insight in the construction of MaaS under the epidemic situation, constructs a customer journey map according to the characteristics of the segmented population, and proposes the idea of providing different transportation services for the segmented population. This research provides important theoretical and practical implications for the airline digital transformation and MaaS construction under the epidemic.

Keywords: federated learning, passenger value analysis, MaaS construction

1. Introduction

1.1 Background

Affected by the COVID-19 epidemic, passenger travel demand has declined sharply, various countries' strict immigration management policies have pressed the pause button on cross-border travel, and the global aviation market has entered a

freezing period. Since the outbreak of the COVID-19, the development of the global civil aviation industry has been dramatically impacted. Statistics from the Civil Aviation Administration show that the total number of passenger flights performed by domestic airlines in China in 2020 decreased by about 22% compared with 2019 [1]. In the information age, it is imperative for airlines to adjust their market strategies according to the changes in the market under the epidemic, deeply cultivate market segments, and form a differentiated competitive advantage. The differentiated service of customers is the key to the differentiated competition of airlines, and it is also the core of the airline's implementation of digital strategy. Through customer classification, we can distinguish between worthless customers and high-value customers to formulate optimized, personalized service plans for customers with different values, adopt different marketing strategies, concentrate limited marketing resources on high-value customers, and achieve the goal of maximizing corporate profits [2]. In the case of ensuring data security, accurately identifying customer categories is an essential means for enterprises to optimize the allocation of marketing resources.

1.2 Specific research questions

This study mainly addresses the following questions:

1. How to mine data while ensuring privacy?
2. How to use airline customer data and operator external data to conduct customer value analysis?
3. How to provide MaaS-personalized services to customer categories of different values and improve the happiness brought by convenient transportation?

2. Literature review of subject area

2.1 Customer value analysis

Drucker once pointed out that when our customers purchase products or services, it is not because of the product or consumption itself but the value brought by the product [3]. Customer value is based on the trade-off between the customer's perceived gain and perceived loss or the customer's comprehensive evaluation of the product's utility. Ravald proposed that customer value should focus on the entire relationship continuance process [4]. Butz and Goodstein also emphasized that customer value includes the added value customers receive after purchasing and using a product, which can help build stronger connections between customers and suppliers [5]. Woodruff found that customers' additional value comes from the perceptions, preferences, and evaluations that customers get after using a product or experiencing a service [6]. With the advent of the Internet and the significant data era, emerging data mining technology in customer value analysis has brought customer value analysis into a new era.

As a classic model of data mining, the RFM model is an essential tool and means to measure customer value and the ability of customers to create benefits [7]. These three indicators describe the value of the customer. Based on these three factors, a customer score is calculated based on the customer's purchasing behavior [8].

This model achieves the purpose of direct marketing by distinguishing different types of customers according to their purchase behavior. Because the interpretability of the RFM model is very good, it is a widely used customer value analysis model. However, the RFM model has few variables and cannot capture the variables of the specific personalized behavior of customers, which has certain disadvantages, and machine learning can overcome this defect. More specific variables can be included in the model in machine learning models. For example, specific variables such as customers' consumption habits and payment preferences can reflect the customer's consumption attitude. For customers accustomed to excessive consumption, the company can adopt active marketing methods to sell some fashionable products beyond their current economic level to customers. Companies can make marketing policies economical to maintain customers from a longer-term perspective for customers with conservative consumption attitudes. The customer lifetime value model using machine learning uses multiple specific variables to comprehensively evaluate customer value, taking into account the sum of the net present value of all current and future monetary benefits that customers create for the business [9]. Researchers have different opinions on the definition of CLV. Robert Dwyer believes that customer lifetime value is the sum of discounted benefits customers create for the enterprise during the active period [10]. Gupta and Lehmann consider the customer lifetime value to be the discounted value of the customer's total expected future profit [11]. Sharad Borle and other scholars believe that customer lifetime value is the present value of all profits customers bring to the business [12]. It can be seen that scholars are divided on the time frame of lifetime value. In the existing CLV models, most focus on the cash flow of customers and lack of consideration of variables related to customer consumption behavior [13]. Therefore, it is crucial to incorporate broader multi-source data variables (considering variables related to customer consumption history in the time dimension) to predict CLV.

Chen first proposed to use the xgboost model to predict the passenger value of China Eastern Airlines in their research. They took the lead in combining the airline's internal customer primary data with TravelSky's external data, enriching the labels of passenger consumption behavior, and improving prediction accuracy. Similarly, Yang et al. proposed an ER framework to deal with classification imprecision from the perspective of uncertain information fusion [14]. Yang & Singh et al. incorporated ER into the Dempster combination rule and proposed a recursive algorithm [15]. After that, Yang and Xu solved the decision-making problem dealing with multiple data forms with a general decision-making model based on rules and utility-based information transformation methods [16]. Through multiobjective reasoning, ER has been applied in system prediction [17], automobile research and development, nuclear power plant site selection, inventory management [18], performance evaluation [19]. However, both XGBOOST and ER models can realize multi-source data modeling when the data are known or partially known. In reality, the data of different enterprises are stored and maintained independently of each other, and it is not easy to share. Moreover, there is also the risk of data leakage, so technology is needed to solve the problem of data sharing in multi-source data fusion modeling and ensure data security.

2.2 The federated learning

Nowadays, data privacy and security protection by law is becoming more and more strict. Whether it is the General Data Protection Regulations promulgated in 2016 [20]

or the Cybersecurity Law of the People's Republic of China introduced in 2017 [21], both confirm the global trend of data privacy protection and reflect difficulty in integrating data from different industries. At the same time, in data fusion, the privacy of data has a high risk of leakage. For example, the original data transmitted are quickly attacked, and there is a possibility of leakage at the data level [22]. Therefore, safely and legally integrating data in various fields is a breakthrough in big data. The key to the bottleneck is the core of insight into passenger value and accurate service.

Federated machine learning was first proposed by Google in 2016 [23], mainly to train models for Gboard (an input board created by Google) by training the model on each terminal that uses Gboard and then aggregating the encryption of each model. Gradient, to generate a federated model with better training effect, instead of collecting all the data from the terminal to the cloud and then unifying the training model, this operation significantly saves computer computing power, releases the pressure of cloud computing, and becomes a solution to data security [24]. The effectiveness of big data models cannot be a good solution for the problem. Under the framework of federated learning, the enterprise realizes that the exchange of gradient and loss under the encryption mechanism, that is, the exchange of model parameters without the physical exchange of data, is realized without violating the data privacy regulations, a virtual shared model is established to realize that the data do not move, do not leak privacy and affect data compliance, improve the accuracy of the model, and optimize the performance of the model [24].

Federated learning is divided into horizontal federated learning, vertical federated learning, and federated transfer learning. Horizontal federated learning divides the dataset according to the horizontal or user dimension when the user features of the two datasets overlap more and the users overlap more diminutive, and take out the part of the data with the same user characteristics but not the same users. For example, there are two banks in different regions, their user groups are from their respective regions, and the intersection of each other is tiny. However, their business is very similar, so the recorded user characteristics are the same, and horizontal federated learning can build a joint model to increase the number of samples.

Contrary to horizontal federated learning, if the users of the two datasets overlap more and the user features overlap less, the dataset is divided vertically (i.e., feature dimension). The two users are the same, but the user features are incomplete. The same part of the data is used for training. For example, there are two different institutions, one is a bank in a particular place, and the other is an e-commerce company in the same place. Their user groups are likely to include most of the place's residents, so the intersection of users is large. However, since banks record the user's income and expenditure behavior and credit rating, while e-commerce keeps the user's browsing and purchase history, the intersection of their user characteristics is small. Vertical federated learning is federated learning that aggregates these different features in an encrypted state to increase feature dimensions to enhance model capabilities. It is also a critical technology that will be used in this project to integrate operator and airline data.

3. Background to study population

This study is based on the federated learning architecture, under the premise of ensuring the privacy and security of passenger information and integrating the operator's multi-source big data to enrich the airline's passenger characteristics dimensions,

to evaluate the lifetime value of passengers, and to identify passengers with different values accurately. The research data are derived from historical data and authorization data in enterprise APPS of operators and airlines, extracted in a compliant and legal environment, and analyzed on private cloud. In this study, "operator" refers to China Telecom, and "airline" refers to China Southern Airlines.

3.1 China southern airlines

China Southern Airlines is the airline with the most significant number of transport aircraft, the most developed route network, and China's enormous annual passenger volume. It has eight holding public air transport subsidiaries in Xiamen, Henan, Guizhou, and Zhuhai and 20 branches in Xinjiang, Beibei and Beijing, with 23 domestic sales offices in Hangzhou, Qingdao, and other places and 54 overseas sales offices in Singapore, New York, Paris, and others. In 2019 and 2020, the passenger traffic volume was 152 million and 97 million, respectively, ranking first among Chinese airlines for 42 consecutive years. The annual passenger transport volume ranks first in Asia and the second in the world, and the cargo and mail transport volume ranks among the top 10 in the world (Data source: IATA). As of December 2020, China Southern has operated more than 860 passengers and cargo transport aircraft, including Boeing 787, 777, 737 series, Airbus A380, A330, A320 series, and is the first airline in the world to operate Airbus A380.

3.2 China telecom

China Telecom is a super-large communications operation company in China. It has been selected as one of the Fortune Global 500 Companies for many consecutive years. It mainly engages in comprehensive information services such as mobile communications, Internet access and applications, fixed telephone, satellite communications, and ICT integration. China Telecom has total assets of 907.8 billion yuan and 400,000 employees. It is a central enterprise funded by the state alone.

4. Methodological chapter

With the development of social science research, research design plays an increasingly important role in the research process. A rigorous study design can help ensure that the information obtained enables researchers to effectively and accurately understand the research question. This study was designed using quantitative methods.

4.1 Research design

Scientific research includes single-method research, mixed-method research, and multi-method research. The difference between the three types of research is the use of qualitative and quantitative research methods. Single-method studies use only a single qualitative or quantitative method. Mixed methods research combines qualitative and quantitative methods. Multiple methods prefer two quantitative methods or two qualitative methods.

Qualitative methods aim to collect and analyze more explicit information, such as participants' performance and written or oral expressions in interviews [25]. Corbin and Anselm [26] propose a qualitative approach that investigates real-world problems,

Ticket buying behavior	Travel experience	Passenger membership attributes
Number of segments scheduled for future departure	The latest delay is 1 hour away from the current number of days	Member current level
Number of trips in the last 3 months	The latest delay is 2 hours away from the present number of days	Membership registration method
Number of first-class travel segments in the last 3 months	The latest delay is 3 hours away from the current number of days	Membership registration level
Number of business-class travel segments in the last 3 months	The latest delay is 4 hour away from the current number of days	Number of points accumulated in the last 3 months
Number of economy-class travel segments in the last 3 months	The latest delay is 5 hours away from the current number of days	The main channel of points accumulation in the last 3 months
Cabft preference for the last 3 months	Maximum flight delay in the last 3 months (unit: minutes)	Total points were accumulated in the last 3 months
Average flight time interval in the last 3 months	Average departure delay time in the last 3 months (unit: minutes)	The cumulative average score of the last 3 months
The largest flight interval in the last 3 months	Maximum arrival delay for a flight in the last 3 months (unit: minutes)	Number of points redeemed in the last 3 months
Average booking interval in the last 3 months	Average arrival delay time in the last 3 months (unit: minutes)	The main channels of points exchange in the last 3 months
The largest booking interval in the last 3 months	The number of flights delayed for one hour in the last three months	Total points are exchanged for the last 3 months
In the last three months, the main ticket purchase channels	The number of delayed two-hour flights in the last 3 months	Points are exchanged on average for the last 3 months
Maximum ride interval in first class in the last 3 months	The number of flights delayed for three hours in the last three months	Number of points accumulated in the last 6 months
Average first-class ride interval in the last 3 months	The number of four-hour flight delays in the last three months	The main channel of points accumulation in the last 6 months
Number of trips in the last 6 months	Maximum flight delay in the last 6 months (unit: minutes)	Total points were accumulated in the last 6 months
Number of first-class travel segments in the last 6 months	Average departure delay time in the last 6 months (unit: minutes)	The cumulative average score of the last 6 months
Number of business-class travel segments in the last 6 months	Maximum arrival delay for a flight in the last 6 months (unit: minutes)	Number of points redeemed in the last 6 months
Number of economy-class travel segments in the last 6 months	Average arrival delay time in the last 6 months (unit: minutes)	The main channels of points exchange in the last 6 months
Cabft preference for the last 6 months	The number of flights delayed for one hour in the last 6 months	Total points are exchanged for the last 6 months
Average flight time interval in the last 6 months	The number of delayed two-hour flights in the last 6 months	Points are exchanged on average for the last 3 months

Ticket buying behavior	Travel experience	Passenger membership attributes
The largest flight interval in the last 6 months	The number of flights delayed for three hours in the last 6 months	Points accumulated in the last year
Average booking interval in the last 6 months	The number of four-hour flight delays in the last 6 months	The main channels for accumulating points in the last year
The largest booking interval in the last 6 months	Number of flight segments delayed by 1 hour in the last 6 months	The total accumulated points in the last year
In the last 6 months, the main ticket purchase channels	Number of flight segments with a 2-hour delay in the last 6 months	The average accumulated points in the last year
Maximum ride interval in first class in the last 6 months	Number of flight segments in the last 6 months with a flight delay of 3 hours	Number of points redeemed in the last year
Average first-class ride interval in the last 6 months	Number of flight segments in the last 6 months with a flight delay of 4 hours	Main channels for point redemption in the last year

Table 1.
Airline data dimension.

participants say how they feel in their context, and researchers obtain data from reality. Quantitative methods analyze linkages to quantities in non-value scenarios [27]. The senior researchers of Xinli Market Research (DMB Research) believe that quantitative research is a research method and process that expresses problems and phenomena in quantity and obtains meaning through analysis, testing, and interpretation [28]. This study adopts quantitative methods, uses mathematical tools to analyze things quantitatively, and uses federated transfer learning tools to integrate airline data and operator data for modeling, considering passengers' travel ability, willingness, stability, physical space, and bio space security (Normalized epidemic situation), social network and other dimensions, to evaluate the value of passengers more comprehensively [28].

4.2 Data collection

Data collection consists of dataset A: data of airlines (China Southern Airlines) and dataset B: data of operators (China Telecom). Data A comes from China Southern Airlines and consists of 10,000 data instances, each of which has 40 attributes, including data on ticket purchase behavior, travel experience, and passenger membership attributes. The dimensions of information about passengers are shown in **Table 1**.

It is impossible to predict passengers' travel willingness, stability, movement trajectory safety of physical space and biological space under the epidemic situation, social network, only by relying on their data, which reduces the accuracy of passenger value evaluation. The company can only blindly provide the same service to all passengers, which significantly increases unnecessary costs, and the promotion and transaction rates are shallow. Therefore, it is necessary to integrate the operator dataset B to enrich the data dimension of airline passengers.

Dataset B comes from China Telecom and consists of 10,000 data instances. The ID is the same as data A, but it has 33 different attributes, including user Internet

access, consumption, preferences, travel OD trajectories, social network information, and other label data. The dimensions of passenger information that can be extracted by China Telecom are shown in **Table 2**.

The user's travel trajectory can be constructed through the integration of operator data. The travel mode preference, consumption ability, and online behavior (social network) can be determined to refine the passenger label further, gain insight into the value of passengers, and assist the precision marketing and decision-making of the aviation industry. Support and improve airline profit margins.

4.3 Data analysis

Under the framework of federated learning, the technology of vertical federated learning can be realized, that is, the data of airlines and operators can be safely and legally integrated, a federated longitudinal logistic regression model can be established to predict the lifetime value of passengers, and a joint K- The Means model, which accurately divides the passenger group. Based on the federated learning framework, the specific steps to build logistic regression and K-Means model for longitudinal federated learning by integrating airline and operator data are as follows:

1. Encrypted sample alignment

   A. Distribute public keys to ensure data security

   B. Using homomorphic encryption, RSA and Hash multilayer encryption of entity data

   C. Perform entity data collision through Hash to find the intersection of the two data sets. According to the same sample (passenger ID), align the two data sets to ensure that the formats of the two datasets are the same.

2. Joint Modeling

After the dataset format is aligned, based on the vertical federated learning framework, an intermediate party is created to help both parties build a linear regression federated model to avoid data leakage (**Figure 1**).

   A. The intermediary party distributes the public key to ensure data security

   B. The two aligned datasets are left locally to build both logistic regression and K-Means models at the same time

   C. Cryptographically interact the intermediate results of the gradients of the two logistic regression and K-Means models and summarize the results to the middle party, which calculates the total gradient by summing and decrypting it

   D. Send the decrypted gradient results back to the data parties, and the data parties update the parameters of their respective models according to the total gradient number

   E. Repeat the above steps until the loss function converges

Status	Equipment	Consuming behavior	Location track	Social networks
Age	Brand	Level of consumption	Resident analysis	Internet behavior
Sex	Type	Capability	Often go to the place	Internet habits
Date of birth	Operating system	Consumption custom	Travel characteristics	Social influence
Incunabulum	Function	Consumption potential	Whether to travel to the risk areas	Social features
Habit	Package	Consumption frequency	Workplace	Social circle
Character	Flow	Consumption time	Places have been in the last week	Social time

Table 2.
China telecom data dimension.

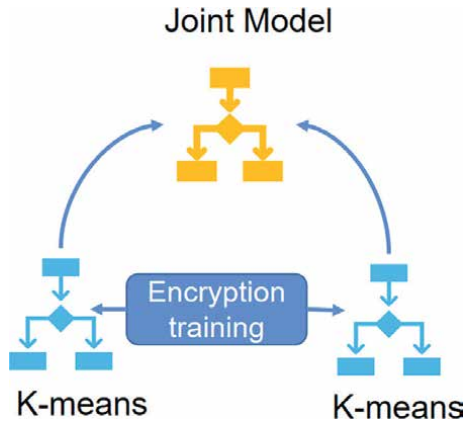

Figure 1.
Joint modeling.

3. Effect incentive

Another prominent feature of federated learning is that the effects after modeling will be reflected in practical applications and recorded in the.

In terms of permanent data recording mechanisms, such as blockchain, data providers—airlines and operators—will see the effects of the model promptly and reflect the contributions of both parties to their institutions and others.

5. Results chapters

5.1 The results from the modeling

Federated learning modeling is similar to traditional machine learning modeling, where the quality of the data and variables determines the prediction

outcome more than the algorithm. The IV values of the variables in dataset A are mainly in the range of 0.4–0.9, while the IV values of the variables in dataset B are mainly in the range of 0.4–1.3. The characteristic validity of the host is relatively more substantial than that of the guest. By adding the host variable, the performance of the entire federated model is significantly improved, and the AUC value is increased from 0.757 to 0.823 for the unilateral model, with an improvement rate of 8.7%. It can be seen that the empirical evidence that adding more high-quality variables significantly improves the fitting and predictive power of the model also applies to the federated machine learning case. The essence of federated learning is to solve the problem of how to make full use of the advantages of big data while ensuring data security. This has no adverse effect on the power and performance of the model. Therefore, federated machine learning can be regarded as a safe, efficient, and guaranteed machine learning method in the era of big data (**Figures 2-5**).

The accuracy of the federated model increases from 0.837 to 0.847, an improvement of 1.2 percentage points. The federated model improves recall by 0.21% and accuracy by 1.7%.

5.2 The results from the data

This experiment shows that the model is more accurate after integrating external data, and it can be reversed that it is not comprehensive to rely solely on airline data to evaluate passenger value. Due to the particularity of aviation products, the services and products of various airlines are highly homogeneous at present, which cannot meet the personalized experience of different users. In order to provide targeted, personalized services, it is necessary to accurately gain insight into passengers' preferences, interests, influence on others, travel intentions, and other details. The operator's data can supplement the passenger label to analyze the travel trajectory and network behavior of passengers to describe the passenger behavior profile more comprehensively and accurately. Help airlines gain insight into the needs of passengers before and after the flight and the experience after the flight and launch a variety of differentiated services in a targeted manner to expand the scope and dimension of services.

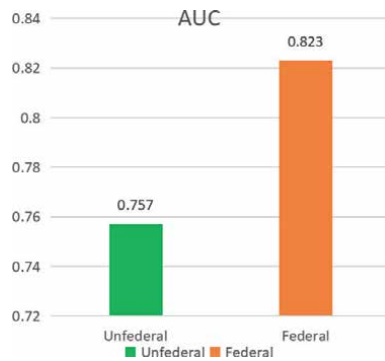

Figure 2.
AUC comparison.

DOI: http://dx.doi.org/10.5772/intechopen.107115

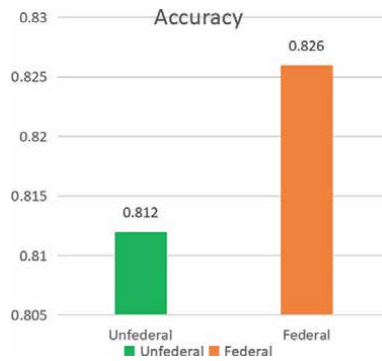

Figure 3.
Accuracy comparison.

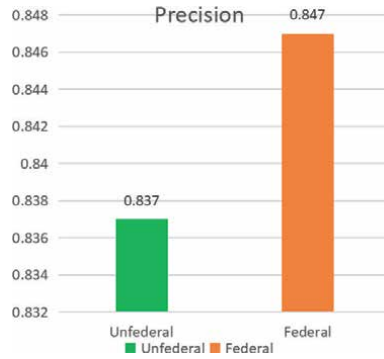

Figure 4.
Precision comparison.

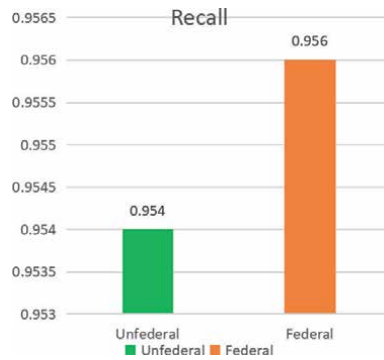

Figure 5.
Recall comparison.

Through this research, we found that in addition to the airline's internal factors such as the consumption amount, class, destination, and ticket purchase method during the flight, the following external factors can more comprehensively evaluate a passenger's value to the company:

1. Travel stability

A traveler's fixed travel characteristics are in residence, work (school), and place of life and travel.

2. Willingness to travel

The proportion a traveler spends on the airline's flight among all his boarding situations represents the willingness to travel with the airline.

3. Social network influence

How many fans a traveler has on his Weibo, WeChat, Twitter, Instagram, and other social media and the influence of his words on fans.

4. Security of physical and biological spaces

In the normalized epidemic environment, the travel trajectory of a traveler and whether he is in close contact with risk groups.

6. Conclusion and implications for policy and/or further research

In reality, data silos, privacy protection, and data security are urgent issues to be solved. This paper proposes a federated learning-based model for passenger value research in the civil aviation industry while ensuring data security. To precisely analyze the value of airline passengers, a unilateral model using airline data and a joint model combining airline internal data and operators through federated learning are compared. It is concluded that the federated learning-based model solves the problem of data silos and dramatically improves the model's results, thereby better protecting user privacy and institutional data security. The model results provide airlines with technologies and methods to more accurately identify high-value passengers, help airlines understand passengers more comprehensively, provide differentiated services for passengers, and improve passengers' travel happiness.

With the improvement of people's living standards, the frequency of urban residents' travel has gradually increased, and citizens' travel has become more flexible and diverse. In order to solve the problems of vehicle reservation, route planning, and travel payment in the whole process of citizens' travel, the establishment of a MaaS platform that can integrate multiple travel methods and realize past paid travel services is considered by many scholars to achieve the above goals and is the key to promoting the sustainable development of the transportation industry in the post-epidemic era. There are already some practitioners abroad. Whim has launched a monthly travel package. By paying the monthly rental fee, users can enjoy multiple trips within a month. If the user runs out of services within the scope of the package this month, additional charges will be incurred; on the contrary, if the monthly rental is not used up at the end of the month, the remaining charges will be accumulated for the next month. Ubigo also launched a monthly rental package service. Users only need to pay a monthly rent to enjoy various travel services. For example, users can use public transportation for free in four designated areas and have 10 km of free time-sharing rental, long-term and short-term rental. Mileage, enjoy the privilege of free 30 minutes before sharing bicycles, and discount coupons for online taxi booking. NaviGoGo is mainly aimed at people aged

16–25. It uses the taxi splitter function to realize the sharing of carpooling costs and uses the deal matcher function to customize travel according to user preferences.

In contrast, China's MaaS construction is in its infancy. The more well-known company is Didi Chuxing, which has integrated taxis, green orange rides, and busses, but no intercity transportation, such as trains and planes. AutoNavi Maps relies on Alibaba's ecological resources to build a one-stop intra-city mobile travel and payment platform, including public transportation, trains, and planes. At the same time, AutoNavi Maps is also in urban travel, connecting more than 17 travel service providers and creating the most extensive aggregated taxi-hailing model. However, AutoNavi Maps cannot realize one-stop online payment. Relying on Alibaba's ecological resources, Alipay has integrated busses, subways, 12,306, online car-hailing, taxis, and bicycles, and deepening local life services. However, the bus and subway only have payment and scan code entrances, there is no route planning, and there are only motor trains and no planes for intercity. To sum up, there is still more room for development in China's MaaS platform construction.

China's new crown pneumonia epidemic has passed the most critical moment, entering the post-epidemic era and entering the industry recovery period. The COVID-19 pandemic has had a profound impact on people's daily travel. With the rapid rise of the home office, intelligent logistics, and zero-contact distribution, implementation of a series of epidemic prevention measures such as current limit control, closed management, and social contact restrictions, residents' travel frequency has decreased, and the transportation travel market has shrunk significantly. The transportation industry has had a strong impact.

Cost and risk are the primary measurement factors for travelers in the post-epidemic era. The digital divide encountered by the elderly in travel deserves attention. For example, in news reports, "the elderly were refused a ride because they did not have a health code" and "the subway cannot be taken without a smartphone." Wait. In the post-pandemic era, improving the fairness and inclusion of mobility is critical.

In future research, this study can provide a reference for the construction of MaaS platforms at home and abroad. Our research team AMY is trying to further segment passengers based on the insights of passenger value evaluation in this research. For example, we can divide passengers into three groups: young people, high-end passengers, and older adults, and combine the insights on their behavior preferences to launch suitable for them. Products and services such as routes mean transportation and payment methods improve transportation efficiency and enjoy the happiness brought by the convenience of transportation.

6.1 Design a service blueprint for the characteristics of segmented groups

Considering the characteristics of young people, high-end travelers, and the elderly, we design specific products and functional details to build a new MaaS service model. The system meets the following service functions (see **Figure 6**).

Preparation page: comprehensive travel information, including weather, air quality, travel information (distance, time, cost), available transportation methods, station facilities, and other information.

Plan a journey page: multimodal transport. The comprehensive information system will arrange and coordinate the transportation such as busses, subways, shared bicycles, and online taxis needed in the travel process at one time.

Take the transportation page: cross-platform service will access multiple shared bicycles and an online car rental platform that allows customers to use different third-party transportation services in one stop.

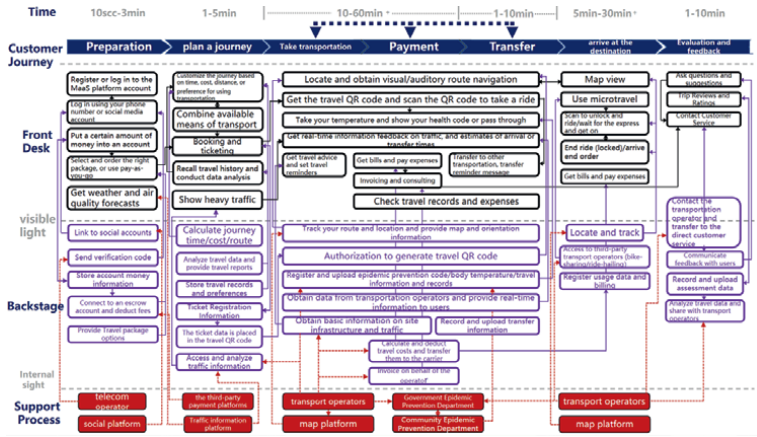

Figure 6.
Service functions.

Payment page: allows customers to pay for different transportation combination services at one time.

Transfer page: track routes and locations in time and set transfers reminder.

Arrive at the destination page: access third-party operational data, provide nearby bicycle locations, and provide arrival payment function.

Evaluation and feedback page: Allow customers to make suggestions and feedback evaluations, analyze and operate in the background of business sharing.

6.2 Create a customer journey map based on the characteristics of the segmented population

According to the characteristics of young people, high-end travelers, and the elderly, combined with the emotional fluctuations and experience pain points of

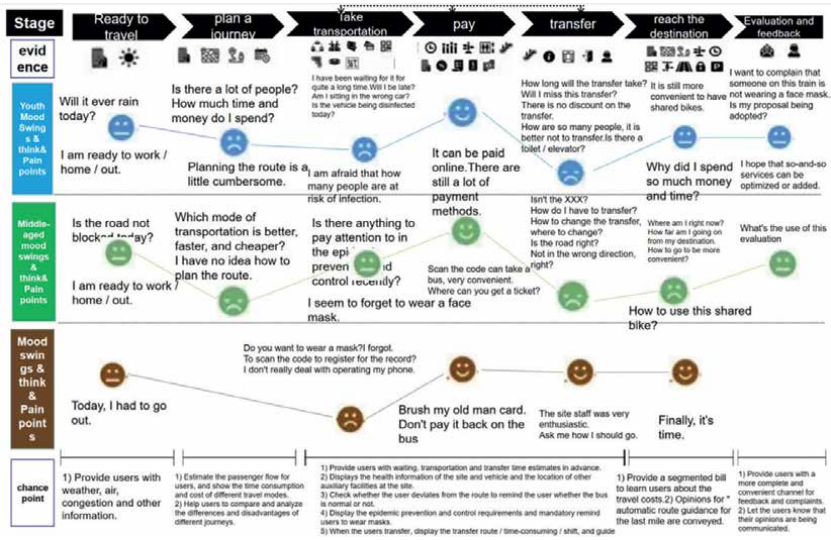

Figure 7.
Customer journey map.

travel, we can find opportunities to improve the experience. People of different age groups have experienced pain points in the travel and use of transportation due to the hidden dangers of the epidemic and the requirements of epidemic prevention. Young people and high-end people may encounter obstacles in travel route planning, transfer, and arrival at the destination due to the complex travel process and unknown transportation options. In addition, young people and high-end people are more emotionally volatile because they are under pressure from work and life. For the elderly, with the popularization of elderly transportation cards in recent years, and the deepening of respect for the elderly and the love of the young, the elderly feel very comfortable and convenient when going out, with less emotional fluctuations. A customer journey map can be created based on the opportunities to improve the problem, and a more detailed MaaS service vision can be added (see **Figure 7**).

6.3 Provide different transportation services for segmented groups

According to the survey, young people prefer a pay-as-you-go approach, and the introduction of monthly rents could send spending out of control. If the surplus monthly rent can be accumulated to the next month, young users can barely accept it, but if it is cleared at the beginning of the month like a phone bill, they cannot accept it. Therefore, we can provide "pay-as-you-go" services for young users because the current travel payment experience is most important to them. However, the function of travel bill management still exists, which can still help users understand the monthly travel situation and control travel expenses. For high-end users, monthly rental services can be considered. Because the travel monthly rental model is a significant innovation in the business model of the travel industry, it has its current needs and long-term value. Years later, a monthly rental package is also 100 yuan. However, the number and quality of services included may be significantly improved, just as the traffic and call duration in the same call package increase year by year. For high-end people, precision, efficiency, convenience, and safety are their primary travel needs, so they are prevalent to enjoy seamless one-stop travel services with only one monthly rent. It can be referred to Whim's monthly service package to design services. The Whim system interface (**Figure 8**) is as follows:

1. Whim online car-hailing—service is calculated hourly, regardless of model differences. Each hour includes fuel costs and 10 km of travel mileage. If it exceeds 10 km, additional charges will be incurred.

2. Rental car—service is calculated hourly (minimum 18 hours for rental). The longer the traveler rents, the less the traveler spends (for example, if you rent for 2–4 days, you only need to charge for 12 hours per day).

3. For high-end models, there is a corresponding increase in costs, and users need to pay additional fixed fuel costs (per 10 km and liter) and daily insurance costs.

4. Shared bicycles—The usage fee of shared bicycles is included in the monthly rent of travel. The first 30 minutes of each use are free, and there will be additional costs for more than half an hour (invoices can be issued).

5. Taxi—After paying the monthly rent for travel, users can book taxi services at a discounted price, and all taxi expenses will be settled at the end of the month.

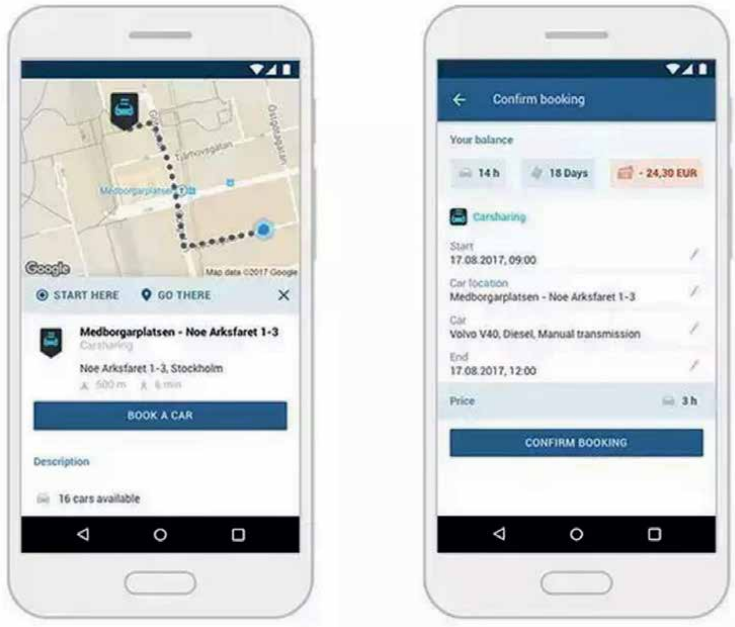

Figure 8.
Whim system interface.

The elderly pay more attention to travel safety and the simple and easy process interface for transportation. Therefore, it can provide one-time overall planning of the entire travel process (before, during, and after travel) for vulnerable groups such as the elderly—plan to reduce transfers. Furthermore, the interface is designed to be simple and easy to operate so that the elderly can travel smoothly.

Funding

This work was supported in part by the National Key Research and Development Program of China under Grant 2020YFB2103700, in part by Xiamen Major Science and Technology Projects under Grant 3502Z20221004.

DOI: http://dx.doi.org/10.5772/intechopen.107115

Author details

Sien Chen[1,2,3]*

1 Alliance Manchester Business School, University of Manchester, Manchester, UK

2 Antai College of Economics and Management, Shanghai Jiao Tong University, Shanghai, China

3 Institute of Internet Industry, Tsinghua University, Beijing, China

*Address all correspondence to: sien.chen@postgrad.manchester.ac.uk

References

[1] Peng Z. Analysis and policy suggestions on the impact of the new coronary pneumonia epidemic on civil aviation. Transportation Research. 2020;**6**(1):33-44

[2] Grönroos C, Ravald A. Service as business logic: Implications for value creation and marketing. Journal of Service Management. 2011;**22**(1):5-22

[3] Peter FD. Delivering value to customers. Measuring Business Excellence. 2002;**6**(4):55-61

[4] Ravald A, Grönroos C. The value concept and relationship marketing. European Journal of Marketing. 1996;**30**(2):19-30

[5] Butz H, Goodstein L. Measuring customer value: Gaining the strategic advantage. Organizational Dynamics. 1996;**24**(3):63-77

[6] Woodruff R. Customer value: The next source for competitive advantage. Journal of the Academy of Marketing Science. 1997;**25**(2):139-153

[7] Hughes A. Strategic Database Marketing 4e: The Masterplan for Starting and Managing a Profitable, Customer-Based Marketing Program. New York: McGraw-Hill Companies; 2012

[8] Wei J, Lin S, Wu H. A review of the application of RFM model. African Journal of Business Management. 2010;**4**(19):4199-4206

[9] Jackson B. Winning and Keeping Industrial Customers. Lexington, Mass: Lexington Books; 1988

[10] Robert Dwyer F. Customer lifetime valuation to support marketing decision making. Journal of Direct Marketing. 1989;**3**(4):8-15

[11] Gupta S, Lehmann D. Customer lifetime value and firm valuation. Journal of Relationship Marketing. 2006;**5**(2-3):87-110

[12] Borle S, Singh S, Jain D. Customer Lifetime Value Measurement. Management Science. 2008;**54**(1): 100-112

[13] Jain D, Singh S. Customer lifetime value research in marketing: A review and future directions. Journal of Interactive Marketing. 2002;**16**(2):34-46

[14] Yang Y, Xu D, Yang J, Chen Y. An evidential reasoning-based decision support system for handling customer complaints in mobile telecommunications. Knowledge-Based Systems. 2018;**162**:202-210

[15] Yang J, Singh M. An evidential reasoning approach for multiple-attribute decision making with uncertainty. IEEE Transactions on Systems, Man, and Cybernetics. 1994;**24**(1):1-18

[16] Xu L, Yang J. Introduction to Multi-Criteria Decision Making and the Evidential Reasoning Approach. Manchester: Manchester School of Management; 2001

[17] Si X-S, Chang-Hua H, Yang J-B, Zhou Z-J. A new prediction model based on belief Rule Base for System's behavior prediction. IEEE Transactions on Fuzzy Systems. 2011;**19**(4):636-651

[18] Atkinson T, Sit L, Mendoza T, Fruscione M, Lavene D, Shaw M, et al. Confirmatory factor analysis to evaluate construct validity of the brief pain

inventory (BPI). Journal of Clinical Oncology. 2010;**28**(15_suppl):e19505

[19] Rahman M, Mahmud M, Pota H, Hossain M. Distributed multi-agent scheme for reactive power management with renewable energy. Energy Conversion and Management. 2014;**88**:573-581

[20] Labadie C, Legner C. Understanding data protection regulations from a data management perspective: A capabilitybased approach to EU-GDPR. In: Proceedings of the 14th International Conference on Wirtschaftsinformatik. 2019. Switzerland: Springer International Publishing; 2019

[21] Qi A, Shao G, Zheng W. Assessing China's cybersecurity law. Computer Law & Security Review. 2018;**34**(6):1342-1354

[22] Lei X, Jiang C, Wang J, Yuan J, Ren Y. Information security in big data: Privacy and data mining. IEEE Access. 2014;**2**:1149-1176

[23] Yang Q, Liu Y, Chen T, Tong Y. Federated machine learning. ACM Transactions on Intelligent Systems and Technology. 2019;**10**(2):1-19

[24] McMahan B. Federated Learning: Collaborative Machine Learning without Centralized Training Data [online] Google AI Blog. 2017. Available from: https://ai.googleblog.com/2017/04/federated-learning-collaborative.html. [Accessed: March 1, 2022]

[25] Taylor S, DeVault M, Bogdan R. Introduction to Qualitative Research Methods. 4th ed. Hoboken, N.J: Wiley; 2015

[26] Corbin J, Anselm S. Strategies for qualitative data analysis. Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory. California: Sage; 2008;**3**(10)

[27] Smith LM. Biographical method. In: Denzin N, Lincoln Y, editors. Handbook of Qualitative Research. Gateshead Quays: The SAGE; 1994

[28] Young P, Pedregal D. Data-based mechanistic modelling. Environmental Modelling and Software. 1998;**13**:105-122

Chapter 9

Antecedents and Consequences of Customer Engagement Behaviour in the Hospitality Industry: A Moderated Mediation

Titus Chukwuemezie Okeke

Abstract

This chapter dwells on antecedents and consequences of customer engagement behaviour in the hospitality sector. It is a moderated mediation with customer involvement, enthusiasm, attention and absorption as the antecedents, and electronic word of mouth and behavioural intentions to loyalty as the consequences or outcomes, while customer engagement behaviour and customer relationship management were used as mediating and moderating variables, respectively. Data were collected from 350 respondents from southern Nigeria and were analysed with the aid of WarpPLS version7. Findings show that customer relationship management largely moderates the direct and indirect effects of the antecedents on the consequences. Implications of the findings were discussed among others that operators in the hospitality sector, an industry that is drastically affected by the COVID-19 pandemic, need to apply key customer engagement behaviour concepts in designing and managing of service experiences.

Keywords: customer engagement, customer loyalty, behavioural intentions to loyalty (BIL), customer relationship management, involvement, enthusiasm, attention, absorption, e-WOM, hospitality sector and COVID-19

1. Introduction

Managing customers has evolved over the years and has been the primary focus of marketing and business organisations. Pansari and Kumar [1] aver that customer management has not changed and that what has changed is how customers are managed. Thus, customer engagement (CE) is not a new concept. It is perhaps as old as marketing itself. The advent of information and communication technology especially social media and their wide application in business and marketing has boosted and exacerbated CE especially as it relates to creating and maintaining online brand communities. Kotler et al. [2] state that yesterday's businesses relied majorly on mass marketing to large segments of customers operating independently and in their self-interest; whereas, nowadays firms are utilising online, mobile, and social media to

improve their targeting and to involve as well as engage customers more profoundly and interactively. According to Kotler et al. [2], the traditional marketing entailed marketing brands to consumers; while the contemporary marketing referred to as CE marketing implies fostering direct and dynamic customer involvement in tweaking and modifying brand conversations, brand experiences, and brand community. CE marketing goes beyond just marketing a brand to consumers. The aim is to turn the brand into a meaningful and strongly reminiscent part of customers' conversations and lives [2]. CE has greatly benefited companies in the United States as demonstrated by Pansari and Kumar [3] and there is also tremendous scope for researchers in other climes to explore CE in depth and contribute to this growing body of knowledge. Dessart et al. [4] stated that CE is receiving increasing attention, yet the current literatures are inconsistent in its dimensionality. Mintz [5] noted that the COVID-19 pandemic has been catastrophic for the world stressing that the fundamental driver of the COVID-19 economic crisis has been health and safety concerns and, hence, changes to customer behaviour. This is particularly so in the hospitality sector with reported millions of job losses. He stressed the need for marketers and businesses to map out strategies to win back customers post COVID-19 as *majority of customers switched their shopping strategies from a hedonic, enjoyment-focused strategy to a utilitarian, goals-based strategy* (p. 5). Four antecedents of CE: involvement from the study by Coulter et al. [6]; enthusiasm, attention, and absorption as well as an outcome variable, BIL from the study by So et al. [7]; the second outcome: e-WOM from the study by Konttinen et al. [8]. The measures of CE, which was used as the mediating variable, were based on the work of Sprott et al. [9]. While CRM, the moderating variable, was based on Dazagbyilo et al. [10] study. This chapter concerns a conceptual analysis of the CE in the hospitality industry and is divided as follows: hospitality industry, customer engagement (CE), CE and CRM, CE and s-CRM, CE and customer loyalty, conceptual framework of CE and CRM, and finally conclusions and implications.

2. Hospitality industry

The hospitality industry includes hotels, tourism agencies, events centres, restaurants and bars. Livio offline Dictionary define hospitality (i) as the act or service of welcoming, receiving, hosting, or entertaining guests; an appropriate attitude of openness, respect, and generosity toward guests; (ii) the business of providing catering, lodging, and entertainment service, the industry which includes the operation of hotels, restaurants, and similar enterprises; and (iii) the food, drink, and entertainment given to customers by a company or organisation or provided to visitors by a private host. There exists no consensus among various authors on what the definition of the term hospitality industry is. Numerous authors and researchers have taken different routes to explain the hospitality industry. A number of them sought to condense the scope of the sector/industry and its features into comprising both tangible and intangible attributes in the service delivery process. A fraction also tried to depict the industry through studying the stakeholders involved, mutual gains and benefits generated and the industry's impacts to the society and economy [11]. Generally speaking, Chan and Mackenzie [11] further aver that 'hospitality is the act of kindness in welcoming and looking after the basic needs of customers or strangers, mainly in relation to food, drink and accommodation.' A modern-day account of Hospitality conveys the affiliation process between a customer and a host. Rodriguez et al. [12] went further to state that 'when we talk about the *Hospitality Industry,* we

are referring to the companies or organizations which provide food and/or drink and/or accommodation to people who are *away from home',* adding that their delineation only satisfies most situations. Data from the reference [13] show that the classification of the hospitality industry in Nigeria is also based on the standard industrial classification (SIC) codes. These are the accommodation and food services; and transport and storage including road, rail, water, air transportation as well as post and courier services. Also included are tourism, event management and related recreational parks and resorts that provide food, including fast food, accommodation and entertainments.

Operators in the hospitality sector, an industry that is drastically affected by the COVID-19 pandemic, are now required to understand and apply key CE concepts in the design and management of service experiences. The hospitality sector which account for 6.06% of Nigeria's GDP in 2018 could only account for 5.15% and 4.3% of GDP in 2019 and 2020 respectively, no thanks to COVID-19 pandemic. United Nations World Tourism Organisation (UNWTO) [14] reports that as countries closed their national borders to contain the COVID-19 infection, the effects on tourism, hospitality and events were devastating, with projected impacts estimated at US$910 billion lost in exports and 100–120 million jobs at risk. The hospitality sector as a per cent of Nigeria's gross domestic product (GDP) as at 2011 is 2.89%; and moved up to 5.93% in 2016 to 6.06% in 2018 from where it declined to 4.29% in 2020. This decline can rightly be attributed to the COVID-19 pandemic. In spite of the decline occasioned by the COVID-19 pandemic, the sector is a significant contributor to the Nigerian economy. The sector has also been variously recognised as making the highest impact on the Nigeria, Africa and World economies in terms of employment generation. In the African continent, World Travel and Tourism Council (WTTC) [15] reports that, as part of the global trends, travel and tourism (T&T) GDP in Africa dose dived by 49.2% in 2020. While domestic spending contracted by 42.8%, international spending saw a deeper reduction at 66.8% adding that Africa suffered disproportionately more than other regions, with jobs dwindling by 29.3% (7.2 million).

At this point, the yearly competitiveness rankings of the World Economic Forum (WEF) come to mind. Nigeria continues to rank poorly in the yearly reports of the WEF. Nigeria ranked 129 out of 139 countries in 2019 report; and in the 2021 report she ranked 110 out the 117 countries covered. The poor rankings manifest majorly in the areas of safety and security. In its 2019 report, World Economic Forum [16] notes that Nigeria (129th) accounts for almost half of the sub-Saharan Africa (SSA's) T&T GDP and is also its largest economy. It adds that though Nigeria ranks in the middle in terms of competitiveness, her safety and security ranking (139th) is worst in the SSA region.

The hospitality sector is multiple and varied but for this study we delimit to those concerned with accommodation, food and drinks, including hotels, resorts, recreations parks and tourism. Distinct from other sectors, the hospitality industry is unique in its nature which tends to be service-oriented and has a strong emphasis on human exchange in the service delivery processes. Chan and Mackenzie [11] identify key characteristics relating to the sector as: product-service; two-way communication; relationship building; cultural diversity; and labour-intensive operations. The personnel are the most crucial in all these characteristics. As Barrows et al. [17] put it: as firms in competition expand their menus and amenities and dress up their operations, *all operations at a given price level tend to become more like one another. The crucial differentiation becomes service—usually in the form of personal service* (p. 27). This calls for a more emphasis by the sector operators on build on its CE framework: creating

direct and continuous customer involvement in designing brands, and in creating and managing brand conversations, customer experiences, and consumer brand communities. According to Manfreda and King [18], the mature stage of the hospitality industry, characterised by higher levels of customer expectations, increased competition and low product differentiation, has made the importance of staging and managing personalised, high quality guest experiences more paramount. CE allows marketers to create and sustain a competitive advantage and could serve as a differentiation strategy.

3. Customer engagement (CE)

Marketing scholars mostly describe the concept of CE from three perspectives. One, the behavioural viewpoint proposes that it is a non-transactional behaviour of the customer to the brand and is manifested through positive word-of-mouth among others. Two, the psychological stance believes that CE is the customer's emotional and cognitive reactions toward a brand. Naumann et al. [19] believed that CE is a psychological process that encourages new customers to generate loyalty and old customers to maintain loyalty. Mollen and Wilson [20] believed that CE is the cognitive and emotional commitment with a brand. The dimensions of CE carry the following characteristics [21]: Cognitive engagement describes an investment in attention, processing, or thinking skills to develop understanding or knowledge. Customers as humans can know (have knowledge) either based on experience or based on reasoning [22] while understanding relates to comprehension. While also compared to motivation and self-regulation, cognitive engagement is defined by Johnston [21] as a person's investment in attention and processing to evoke knowledge and understanding concerning a product or an idea. Affective engagement entails positive and negative emotional reactions, like pleasure, fear, anger, support, and association and is often displayed as recognition of belonging, or emotional reactions [21]. Behavioural engagement embodies concepts of participation, collaboration, action, and involvement, as well as intended and unintended actions that may be caused by, or result from, cognitive or affective engagement [21]. CE has become an integral component of debates on consumer-brand connections in academic study, and likewise in practice. Weitzl and Einwiller [23] define it as a composite, multifaceted relational construct that entails a consumer's state, that occurs by virtue of interactive consumer experiences with a specific brand. It comprises of psychological and behavioural engagement factors conveying a definite intensity level at a particular time [23]. Psychological engagement denotes a consumer's captivating, inherent motivation to invest cognitive, emotional, and intentional resources in the interaction with a brand, while behavioural engagement reflects specific interactive, brand-related behaviours [23]. In bestowing the term brand dialogue behaviours, Maslowska et al. [24] acknowledge the increasing role of engagement behaviours beyond that of actual purchase. Within a service setting particularly, prior frameworks have recognised the role of the customer in enhancing the entire experience, yet typically centre wholly on the period of the service encounter. The CE behaviour concept regards users as being guided by own personal intentions and motivations, in lieu of those initiating from the firm [25]. One additional note on Van Doorn et al. [26] definition that it explicitly pertains to *CE behaviours*, yet the authors proceed to suggest that these behaviours may also be targeted to an expanded network of actors than other current and potential customers. Van Doorn et al. [26] clearly acknowledge the capacity for not only

current customers, but consumers in general, to generate these engagement behaviours with either the brand directly or other consumers. Kumar et al. [27] acknowledge Van Doorn et al.'s view [26] yet argue that such a conceptualisation is incomplete while actual purchases remain omitted. Such a stance would further exemplify the requirement for a more holistic view of engagement, such as throughout the entire process in tourism or restaurant.

From a comprehensive perspective, CE can be regarded as a multidimensional concept and includes multiple aspects of cognition, emotion, and behaviour. Vivek et al. [28] followed the expanded relationship metaphor and service-dominant logic, and conceptualised a three-dimensional perspective of CE, that include: conscious attention, enthused participation, and social connection. Mollen and Wilson [20] suggest that online CE includes three dimensions: active cognitive processing, instrumental value, and experience value. So et al. [7] confirmed that CE had identification, enthusiasm, attention, absorption, and interaction. Hollebeek et al. [29] suggested that customer brand fit consists of three dimensions: cognitive processing, affection, and behaviour. Moreover, the object of CE can be products, brands, or activities [30]. Therefore, different types of CE can be distinguished according to the objects of that engagement [30].

Important to the conceptualization of CE is to provide the unique characteristics that differentiate it from other related concepts and constructs. CE appears to be a related concept, though is theoretically different from many similar other marketing concepts [26, 31]. There has been a clear difference between engagement and other, more well-known customer management and relational constructs [20, 31–34]. CE and involvement seem similar on the basis of customer values and needs that motivate people toward a particular object, like a brand [33]. Vivek et al. [34] proposed that involvement differs from CE because involvement is a psychological concept that does not study behaviours. They argue that involvement may be an antecedent of the behavioural domain of CE. Mollen and Wilson [20] distinguished involvement, since it comprises more passive allocation of mental resources, whereas engagement entails a dynamic bond with the consumption object adding that engagement needs both achievement of instrumental value because of utility and relevance, in addition to/along with a specific level of emotional bonding, which may be achieved due to gratifying and rewarding experiences.

The term engagement in a business-related context originally referred to employee engagement (EE), which seems to enjoy a consistent conceptualization and operationalization. However, the conceptualization of CE, which is still in its infancy, lacks consensus [7]. Buttle and Maklan [35] maintain that this is not unusual for an emerging construct; indeed, competing claims have been made for CRM itself. Interestingly, the stability of the EE construct may provide insight for CE, which is an evolving concept in the customer management field, where it has been drawn from organisational behaviour (cf. employee engagement) [34]. There were scant discussions of CE prior to 2005, but thereafter, there have been emergence of numerous research findings that have been abridged into various literature reviews in [35]. There is no unified agreement about what CE is, how to define it, how to measure it, or what consequences it has for any business [36]. In the organisational behaviour writings, EE *denotes 'the simultaneous employment and expression of a person's preferred self in task behaviours that promote connections to work and to others, personal presence, and active, full role performances'* [37] (p. 700). EE seems to exist as a motivational construct embracing attention and absorption [38] and might involve an identification component [39].

Consistent with this emphasis on the psychological elements, engagement is *a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption* [40] suggesting that EE is a persistent and pervasive affective,

cognitive state [41]. These definitions indicate that EE conceptualizations focus on psychological aspects. In contrast, So et al. [7] note that marketing scholars have conceptualised CE to include a strong behavioural focus. Such interests abound in the literature domains of both academics [26, 42, 43] as well as practitioners [44]. In seeking to establish a conceptual understanding of CE, researchers have argued that the knowledge of EE is applicable to CE [45]. Feelings of passion, energy, and enthusiasm characterise both EE and CE [33, 45]. However, the focus of those feelings differs (workplace vs. consumer brand). In addition, in building on the EE literature, the conceptualization of CE tends to go beyond an attitudinal perspective, reflecting both psychological and behavioural dimensions [45]. Buttle and Maklan [35] maintain that CRM practitioners often use tools such as campaign management to build CE.

As Brodie et al. [32] discussion proposes that CE might entail that equal attention be lent to the psychological facets of engagement along with behavioural participation, it shows that there persists a diversity of opinions as regards the conceptualization of the concept. For example, some researchers consider CE to be a behavioural construct (i.e., interaction) emanating from a range of motivational drivers. [26, 42, 43, 46], whereas others propose CE to be a multidimensional construct comprising both psychological and behavioural aspects [32, 33, 45, 47, 48]. Support for the adoption of a multidimensional approach is evidenced in the conceptualization of composite loyalty (i.e., behavioural and attitudinal), which suggests that behavioural measures alone may lack a conceptual basis in [7] and provide insufficient insight into the factors underlying repeat behaviour. So et al. [7] argue that this is also correct in describing the conceptual domain of CE, whereby involvement in the activities of the phenomenon does not guarantee a truly engaged customer. For example, involvement in a brand conversation conference or gathering may emanate from issues like the need for product information or reduction of perceived risks [32] rather than from being attached or engaged with the brand. So et al. [7] maintain that the truly involved customer must have an enduring psychological attachment with the brand in addition to behavioural involvement or engagement, adding that while a behavioural approach may provide an indication of customers' involvement level in CE activities, a multidimensional approach will express the full complexity of CE.

In line with the above, Buttle and Maklan [35] identified two main schools of thought on CE. The first sees CE as a two- dimensional construct with a behavioural and an emotional component (see: [35]). Extremely involved customers devote substantial share- of- wallet to the brand with which they are involved and are also emotionally dedicated to it. This school of thought makes CE hard to differentiate from the customer loyalty construct, described as having a behavioural and attitudinal component. The second school sees CE as a multi- dimensional construct in which an attached customer is not just a buyer of a firm's products but is involved in co- creation of value for the brand in many other indirect ways [1]. The focal point of this school is on the brand owners' activities to promote customers' indirect involvement with the brand. The main aim is to convert the customer into an additional, unpaid marketer, working in the brand's interests. Whereas direct involvement means buying, indirect involvement could manifest in many different non- transactional activities [28].

CE has continued to attract increasing attention from both practitioners and academics [32] in part owing to the growth of the information technology and the social media as essential tools for customer communication and cooperation. Specifically, the online environment has created a range of new media channels for the hospitality firms to enhance connections and relationships with customers far-off the service encounter [7]. In a bid involve their customers via interactivity beyond purchase,

tourism brands establish their presence on social network sites like Facebook and Twitter in addition to online interaction panels. As a medium of exchange, the Internet enables hospitality business operators and consumers to spread and disseminate information, opinions, and experiences, not just from business to customer but also from customer to customer [49]. These discussions highlighted the importance of involving customers to build loyalty after the transaction, especially in the highly competitive environment of the hospitality industry. The importance of non-transactional customer discussions is detailed in literature [7]. For instance, online user-generated evaluations and assessments can influence the number of online bookings in a hotel [50] as well as intentions to book and perceptions of trust in the hotel [51]. In an off-line environment, opinion or advice from existing customers influences the consumer's purchase decisions [52]. Collectively, such interactions form the behavioural manifestation of CE [26, 43, 46]. Additionally, hospitality organisations can leverage CE behaviours to attract and retain more customers and gain additional insight into their business [53]. From a consumer perspective, the benefits for engaging in CE activities include financial gains or incentives as well as emotional fulfilment, such as enjoyment and positive affect [26]. CE is emerging as a construct that may enhance loyalty and purchase decisions e.g., [45, 47] through a strong, enduring psychological connection accompanied by interactive brand experiences beyond purchase. CE with a brand influences important aspects of consumer brand knowledge, brand perceptions, and brand attitudes, and hence brand loyalty [9].

Buttle and Maklan [35] identify four forms of CE: behavioural, social, cognitive and emotional. (i) **Behavioural:** the engaged customer acts favourably toward the brand, for example by taking part in brand research or passing on positive word- of-mouth thereby creating customer referral value or CRV. (**ii) Social:** the involved customer connects with the brands and other customers in social media channels, through creating, viewing or sharing online content, taking part in crowd- sourced customer service, blogging, recording assessments or complains, sharing brand-use information on Instagram, or joining a Twitter interaction among others. According to Buttle and Maklan [35] these two types of engagement are stimulated by allowing the intra- personal characteristics of the customer: 1) Cognitive. the engaged customer is knowledgeable about the brand like, the brand's values, price- point, advantage of the product relative to competitors, status or country of origin. 2) Emotional. The involved customer has a powerful liking for and devotion to the brand. It is also imperative to note that engagement cannot be dichotomised, that is, customers cannot just be separated into engaged and disengaged segments. Rather, customers are always changing with rest to their level of engagement. Some customers will be mostly engaged in all the forms; while others may not even realise what brands they have bought. Buttle and Maklan [35] state that managers and marketers should be concerned with the role of CE in building and sustaining relationships with customers stressing that engagement is only possible when a relationship is entrenched on the basis of trust and commitment.

So et al. [7] CE study rely on five distinct dimensions of identification, enthusiasm, attention, absorption, and interaction, which reflect the psychological and behavioural aspects, defined as a customers' personal connection to a brand as manifested in cognitive, affective, and behavioural actions outside of the purchase situation. Behavioural manifestations include participation in activities, such as customer-to-customer interactions, blogging, writing reviews, as well as other similar activities that are centred on the brand. Recent reviews of the conceptual foundation and relationship of CE provide useful guidance on potential antecedents and

consequences of CE. Possible antecedents of CE include involvement, interactivity, rapport, commitment, trust, brand attachment, and brand performance perceptions [26, 33]. Consequences of CE include cocreated value, brand experience, satisfaction, trust, commitment, customer value, brand loyalty, customer equity, firm reputation, brand recognition, and financial outcomes [26, 33]. In addition, such a psychological connection may depend on various situational factors [54] such as age, computer experience, and degree of socialisation. It does appear that engagement and involvement are correspondingly hinged on consumer needs/values stimulating the individual toward a specific object, such as a brand [47]. In line with marketing literature, involvement most often concerns the perceived personal importance and significance of the product or brand (see [7]). However, engagement requires more than the exercise of cognition. CE entails an active relationship with the brand, and the intention to act makes CE distinct from involvement's more passive allocation of mental resources [20]. Nevertheless, the emergence of specific customer brand engagement levels requires some level of involvement with a focal brand [33]. These characteristics make the multi-faceted concept of CE conceptually distinct from involvement. Additionally, studies [33, 45, 47] provide extensive reviews of how CE is different from other similar constructs, such as commitment, satisfaction, cocreation, and brand loyalty.

3.1 CE and customer relationship management (CRM)

Over the years, marketers have employed various tools in managing their customers and these range from: transaction marketing, customer loyalty and loyalty management, relationship marketing, customer relationship management and of recent CE. Customer relationship management (CRM) as a tool is very beneficial for business firms in building and expanding their relationships with their customers [55]. In a review and classification of CRM researches from 2000 to 2020 Mena and Sahu [56] show that though CRM is prominent within service industries, it has become a potent tool in all industries from manufacturing to tourism and hospitality; from education to logistics and telecommunications among others; as the number of published research articles concerning other sectors is increasing compared to that of service industries. As a customer management strategy (CMS), CRM is the strategic process of selecting customers that a firm can most profitably serve and shaping interactions and management of technology between a company and these customers; the ultimate goal is to optimize the current and potential value of customers for the company [57]. Thus, CRM can be described as a business and marketing relationship strategy based on supported by methods and technology. The most complete definition is recommended by [58] who considered CRM *as a customer-oriented business philosophy that involves analysing, planning and controlling customer relationships by means of modern information and communication technologies (p. 1)*. Chen and Popovich [59] suggest that a CRM model should mix the three proportions of people, process and technology inside the context of an enterprise-wide, customer-driven, technology integrated and cross-functional organisation [59]. Through these combinations, the organisation can choose particular technologies to improve its knowledge of customers and performance as well as enhance customer relationships. From this perspective, Bozbay [55] defined CRM as a global procedure that allows a lasting and profitable relationship between the organisation and customers. While CRM definitions vary, they can be grouped into three types – technology centred, customer life cycle-centred, and strategy-centred explained as below [60]. Technology-centred definitions establish the link between technology and CRM. It is not surprising

that an investment in CRM technologies has been made, and the conversation has drawn CRM into the technological and practical mechanics [60]. CRM is a technology solution that expands to separate databases and sales force automation tools to integrate sales and marketing functions to reach targeted efforts. On the technology perspective, Buttle and Maklan [35] maintain that IT companies have tended to use the term CRM to describe the software tools that are used to support the marketing, selling and service functions of businesses. CRM is a tool used in one-to-one customer communications, sales, service, call centres or marketing departments. In fact, as we have already noted, it is one of the modern tools for customer management and when used properly with the CE, will offers strong competitive advantage to firms. CRM is not just a tool for those departments. It is for every department within the entire organisation. According to Bozbay [55], if CRM strategy is well applied within the whole organisation, all the organisations' departments like marketing, human resources, R & D, finance and information technology will succeed in maximising healthy and profitable relationships with customers. CRM is customer-oriented, technology-integrated and cross-functional strategy that facilitates customer personalization, simplicity and convenience in interactions [59] and is significantly a marketing strategy that firms employ to improve customer value. It is also a set of concepts that must be blended and harmonised together with an organisation's overall business strategies [61]. Interestingly, CRM ballooned to a major transformation from a strategy that relied only on the customer transaction to accommodate customer connections [62]. Currently, marketers can extract initial information about customers that organisations can use to realise greater success in carrying value to the customer [34]. Previous research has done a great deal of modelling on the use of technologies and their impact on CRM, but with the advent of social media, more marketers realise that technologies are already great enabling factors for CRM [63]. Therefore, CRM has a new name called social CRM [63, 64]. In this study, CRM is used as a moderating variable between antecedents and outcomes of CE.

3.2 CE and social CRM

Social CRM is a postulation much like the CRM however embodies and integrates social methods, capabilities and operations that function through the communication between organisations and customers as well as the customers and their peers, families and friends [65]. Additionally, the presence of these novel methods, procedures and technologies facilitates interactions with customers [66] to build long-term relationships with improved performance [67]. Social CRM therefore focuses on CE through communicating, bi-directional relationships with customers where they are ready to participate in the marketing activities and the product offerings through interactions in social media [12, 63]. Mobile devices and social media have changed the relationship between organisations with the customers pushing them to reach and create strategies to manage the relationship with customers beyond just financial transactions [68]. Statista (2022) blog, reports among others that as at January, 2022, Facebook has 2.91Billion active users while WhatsApp has 2.4Billion active users. This makes Facebook the single largest community in the world. These social media communities share information, ritual and concern for each member. Any business organisation can ignore these communities at its own peril. Business organisations rely on these large communities to build online brand communities to relate and engage customers for profit. Accordingly, business and marketing practitioners need to understand how to promote and maintain online communities for profitable CE. In his seminal book, Marketing 2.0: bridging the gap between seller and buyer through social

media marketing, [69]: *encourage SMB CEOs and their marketing and sales managers to embrace social web as three things: a culture, a mindset and as a* platform (p. 4). He adds: *the social web allows any business of any size in any location to reach the people they desire to reach and build strong relationship with them* (p. 4). According to Bozbay [55], a study showed that extremely engaged customers pay 23% more, which increases profitability and share of wallet; the Convero survey found that 74% of managers plan to make their investments on CE in the following years [64]. The social media channels enable business firms and organisations to involve with customers under their own circumstances, at work, play or at any time they want, and through their own preferred media [55]. Marketers appreciate and help customers to buy more, assist them in using the brand, make them more knowledgeable about the brand and handle the customers' complaints. Through the product cycle, the firm can utilise social media to enhance its speed in the market, to assist in designing innovative products based on the customers' desires and aspirations, to boost early sales quicker in order to nurture their prices, and to know the features and functions that appeal more to the customers [55]. Firms also use the social media for the optimisation of the costs of sales, service and marketing expenditures by involving customers and handling transactions through replacing the traditional media by the new media channels and by listening to the voice of customers to minimise the cost of failure [70]. From a strategic point of view, experts describe engagement as: allow businesses to cultivate in-depth, more thoughtful and sustainable discussions between the organisation and its customers or external stakeholders [71]. As soon as customers connect through the brand, the amount of time spent sharing information through different media is likely to be enhanced over the internet either in form of comments on other user posts or through content creation. By verifying customer purchases over certain period, buyers can be monitored easily, possibly to contribute to the development of the products by generating ideas. The number of stories generated or even shared by the customer and a satisfaction assessment could as well be done online. Thus, this can lead managers to provide reasonable understandings of organisation performance [27]. Social media is reengineering the business processes and methods by facilitating the two-way communication strategy between the organisations and the customers. Thus, it can develop many new challenges and opportunities. Sharing resources and gaining understanding are the prerequisites for the long-term sustainability of the organisations [72]. Online communications can generate huge knowledge and lead to the creation and growth of customer value [64, 73]. Woodcock et al. [74] noted that social CRM avails full support to customer life cycle strategy and CMS that will enhance sales by minimising costs, spreading and enhancing involvement and awareness. According to Bozbay [55] social CRM can engender many benefits to firms by following a four-step procedure – involving/engaging customers and prospects, attracting new customers, recalling customers and increasing customer value. Thus, social CRM supports the entire CMS and customer life cycle and therefore should lead to enhanced sales through improving engagement and awareness, and improve customer value and minimise costs [61]. CRM philosophy helps to understand the main components in customer management such as attracting customers, maintaining loyalty and retaining them; and the newest component in managing customers is CE. CE (CE) is defined as a kind of mind generated by customers interacting with the brand in a specific service relationship and creating an experience [30]. Because it relies majorly on utilising social media for communication and interaction, CE is also referred to as social customer relationship management (s-CRM). Greenberg [65] maintain that understanding the customer the right way applies to Social CRM as it is

focused on CE, and the recognising that the customer controls the conversation, stressing that when it comes to how you engage customers, the primary strategy remains what it has always been, and that's the people, whether in 21st century or not. He adds that the kind of culture that disseminates *throughout a company is a key determinant in the effort to make that CE fruitful, to the point of creating a customer relationship that is both delightful and extraordinary,* (pp. 93–94). CE is a dynamic and cyclical process and has different performances in different situations [30].

In customer journey analysis, firms rely on customers interactions and how they interact with multiple touch points, from consideration, search, and purchase to post purchase, consumption, and future engagement or repurchase. The main aim of such analyses is to define this journey and appreciate the customers' options and preferences for the touch points in multiple purchase phases [43]. Lemon and Verhoef [75] stated the increasing focus on customer experience arises because customers now interact with firms through myriad touch points in multiple channels and media, social and offline media, resulting in more complex customer journeys. Van Hagena and Brona [76] recommends measuring customer experience and determining how strong the emotional level in various customer journey phases in different groups of passengers so that the customer experience of each customer journey phase is known. Aaker and Joachimsthaler [77] stated that the experience customers acquire through participation and engagement on the internet has the implication to be captured more firmly than the experience from other traditional media, hence it can be said that the quality of user experience on a website affects the overall feeling and trust associated with brands which could be deepened and firmed more strongly than experience through other media [78]. As customers interact with products and services, they share their experience on social media which affect relationships and engagement with the firm.

3.3 CE and customer loyalty

Loyalty is the end result of CE in the hospitality sector especially with COVID-19 when there were noticeable declines in revenue. Loyalty is also very essential post COVID-19 as business operators in the sector try to win back customer trust and confidence. According to Boohene and Agyapong [79] loyalty as a concept has its base from the consumer behaviour theory and is something that consumers may portray to brands, services or activities. Customer loyalty is the normal willingness of customer to maintain their relations with a particular firm or service/product [80]. According to Wirtz and Loveloch [81] loyalty refers to the submissiveness of a customer to continue patronising a company's product and services over a long time and on a persistent and rather exclusive basis, and willingly endorsing and advocating the firm's products to friends and associates. Customer loyalty results from a firm creating a benefit for customers so that they will maintain progressively repeat purchases with the organisation [82]. Oliver [83] defined customer loyalty as a deeply held commitment to rebuy a preferred product or service consistently in the future, causing repetitive same brand or same brand-set purchasing, despite situational influences and marketing efforts. Leong et al. [84] note that the economic growth noticed in the tourism and hospitality industry and competition in the industry has led to the discovering consumer loyalty as a key success factor. Reichheld [85] pointed out loyalty behaviour affects business growth and companies get to profit from price premium, referrals, increase purchases and higher balances, reduced operating cost and customer acquisition cost. According to *Srinivasan, Anderson and Ponnavolu* [86] loyalty

in online behaviour is attitudes that are beneficial to the customer and his dedication to online companies that engender repeat purchase behaviour. A truly loyal customer is a dedicated customer that is connected with the retailer and may not be easily bothered by more and perceived interesting alternatives [87]. In general, customer loyalty is the final purpose that firms implement CRM and CE.

Researchers have recognised various vital concepts of the CRM which are potentially linked to CE [26, 48, 88]. These constructs include satisfaction, brand trust, commitment, and service quality, all of which are essential to the development of loyal relationships [89]. Nevertheless, very scant empirical confirmation exists to provide a clear understanding of the relationship between CE components and behavioural intentions toward loyalty (BIL). Such information is fundamental to both researchers and marketing practitioners, going by companies' growing interest in CE strategies and in view of the significant amount of academic interest availed to this emerging phenomenon as a serious determinant of loyalty. Interestingly, CE can support important and profound marketing metrics like share of wallet, loyalty, cross-selling, and word of mouth [34]. CE influences behaviour intensions of loyalty significantly in the hospitality and tourism brands of hotels and airlines [90]; but further empirical investigation of this relationship in different contexts has been suggested [91]. The outcomes of CE in this present study includes e-WOM and behavioural intentions to loyalty (BIL).

4. Conceptual framework

The framework for explaining and understanding CE evolved from the relationship marketing model where the foundation is based on Morgan and Hunt commitment trust theory [1]. Previously, the primary purpose of relationship marketing was to establish long-term relationships with the firm, thereby promoting efficiency, productivity, effectiveness, and cooperation [1]. Tracing the development of CE, Pansari and Kumar [1] noted that a firm's initial relationship with the customer was restricted to purchases, ensuring long-term loyalty, and continued patronage, noting that, nevertheless, this has evolved with the developments in the marketplace based on the ever-evolving needs and interests of the consumers. Accordingly, CE has hypothetical roots within the extended domain of relationship marketing that emphasise the notions of interactivity and customer experience [34]. CE is considered as the creation of a deeper and meaningful connection between the company and the customer [92]. It is widely believed that a well engaged customer plays a key role in viral marketing activity and by providing constant referrals and recommendations [32] and increasing advocacy intention for a specific products, services, and brands to others either face-to-face and on various channels including social media. Dessart et al. [4] stated that CE is receiving increasing attention, yet the current literatures are inconsistent in its dimensionality.

In a case study-based research, Singala [93] explains the use of art for business purposes by showing how the Cube has embedded art into its servicescape and experience design to position its wine brand in the d'Arenberg Cube, Australia; adding that by synergising art, wine and tourism, the d'Arenberg Cube managed to create the living culture and experiences of its servicescape that are hard to be replicated by competitors. This new normal emphasises that CE is evolving and so are the theories for explaining and understanding the CE phenomenon. In a study on how celebrity endorsement effect can help CE in promoting tourism products through Live

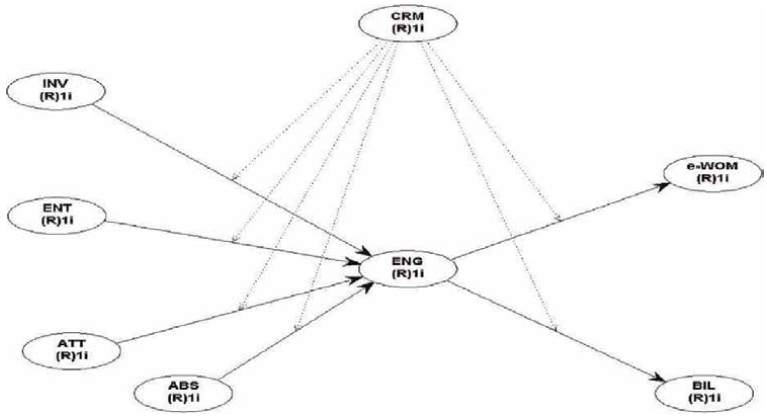

Figure 1.
The proposed conceptual model.

Streaming, Qui et al. [30] argue that consumer trust predicts the three dimensions of CE (cognitive processing, affection, and activation); and that the three dimensions of consumer trust also play a positive mediating role between celebrity effects and CE. This study relies on four antecedents of CE: involvement, enthusiasm, attention, and absorption as well as outcomes, BIL e-WOM. CE was used as the mediating variable while CRM is the moderating variable. Based on this we conceptualise our research model as in **Figure 1**.

Our model (**Figure 1**) has independent variables (IVs): involvement, enthusiasm, attention, and absorption; two dependent variables (DVs): e-WOM and BIL; one mediating variable: CE; and one moderating variables: CRM, as already defined.

Involvement. Involvement is variously conceptualised and is also differently measured by authors and researchers. It is a function of the goal object, the individual consumer and the decision situation [94]. Product involvement generally relates to self-relevance, and is defined as the personal importance of a product category [in 90]. Product involvement has significant effects on consumers' cognitive and behavioural responses including processing, search, retention, brand commitment, satisfaction [see 90]. Research findings show that product involvement is influenced by how consumers link the product category to key life themes and life projects [6]. Based on this the following hypotheses are formulated:

H1a: There is a significant relationship between involvement and CE.
H1b: CRM moderates the relationship between involvement and CE.
H2a: There is a direct and significant relationship between involvement and e-WOM.
H2b: CRM would moderate the direct relationship between involvement and e-WOM.
H2c: There is an indirect and significant relationship between involvement and e-WOM through CE.
H2d: CRM would moderate the indirect and significant relationship between involvement and e-WOM through CE.
H3a: There is a direct and significant relationship between involvement and BIL.
H3b: CRM would moderate the direct and significant relationship between involvement and BIL.
H3c: There is an indirect and significant relationship between involvement and BIL through CE.

H3d: The indirect and significant relationship between involvement and BIL through CE is moderated by CRM.

Enthusiasm. Enthusiasm is an individual consumer's strong level of excitement and interest with reference to the focus of engagement, such as a brand [48]. Conceptually, there are two complementary aspects of the affective dimension of engagement: enthusiasm that refers to *a consumer's intrinsic level of excitement and interest* and enjoyment which shows a consumer's *pleasure and happiness derived from interactions* with the community or content [4] (p. 35). Analysis of the relevant literature suggests that the feeling of enthusiasm as a positive and central indicator of affection is a central to a customer's engagement with a brand. Based on this the following hypotheses are formulated:

H4a: There is a significant relationship between enthusiasm and CE.
H4b: CRM moderates the relationship between enthusiasm and CE.
H5a: There is a direct and significant relationship between enthusiasm and e-WOM.
H5b: CRM would moderate the direct and significant relationship between enthusiasm and e-WOM.
H5c: There is an indirect and significant relationship between enthusiasm and e-WOM through CE.
H5d: The indirect and significant relationship between enthusiasm and e-WOM through CE would be moderated by CRM.
H6a: There is a direct and significant relationship between enthusiasm and BIL.
H6b: CRM would moderate the direct and significant relationship between enthusiasm and BIL.
H6c: There is an indirect and significant relationship between enthusiasm and BIL through CE.
H6d: The indirect and significant relationship between enthusiasm and BIL through CE would be moderated by CRM.

Attention. Researchers have highlighted attention as a key antecedent of CE. Customers who are highly engaged tend to devout serious attention, consciously or unconsciously, on the object of engagement [7]. They pointed out that marketing theory supports of the inclusion of attention as a component/dimension of CE. The concept of attention agrees with the construct of conscious engagement [48], that expresses a consumer's level of involvement or attention toward a brand. A customer who is involved with a brand is fascinated to information relating to the brand. For instance, a highly involved customer of Sheraton Hotels or NICON Hotel will no doubt commit a greater deal of attention to the hotel's brand information, such as public relations, and other product information. Therefore, attention, representing a consumer's attentiveness and focus on the brand, is considered to be an important dimension of CE [7]. Based on this the following hypotheses are formulated:

H7a: There is a significant relationship between attention and CE.
H7b: CRM moderates the relationship between attention and CE.
H8a: There is a direct and significant relationship between attention and e-WOM.
H8b: CRM would moderate the direct and significant relationship between attention and e-WOM.
H8c: There is an indirect and significant relationship between attention and e-WOM through CE.
H8d: The indirect and significant relationship between attention and e-WOM through CE would be moderated by CRM

H9a: There is a direct and significant relationship between attention and BIL.
H9b: CRM would moderate the direct and significant relationship between attention and BIL.
H9c: There is an indirect and significant relationship between attention and BIL through CE.
H9d: The indirect and significant relationship between attention and BIL through CE would be moderated by CRM.

Absorption. Dessart et al. [4] explicate sub-dimensions of CE to include enthusiasm, attention, and absorption among others; and defined absorption as *the level of consumers' concentration and immersion with a focal engagement object* (p 35). Absorption refers to an effortless concentration, loss of self-consciousness, distortion of time, and intrinsic enjoyment [7]. In the marketing domain, scholars have also argued that strong engagement extends beyond concentration to absorption or being engrossed with a something in the study by So et al. [7]. Absorption is a pleasant state in which the customer is fully concentrated, happy, and has a deep engrossment as he/she plays his/her role [45] and an absorbed customer interacting with the brand or other customers perceives time as passing very fast. It is accepted fact that an absorbed or engaged customer of a hospitality brand can devote reasonable time reading or writing customer reviews on the Internet. The involvement engagement literature shows that a deeper level of concentration and total immersion in a person's responsibility when interacting with the firm, its offering, or other customers, signals a strong level of CE [7]. Based on the above, we formulate additional hypotheses:

H10a: There is a significant relationship between absorption and CE.
H10b: CRM moderates the relationship between absorption and CE.
H11a: There is a direct and significant relationship between absorption and e-WOM.
H11b: CRM would moderate the direct and significant relationship between absorption and e-WOM.
H11c: There is an indirect and significant relationship between absorption and e-WOM through CE.
H11d: CRM would moderate the indirect and significant relationship between absorption and e-WOM through CE.
H12a: There is a direct and significant relationship between absorption and BIL.
H12b: CRM would moderate the direct and significant relationship between absorption and BIL.
H12c: There is an indirect and significant relationship between absorption and BIL through CE.
H12d: The indirect and significant relationship between absorption and BIL through CE would be moderated by CRM.

e-WOM. Word-of Mouth (WOM) can be defined as communication and exchange of information between customers as relates to the features of a company or the product and services. This communication could verbal as in informal discussions or through social and or electronic media, electronic word-of-mouth (e-WOM). Avidar [95] aver that e-WOM has become very popular among consumers who share online marketing information on social media platforms. The information informs their attitudes and behaviours toward services and products since they perceive its sources as more trustworthy than organisational messages [96]. As suggested by Chu and Kim [96] positive electronic e-WOM influence the attitudes and behaviour of potential adopters to form a favourable attitude toward products and or services and adopt them. Consumers' brand experiences can easily be deduced from their messages about

those brands in various digital channels: social media as well as product reviews and recommendations) [97]. Customers' online experiences are highly related to their behaviour and intentions, and e-WOM. The importance of customer satisfaction with product and service offerings cannot be overemphasised; as satisfied customers are likely to produce favourable WOM related to brand offerings [98]. We formulate additional hypotheses based on the above:

H13a: There is a significant relationship between CE and e-WOM.

H13b: There relationship between CE and e-WOM is moderated by CRM.

Behavioural Intentions to Loyalty (BIL). BIL, such as purchase/repurchase intentions, and e-WOM intentions [97] are typical outcomes of CE. Brand-related outcomes, such as brand satisfaction and loyalty [97], are equally often identified as outcomes of CE. Empirical results [99] reveal that CE has strong influence on satisfaction, likewise loyalty and trust. Rather [99] also report that commitment, satisfaction and trust mediate the relationship between CE and loyalty and that CE increases satisfaction, commitment, trust, and loyalty. Dwivedi [100] define consumer brand engagement as consumers' positive fulfilling, brand-use-related state of mind characterised by vigour, dedication and absorption; and reported that brand engagement has significant effect on loyalty intentions. This study aims to investigate the impacts of the CE antecedents of involvement, enthusiasm, attention and absorption, on CE and the impacts of CE on outcomes: e-WOM and BIL. We also set out to explore the mediating effects of CE between the relationship of the antecedents and e-WOM and BIL. It will also investigate the moderating effects of CRM on the direct and indirect relationship between the antecedents on e-WOM as well as BIL in the hospitality industry.

H14a: There is a significant relationship between CE and BIL.

H14b: There relationship between CE and BIL is moderated by CRM.

5. Methodology

5.1 Measurement

Eight variables were involved in this study and based on literature each was measured with a number of items. Involvement (INV) was measured with 9 items; enthusiasm (ENT) has 5 items; attention has 6 items; absorption 6 items; while e-WOM and BIL, the two DVs has 4 items each. The other two constructs: engagement (ENG) which is the mediating variable was measured with 8 items and CRM, the moderating construct was measured with 6 items. These variables/constructs were used to form the research model (**Figure 1**). All the constructs' items were measured with five-point Likert scale (5 = strongly agree to 1 = strongly disagree) with a neutral option 'undecided', which implies a free-choice scale questionnaire.

5.2 Demographics and data

The respondents for this study were drawn from staff and customers of tourism organisations, events centres, hotels and recreational parks majorly from southern Nigeria within the first quarter and early second quarter of 2022. The questionnaire was distributed through online platforms notably WhatsApp platforms which the author is part. The study was based on a sample of 600 respondents, of which only 350 representing approximately 58% responses were obtained and used in the analysis.

Analysis of the demographics show that 65.7% of the respondents are males while 34.3% are females. Most of the respondents, 80% are within their prime ages of 36–55 years of age, 10% are under 36 years, while the remaining 10% are above 55 years. While 94.3% of the respondents are married with 5.7% unmarried, all the respondents indicate that they have postgraduate qualification. This pattern of response was informed by the membership platforms used in soliciting for the responses. On monthly income, 40% earn below ₦150,000:00 a month, 31.4% earn between ₦150,000:00 to ₦300,000:00 monthly while the remaining 28.6% earn above ₦300,000:00 monthly. The demographics indicate that the respondents are well in position to appreciate the import of the study for valid responses.

5.3 Common method Bias (CMB)

Researchers are enjoined to ensure that CMB, which arises in survey researches where questionnaire, like this study, is used to collect information on both the IVs and DVs, does not constitute a problem. Where CMB is a problem, it influences item validities, reliabilities, and the covariation between latent constructs [101]. Based on this, research outcomes where CMB is serious cannot be relied upon as they could be misleading. Qualitative and quantitative measures are available for addressing issues of CMB. To address this, respondents were assured that there were no right or wrong answers. They were also assured of anonymity and that their responses are for academic purposes only. On the quantitative aspect, the exploratory factor analysis (EFA) shows that no single factor account for majority of the variances. We used WarpPLS to test our hypotheses and Koch [102] recommends using full collinearity. The result of the average full collinearity VIF (AFVIF) is 2.463 which is well below the recommended threshold of 3.3. This is an indication that CMB is not a serious concern in this work.

5.4 Statistical technique

Partial least squares structural equations modelling (PLS-SEM) was utilised in estimation and validation of the hypotheses for this study. Hair et al. [103] have established that PLS-SEM is preferable when estimating formative constructs or a mix of formative and reflective measures which is the situation in this paper. The PLS-SEM is a non-parametric equivalent of SEM that makes less demand on data compared to the CB-SEM; however, the PLS-SEM software used for the analysis is WarpPLS version 7.0, which brings together *the precision of CB-SEM under common factor model assumptions with the nonparametric characteristics of classic PLS algorithms* [102]. Also, the sample size used for the analysis is 350 is considered adequate as in similar studies [104] that employed the PLS-SEM tool. Data entry, cleaning and descriptive analysis were done with the aid SPSS version 25 software.

6. Analysis

In analysing our data, we relied on partial least squares structural equations (PLS-SEM) modelling and like other SEM tools, the analysis follows two procedures: the measurement model and the structural model. The measurement model involves the item loadings, reliability and internal consistencies and the discriminant validity

measures. All these are necessary because unreliable and non-valid items cannot be used to assess the structural model.

Table 1 contains information on the psychometric properties showing information on the items and their means, standard deviations (SD), p-values, average variance extracted (AVE), Cronbach's alpha (CA) and construct reliability (CR). This research involved eight constructs: involvement (INV), enthusiasm (ENT), attention (ATT), absorption (ABS) as IVs; e-WOM and behavioural intention to loyalty (BIL) as DVs; CE (CE) as the mediating variable; and CRM as the moderating variable. The means and the SDs show that the respondents are in agreement with the dimensions of the model. INV was measured with 9 items, ENT and ABS with 6 items each, CE with 8 items, CRM with 6 items while the 2 DVs were measure with 4 items each. Items that loaded below 0.6 were removed while those that loaded above were retained (**Table 1**). Removing the items that loaded poorly enhanced the R square values to 0.55 for CE; 0.66 at e-WOM; and 0.59 at BIL (**Figure 2**) which justified the removal of the items. The remaining items have t-values above 1.96 and p-values well below the 0.01 margin of error which is a justification for their retention. The three tools: AVE, CA, and CR are diagnostic measures of reliability and the thresholds are: 0.5, 0.6 and 0.7 respectively [105]. The information in **Table 1** show that apart from ABS with extracted variance of 0.495 and e-WOM with Cronbach's alpha of 0.570, our constructs are above the acceptable thresholds which implies that our scale has internal consistency and merit further analysis. The next is the discriminant validity analysis.

Discriminant validity is one item of construct validity that relates to the degree to which two constructs are distinctive; as every construct in analysis must be proved to have discriminant validity from all other scales [105]. Discriminant validity shows the extent to which summated scales are distinct. The correlation must be low less than 0.7 [106] to show that the constructs are distinct. High correlation between IV and DV have no problem but for IVs is indicative of collinearity. **Table 2** show high correlation of 0.757 between CRM and CE but these are the moderating and mediating variables respectively hence they are retained. Moreover, the full collinearity variance inflation factors (FCVIFs): INV = 1.982, ENT = 1.694, ATT = 3.143, ABS = 2.541, CE = 3.140, CRM = 2.816, e-WOM = 2.092 and BIL = 2.292 are all within acceptable range (3.3–5.0) and thus no construct need to be removed. Discriminant validity also implies that the diagonal correlations must be higher than all the others below it. All other correlations between the constructs are well within range showing that our scale has discriminant validity. We go to structural model assessment.

Figure 2a shows the mediation model of the study showing the four IVs, the mediator as CE and the two DVs. This is the first structural analysis before the moderation since our study is a moderated mediation. As shown in the figure, the coefficient of determination R square at CE is 0.55, which implies that 55% of the variances in CE are accounted for by the four IVs. The R square at e-WOM is 0.65 which implies that 65% of the variances in e-WOM are accounted for by the Four IVs plus the CE. Similarly, the R square at BIL is 0.59 and this implies that 59% of the variances in BIL are accounted for by the four IVS and the CE. Except for three effects/paths: INV → CE, ENT → BIL and ATT → BIL, all the other eleven effects/paths are statistically significant. We proceed to the moderated mediation model.

Figure 2b is the moderated mediation model of our study showing the four IVs, the Mediator, the two DVs and the moderator. With the inclusion of the moderator variable in the model, the R square at CE improved from 0.55 to 0.59, that of e-WOM decreased from 0.65 to 0.58 while that at BIL improved significantly from 0.59 to 0.77. This on the average show R square increase of 0.05 or 25% increase on the total

Items	Loadings	Mean	SD	t-values	p-values	AVE	CA	CR
INV1	0.727	3.8286	1.07019	15.114	<0.001	0.521	0.846	0.883
INV2	0.658	4.0429	1.24890	13.555	<0.001			
INV3	0.745	4.2714	.82791	15.534	<0.001			
INV4	0.782	3.8286	.94204	16.392	<0.001			
INV5	0.761	4.0286	.82877	15.896	<0.001			
INV6	0.660	4.3143	.68848	13.582	<0.001			
INV9	0.709	4.2143	.86135	14.711	<0.001			
ENT1	0.703	4.1571	.92150	14.566	<0.001	0.595	0.825	0.879
ENT3	0.691	4.2000	.74940	14.295	<0.001			
ENT4	0.844	4.1857	.76253	17.845	<0.001			
ENT5	0.907	4.2143	.77372	19.347	<0.001			
ENT6	0.685	4.6857	.80370	14.167	<0.001			
ATT1	0.754	2.9857	.93473	15.741	<0.001	0.613	0.839	0.887
ATT2	0.863	3.3714	.96011	18.301	<0.001			
ATT3	0.872	3.3286	.98297	18.506	<0.001			
ATT4	0.734	3.2714	.84503	15.284	<0.001			
ATT6	0.673	4.0429	.78371	13.890	<0.001			
ABS1	0.621	3.8429	.69041	12.713	<0.001	0.495	0.743	0.830
ABS2	0.715	3.7286	1.00031	14.850	<0.001			
ABS3	0.735	3.8000	.99569	15.291	<0.001			
ABS4	0.753	3.8571	.76240	15.713	<0.001			
ABS6	0.686	3.9429	.86123	14.189	<0.001			
CE2	0.860	3.4429	.84018	18.242	<0.001	0.623	0.877	0.908
CE3	0.654	3.7429	.85789	13.453	<0.001			
CE5	0.735	3.3571	.79460	15.299	<0.001			
CE6	0.857	3.5857	.88756	18.156	<0.001			
CE7	0.770	3.5000	.89170	16.105	<0.001			
CE8	0.839	3.4714	.92283	17.737	<0.001			
CRM1	0.766	3.2857	.98909	16.029	<0.001	0.589	0.762	0.849
CRM2	0.867	3.8571	.66181	18.389	<0.001			
CRM3	0.618	3.6714	.73241	12.646	<0.001			
CRM4	0.796	3.8000	.71014	16.727	<0.001			
e-WOM1	0.684	3.7286	.82791	14.130	<0.001	0.517	0.570	0.756
e-WOM2	0.636	3.5857	.99415	13.043	<0.001			
e-WOM3	0.673	3.4429	1.02457	13.888	<0.001			
e-WOM4	0.650	3.4429	.96702	13.360	<0.001			
BIL1	0.872	3.7857	.75498	18.517	<0.001	0.772	0.901	0.931
BIL2	0.811	3.8571	.81683	17.064	<0.001			

Items	Loadings	Mean	SD	t-values	p-values	AVE	CA	CR
BIL3	0.915	3.9286	.66258	19.548	<0.001			
BIL4	0.913	3.9000	.75984	19.507	<0.001			

Note: AVE = Average Variance Extracted, CA = Cronbach's Alpha, CR = Composite Reliability.

Table 1.
Psychometric properties of the construct.

variances explained. The implication of this is that the addition of the moderating variable to our model is justified as it enhanced variances explained. We proceed to test and validate our hypotheses using the effects/paths in the moderated mediation model.

Twenty-nine of the forty-four hypothesised relationships are statistically significant (**Table 3**). We assess the hypothesised effects under four groups: direct effects, moderated direct effects, indirect effects and moderated indirect effects/moderated mediation. **Direct Effects.** The effects: INV → CE (β = 0.097, and p-value = 0.03); ENT → CE (β =0.178, p-value = <0.001); ATT → CE (β = 0.487, p-value = <0.001) and ABS→CE (β = 0.095, p-value = 0.037) are statistically significant thus, H1a, H4a, H7a and H10a are supported respectively. The paths INV → e-WOM (β = −0.174, p-value = 0.001); ENT → e-WOM (β = 0.259, p-value = <0.001); ATT → e-WOM (β = 0.214, p-value = <0.001) and ABS→e-WOM (β = 0.327, p-value = <0.001) are all statistically significant. Based on these: H2a, H5a, H8a and H11a are validated respectively. The paths: INV → BIL (β = 0.110, p-value=,0.019); ENT → BIL (β = 0.106, p-value = 0.022) and ABS→BIL (β = 0.420, p-value = <0.001) are all statistically significant. With these, H3a, H6a, and H12a are validated respectively. The path ATT → BIL (β = −0.011, p-value = 0.415) is not significant thus, H9a is not supported. The paths from CE → e-WOM (β = 0.455, p-value = 0.001) and CE → BIL (β = 0.455, p-value = 0.001) are statistically significant and based these, H13a and H14a are supported. The Effect sizes for this group range from high effect sizes for ATT → CE = 0.352, ABS→BIL = 0.276 and CE → e-WOM = 0.263 while others show moderate to low effect sizes. **Moderated Direct Effects.** The following paths: CRM*INV → CE (β = 0.200, p-value = <0.001); CRM*ENT → CE (β = 0.201, p-value = <0.001); and CRM*ATT → CE (β = 0.200, p-value = <0.001) are statistically significant and validate H1b, H4b, and H7b respectively while CRM*ABS→CE (β = −0.005, p-value = 0.464) is not significant and thus, does not support H10b. The moderated effects: CRM*INV → e-WOM (β = 0.137, p-value = 0.005); CRM*ATT → -e-WOM (β = 0.178, p-value = <0.001); and CRM*ABS→e-WOM (β = 0.166, p-value- = <0.001) support H2b, H8b and H11b respectively while CRM*ENT → e-WOM (β = 0.053, p-value = 0.160) is not significant and does not support H5b. The moderated relationship CRM*INV → BIL (β = 0.282, p-value = <0.001) and CRM*ATT → BIL (β = 0.294, p-value = <0.001) support H3b and H9b respectively while CRM*ENT → BIL (β = −0.041, p-value = 0.219) does not support Hb. Also, CRM*ABS→BIL (β = −0.084, p-value = 0.057) does not support H11b. The moderated relationship CRM*CE → e-WOM (β = −0.069, p-value = 0.0.098) does not support H13b while CRM*CE → BIL (β = 0.123, p-value = 0.010) support H14b. All the constructs here show moderate to low effect sizes. It is also important to note that while five of the moderated direct show notable increases in their coefficients, others either show no serious improvement or had decreased coefficients. **Indirect Effects.**

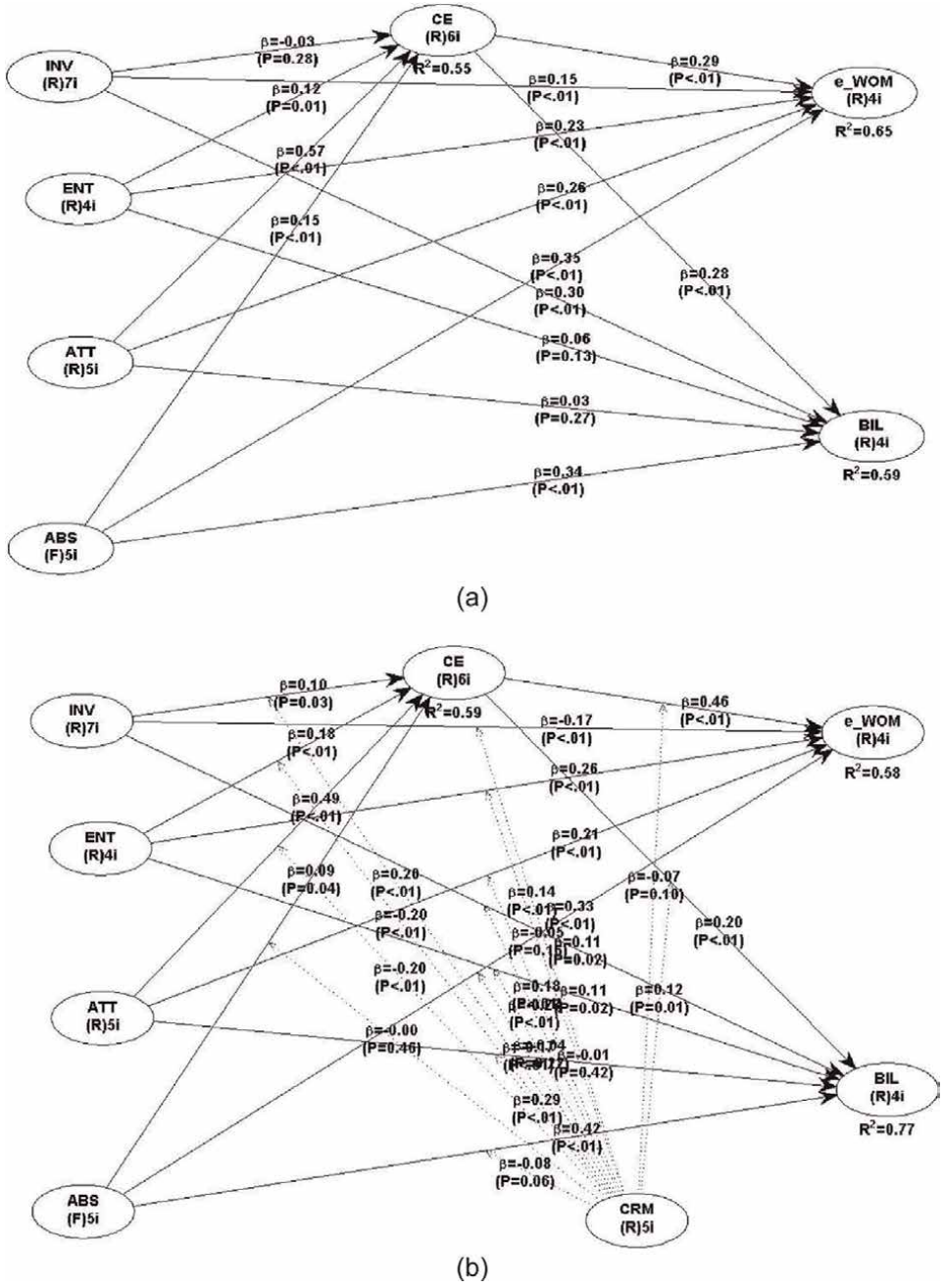

Figure 2.
a. the mediation model; b. moderated mediation model.

The hypothesised indirect relationship, INV → CE → e-WOM (β = −0.044, p-value- = 0.012) is statistically significant and supports H2c; while INV → CE → BIL (β = 0.019, p-value = 0.313) is not significant, hence H3c is not supported. The hypothesised indirect effect, ENT → CE → e-WOM (β = 0.081, p-value = 0.015) supports H5c; while ENT → CE → BIL (β = 0.036, p-value = 0.171) does not support

	INV	ENT	ATT	ABS	CE	CRM	e-WOM	BIL
INV	0.722							
ENT	0.539	0.771						
ATT	0.422	0.278	0.783					
ABS	0.468	0.451	0.660	0.704				
CE	0.252	0.343	0.511	0.505	0.789			
CRM	0.291	0.282	0.512	0.534	0.757	0.767		
e-WOM	0.306	0.218	0.630	0.571	0.551	0.528	0.661	
BIL	0.565	0.447	0.482	0.571	0.461	0.541	0.239	0.879

Table 2.
Fornell-Larcker discriminant validity analysis.

S/No	Paths (direct effects)	B	SE	Effect sizes	p-values	Decision
1.	INV → CE	0.097	0.053	0.030	0.033	Supported
2.	ENT → CE	0.178	0.052	0.085	<0.001	Supported
3.	ATT → CE	0.487	0.050	0.352	<0.001	Supported
4.	ABS→CE	0.095	0.053	0.054	0.037	Supported
5.	INV → e-WOM	−0.174	0.052	0.055	<0.001	Supported
6.	ENT → e-WOM	0.259	0.051	0.077	<0.001	Supported
7.	ATT → e-WOM	0.214	0.052	0.135	<0.001	Supported
8.	ABS→e-WOM	0.327	0.051	0.194	<0.001	Supported
9.	INV → BIL	0.110	0.053	0.062	0.019	Supported
10.	ENT → BIL	0.106	0.053	0.059	0.022	Supported
11.	ATT → BIL	−0.011	0.053	0.006	0.415	Not Supported
12.	ABS→BIL	0.420	0.050	0.276	<0.001	Supported
13.	CE → e-WOM	0.455	0.050	0.263	<0.001	Supported
14.	CE → BIL	0.201	0.052	0.110	<0.001	Supported
15.	CRM*INV → CE	0.200	0.052	0.109	<0.001	Supported
16.	CRM*ENT → CE	0.201	0.052	0.086	<0.001	Supported
17.	CRM*ATT → CE	0.200	0.052	0.045	<0.001	Supported
18.	CRM*ABS→CE	−0.005	0.053	0.001	0.464	Not Supported
19.	CRM*INV → e-WOM	0.137	0.052	0.034	0.005	Supported
20.	CRM*ENT → e-WOM	0.053	0.053	0.013	0.160	Not Supported
21.	CRM*ATT → e-WOM	0.178	0.052	0.009	<0.001	Supported
22.	CRM*ABS→e-WOM	0.166	0.052	0.015	<0.001	Supported
23.	CRM*INV → BIL	0.282	0.051	0.127	<0.001	Supported
24.	CRM*ENT → BIL	−0.041	0.053	0.019	0.219	Not Supported
25.	CRM*ATT → BIL	0.294	0.051	0.113	<0.001	Supported
26.	CRM*ABS→BIL	−0.084	0.053	0.022	0.057	Not Supported

S/No	Paths (direct effects)	B	SE	Effect sizes	p-values	Decision
27.	CRM*CE → e-WOM	−0.069	0.053	0.017	0.098	Not Supported
28.	CRM*CE → BIL	0.123	0.053	0.037	0.010	Supported
Indirect Effects						
29.	INV → CE → e-WOM	0.044	0.038	0.014	0.012	Supported
30.	INV → CE → BIL	0.019	0.038	0.011	0.303	Not Supported
31.	ENT → CE → e-WOM	0.081	0.037	0.024	0.015	Supported
32.	ENT → CE → BIL	0.036	0.038	0.020	0.171	Not Supported
33.	ATT → CE → e-WOM	0.222	0.037	0.140	<0.001	Supported
34.	ATT → CE → BIL	0.098	0.037	0.052	0.005	Supported
35.	ABS→CE → e-WOM	0.043	0.038	0.026	0.126	Not Supported
36.	ABS→CE → BIL	0.019	0.038	0.012	0.307	Not Supported
37.	CRM*INV → CE → e-WOM	0.091	0.037	0.023	0.008	Supported
38.	CRM*INV → CE → BIL	0.040	0.038	0.018	0.143	Not Supported
39.	CRM*ENT → CE → e-WOM	0.092	0.037	0.022	0.007	Supported
40.	CRM*ENT → CE → BIL	−0.040	0.038	0.018	0.141	Not Supported
41.	CRM*ATT → CE → e-WOM	0.091	0.037	0.004	0.008	Supported
42.	CRM*ATT → CE → BIL	−0.-040	0.038	0.015	0.143	Not Supported
43.	CRM*ABS→CE → e-WOM	−0.002	0.038	0.000	0.477	Not Supported
44.	CRM*ABS→CE → BIL	−0.001	0.038	0.000	0.490	Not Supported

Table 3.
Assessing the structural model.

H6c. The indirect paths: ATT → CE → e-WOM (β = 0.222, p-value = <0.001) and ATT → CE → BIL (β = 0.098, p-value = 0.005) support H8c and H9c respectively. Indirect effects: ABS→CE → e-WOM (β = 0.043, p-value = 0.126) and ABS→CE → BIL (β = 0.019, p-value = 0.307) are not statistically significant thus H11c and H12c are not supported. All the constructs here show moderate to low effect sizes.
Moderated Indirect Effects. The moderated CRM*INV → CE → e-WOM (β = 0.091, p-value = 0.008) is significant and supports H2d while CRM*INV → CE → BIL (β = 0.040, p-value = 0.143) is not significant and H3d is therefore not supported. The part, CRM*ENT → CE → e-WOM (β = 0.092, p-value = 0.007) is statistically significant and supports H5d while CRM*ENT → CE → BIL (β = −0.040, p-value = 0.141) is not significant, thus H6d is not supported. The moderated indirect relationship CRM*ATT → CE → e-WOM (β = 0.091, p-value = 0.008) is significant, thus H9d is supported. The parts: CRM*ATT → CE → BIL (β = −0.040, p-value = 0.143); CRM*ABS→CE → e-WOM (β = −0.002, p-value = 0.477); and CRM*ABS→CE → BIL (β = −0.001, p-value = 0.490) are not statistically significant, thus H9d, H11d and H12d are respectively not validated. Six of the eight items in this category show low effect sizes while two have no effect sizes. In terms of the coefficients, the first three items show notable increases in their coefficients while the others show decreases with respect to their coefficients.

6.1. Robustness check

The hypothesised relationships: direct, moderated direct, indirect and moderated indirect effects were tested and analysed using WarpPLS software version 7 and the algorithm used was the PLS Regression. To check the robustness of the findings, we reanalysed the data using the robustness algorithm and the results were not different from the original analysis, thus confirming that our results are robust.

7. Conclusions and implications

This chapter is on CE behaviour in the hospitality industry, a sector that was hard hit by the COVID-19 pandemic. Vivek et al. [34] believe that CE has hypothetical roots within the extended domain of relationship marketing that emphasise the notions of interactivity and customer experience. The imperative of researching and studying CE as noted in the literature is that it helps companies especially multinationals in designing new products and in engaging and managing old and new customers. Pansari and Kumar [3] designed a model which they tested and validated in the US and affirmed that companies around the world could benefit immensely from CE researches. In the present study which is on antecedents and consequences of CE in the hospitality sector, we reviewed literature from the CE and CRM noting as evidenced in the literature that engagement can only take place when relationship(s) have been established. Hence, we proposed a conceptual model with involvement, enthusiasm, attention and absorption as IVs and antecedents; CE as mediator variable and outcomes: e-WOM and BIL as DVs, while CRM is a moderating construct. The import of this is based on the maxim that CE has roots within the extended domain of relationship marketing that emphasise the notions of interactivity and customer experience [34]. The model also investigated the moderating effects of CRM on the direct and indirect effects of the antecedents on e-WOM as well as BIL. The implication of this is that the hospitality industry has some peculiar characteristics that include two-way communication and relationship building. The model was tested with WarpPLS version 7 and we collected from 350 respondents majorly from different southern of Nigeria. We first ran the analysis without the moderator and second with the CRM moderating variable. With the inclusion of the moderator variable in the model, the R square at CE improved from 0.55 to 0.59, that of e-WOM decreased from 0.65 to 0.58 while that at BIL improved significantly from 0.59 to 0.77. That is to say that R square increased by 4% at CE; decreased by 7% at the e-WOM and increased by 18% at BIL. This on the average show R square increase of 0.05 or 5% increase on the average of the variances explained. Some of the direct, direct-moderated, indirect and moderated indirect effects show noticeable increases in their coefficients while others show decrease but on the whole CRM moderate CE which mediate the antecedents and consequences CE. The implication of this is that the addition of the moderating variable to our model is justified as it enhanced variances explained. Mintz [5] emphasises the need for businesses to map out strategies to win back customers post COVID-19 as consumers have shifted their focus from a hedonic, enjoyment-focused to a utilitarian, goals-based consumption procedure. The implication of this is that in the process of managing customers, marketers need to urgently deploy new strategies to better engage their everyday exchanges with their consumers' new behaviour. Mintz [5] proposed a COUNTER COVID framework for engaging firms must follow in addressing their customer's new behaviour: that

marketers need to create emotional connections with their customers; firms should demonstrate their value to their customers; and should expand their digital footprints to better reach their customers. Firms in the hospitality sector should increase customer trial and retention, and engage more effective and efficient digital methods. To engage customers meaningfully, operators of hospitality sector businesses need to maintain strong websites and employ the various social media channels to build relationships with customers and at the time engage them in this post COVID-19 era giving the changing consumer behaviours occasioned by the pandemic. There is also the need to address the security concerns associated with deadly pandemic even as it has subsided. This work is limited to the hospitality sector and could be repeated in other sectors as it should serve as spring board for further studies in the emergent customer management phenomenon. This moderated mediation is contribution to the literature on engagement marketing and will spur other researchers in this important area of customer management as well as the hospitality sector.

Author details

Titus Chukwuemezie Okeke
Department of Marketing, Nnamdi Azikiwe Univeristy, Awka, Nigeria

*Address all correspondence to: tc.okeke@gmail.com; tc.okeke@unizik.edu.ng

References

[1] Pansari A, Kumar V. In: Palmatier RW, Kumar V, Harmeling CM, editors. CE Marketing. Cham, Switzerland: Palgrave Macmillan; 2018

[2] Kotler P, Armstrong G, Opresnik MO. Principles of Marketing. 17th Global ed. Harlow, United Kingdom: Pearson Education Limited; 2018

[3] Pansari A, Kumar V. CE: The construct, antecedents, and consequences. Journal of the Academy of Marketing Science. Springer Nature. 2016;**45**:294-311. DOI: 10.1007/s11747-016-0485-6

[4] Dessart L, Veloutsou C, Morgan-Thomas A. CE in online brand communities: A social media perspective. Journal of Product and Brand Management. 2015;**24**(1):28-42

[5] Mintz O. The Post-Pandemic Business Playbook: Customer-Centric Solutions to Help your Firm Grow. Singapore: Palgrave Macmillan; 2021

[6] Coulter RA, Price LL, Feick L. Rethinking the origins of involvement and brand commitment: Insights from post-socialist Central Europe. Journal of Consumer Research Inc. 2003;**30**:151-169

[7] So KKF, King C, Sparks B. CE with tourism brands: Scale development and validation. Journal of Hospitality & Tourism Research. 2014;**38**(3):304-329. DOI: 10.1177/1096348012451456 International Council on Hotel, Restaurant and Institutional Education, 2014

[8] Konttinen J, Karjaluoto H, Shaikh AA. The antecedents and outcomes of online consumer brand experience. In: Niininen Q, editor. Contemporary Issues in Digital Marketing. Milton Park, Abingdon, Oxon: Routledge Publishers; 2022

[9] Sprott D, Czellar S, Spangenberg E. The importance of a general measure of brand engagement on market behaviour: Development and validation of a scale. Journal of Marketing Research. 2009;**46**: 92-104

[10] Dazagbyilo YYK, Shang SP, Emmanuel OC, Kir KF. Customer relationship management as a tool for improving customer loyalty in the banking industry ... open. Journal of Business and Management. 2021;**9**: 2299-2311. DOI: 10.4236/ojbm.2021.95124

[11] Chan B, Mackenzie M. Manual on Module II: Introduction to Hospitality. The Government of the Hong Kong Special Administrative Region: Tourism and Hospitality Studies; 2013

[12] Rodriguez M, Peterson RM, Krishnan V. Social media's influence on business-to-business sales performance. Journal of Personal Selling & Sales Management. 2012;**32**:365-378

[13] Central Bank of Nigeria (CBN). Statistical Bulletin. Abuja: Central Bank of Nigeria Publications; 2020 Online Edition. Available from: http://statistics.cbn.gov.ng/cbn-onlinestats/DataBrowser.aspx

[14] United Nations World Tourism Organization (UNWTO). International Tourism Highlights 2019 Edition. Madrid, Spain: UNWTO; 2019. Available from: https://www.e-unwto.org/doi/pdf/10.18111/9789284421152

[15] World Travel and Tourism Council (WTTC). Travel & Tourism Economic Impact. London: WTTC; 2021

[16] World Economic Forum. The Travel & Tourism Competitiveness Report 2019: Travel and Tourism at a Tipping Point. Geneva: The World Economic Forum; 2019

[17] Barrows CW, Powers T, Reynolds D. Introduction to Management in the Hospitality Industry. Tenth ed. Hoboken, New Jersey: John Wiley & Sons, Inc; 2012

[18] Manfreda J, King A. A day in the life of guest experience stagers: The Saffire Freycinet experience. In: Sigala M et al., editors. Case Based Research in Tourism, Travel, Hospitality and Events. Gateway East, Singapore: Springer Nature Singapore Pte Ltd; 2022. DOI: 10.1007/978-981-16-4671-3

[19] Naumann K, Bowden J, Gabbott M. Expanding CE: The role of negative engagement, dual valences and contexts. European Journal Marketing. 2020;**54**: 1469-1499

[20] Mollen A, Wilson H. Engagement, telepresence and interactivity in online consumer experience: Reconciling scholastic and managerial perspectives. Journal of Business Research. 2010;**63**: 919-925

[21] Johnston KA. Toward a theory of social engagement. In: Johnston, Taylor, editors. The Handbook of Communication Engagement. Hoboken, USA: John Wiley & Sons, Inc; 2018

[22] Spender JC. Making knowledge the basis of a dynamic theory of the firm. Strategic Management Journal. 1996; **17**(S2):45-62. DOI: 10.1002/smj.4250171106

[23] Weitzl W, Einwiller S. CE in the digital era: Its nature, drivers, and outcomes. In: Johnston, Taylor, editors. The Handbook of Communication Engagement. Hoboken, USA: John Wiley & Sons, Inc; 2018

[24] Maslowska E, Malthouse EC, Collinger T. The CE ecosystem. Journal of Marketing Management. 2016;**32**: 469-501

[25] Jaakkola E, Alexander M. The role of CE behaviour in value co-creation: A service system perspective. Journal of Service Research. 2014;**17**:247-261

[26] Van Doorn J, Lemon KN, Mittal V, Nass S, Pick D, Pirner P, et al. CE behaviour: Theoretical foundations and research directions. Journal of Service Research. 2010;**13**(3):253-266

[27] Kumar V, Aksoy L, Donkers B, Venkatesan R, Wiesel T, Tillmanns S. Undervalued or overvalued customers: Capturing total CE value. Journal of Service Research. 2010;**13**(3):297-310

[28] Vivek SD, Beatty SE, Dalela V, Morgan RM. A generalized multidimensional scale for measuring CE. Journal of Marketing Theory and Practice. 2014;**22**:401-420

[29] Hollebeek L, Srivastava R, Chen T. S-D logic–informed CE: Integrative framework, revised fundamental propositions, and application to CRM. Journal of the Academy of Marketing Science. 2019;**47**:161-185

[30] Qui L, Chen X, Lee TJ. How can the celebrity endorsement effect help CE? A case of promoting tourism products through live streaming. Sustainability. 2021;**13**:8655. DOI: 10.3390/su1315865

[31] Bowden JLH. The process of CE: A conceptual framework. Journal of Marketing Theory and Practice. 2009; **17**(1):63-74

[32] Brodie RJ, Hollebeek LD, Juric B, Ilic A. CE: Conceptual domain, fundamental propositions, and implications for research. Journal of Service Research. 2011;**14**:252-271

[33] Hollebeek LD. Demystifying customer brand engagement: Exploring the loyalty nexus. Journal of Marketing Management. 2011;**27**(7/8):1-23

[34] Vivek SD, Beatty SE, Morgan RE. CE: Exploring relationships beyond purchase. Journal of Marketing Theory and Practice. 2012;**20**(2) Spring:127-145

[35] Buttle F, Maklan S. Customer Relationship Management: Concepts and Technologies. Fourth ed. Abingdon, Oxon: Routledge, Taylor and Francis Group; 2019

[36] France C, Merrilees B, Miller D. An integrated model of customer- brand engagement: Drivers and consequences. Journal of Brand Management. 2016;**23**: 119-136

[37] Kahn WA. Psychological conditions of personal engagement and disengagement at work. Academy of Management Journal. 1990;**33**(4): 692-724

[38] Rothbard NP. Enriching or depleting? The dynamics of engagement in work and family roles. Administrative Science Quarterly. 2001;**46**:655-684

[39] Demerouti E, Bakker AB. The Oldenburg burnout inventory: A good alternative to measure burnout and engagement. In: Halbesleben JRB, editor. Handbook of Stress and Burnout in Health Care. Hauppauge, NY: Nova Science; 2008. pp. 65-78

[40] Schaufeli WB, Martinez IM, Pinto AM, Salanova M, Bakker AB. Burnout and engagement in university students: A cross-national study. Journal of Cross-Cultural Psychology. 2002;**33**: 464-481

[41] Schaufeli WB, Bakker AB. Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. Journal of Organizational Behaviour. 2004;**25**:293-315

[42] Bijmolt THA, Leeflang PSH, Block F, Eisenbeiss M, Hardie BGS, Lemmens A, et al. Analytics for CE. Journal of Service Research. 2010;**13**:341-356

[43] Verhoef PC, Reinartz W, Krafft M. CE as a new perspective in customer management. Journal of Service Research. 2010;**13**:247-252

[44] Shevlin R. CE Is Measurable. Gig Harbor, WA 98335: The Financial Brand; 2007. Available from: http://marketing roi.wordpress.com/2007/10/02/custome r-engagement-is-measurable/

[45] Patterson P, Yu T, de Ruyter K. Understanding CE in services. In: Advancing Theory, Maintaining Relevance, Proceedings of ANZMAC 2006 Conference, Brisbane: ANZMAC; 2006. pp. 1-4

[46] Marketing Science Institute (MSI). 2010-2012 Research priorities. Cambridge, MA 02138 USA: Marketing Science Institute; 2010

[47] Hollebeek LD. Demystifying CE: Toward the development of a conceptual model. In: Paper Presented at the ANZMAC 2009 Conference. Melbourne, Australia: Monash University; 2009

[48] Vivek SD. A scale of CE (Unpublished doctoral dissertation). University of Alabama, Tuscaloosa. 2009

[49] Litvin SW, Goldsmith RE, Pan B. Electronic word-of-mouth in hospitality and tourism management. Tourism Management. 2008;**29**:458-468

[50] Ye Q, Law R, Gu B. The impact of online user reviews on hotel room sales. International Journal of Hospitality Management. 2009;**28**: 180-182

[51] Sparks BA, Browning V. The impact of online reviews on hotel booking intentions and perception of trust. Tourism Management. 2009;**32**: 1310-1323

[52] Crotts JC. Consumer decision making and prepurchase information search. In: Mansfield Y, Pizam A, editors. Consumer Behaviour in Travel and Tourism. Binghamton, NY: Haworth Press; 1999. p. 149168

[53] Wang Y, Fesenmaier DR. Towards understanding members' general participation in and active contribution to an online travel community. Tourism Management. 2004;**25**:709-722

[54] Funk DC, James J. The psychological continuum model: A conceptual framework for understanding an individual's psychological connection to sport. Sport Management Review. 2001; **4**:119-150

[55] Bozbay Z. Customer management: From past to the future. In: Sekerkaya A, editor. Contemporary Issues in Strategic Marketing. Istanbul – Turkey: Istanbul University Press; 2021

[56] Meena P, Sahu P. Customer relationship management research from 2000 to 2020: An academic literature review and classification. Vision. 2021;**25** (2):136-158. Available from: journals. sagepub.com/home/vis. DOI: 10.1177/ 0972262920984550

[57] Kumar V, Reinartz W. Customer Relationship Management: Concept, Strategy, and Tools. Third Ed. GmbH Germany: Springer-Verlag, part of Springer Nature; 2018

[58] Grabner KS, Moedritscher G. Alternative approaches toward measuring CRM. Paper presented at the 6th research Conference on relationship marketing and customer relationship management. Atlanta; 2002. pp. 1-16

[59] Chen IJ, Popovich K. Understanding customer relationship management (CRM): People, process and technology. Business Process Management. 2003; **9**(5):672-688

[60] Tamosiuniene R, Jasilioniene R. Customer relationship management as business strategy appliance: Theoretical and practical dimensions. Journal of Business Economics and Management. 2007;**8**(1):69-78

[61] Dutot V. A new strategy for CE: How do French firms use social CRM? International Business Research. 2013; **6**(9):54-67

[62] Shokohyar S, Tavalaee R, Karamatnia K. Identifying effective indicators in the assessment of organizational readiness for accepting social CRM. International Journal of Information, Business and Management. 2017;**9**(4):209-226

[63] Choudhury MM, Harrigan P. CRM to social CRM: The integration of new technologies into customer relationship management. Journal of Strategic Marketing. 2014;**22**(2):149-176

[64] Dewnarain S, Ramkissoon H, Mavondo F. Social customer relationship management: An integrated conceptual framework. Journal of Hospitality

Marketing & Management. 2019;**28**(2): 172-188

[65] Greenberg P. Customer Relationship Management (CRM) at the Speed of Light. New York: The McGraw-Hill Company; 2010

[66] Zablah AR, Bellenger DN, Johnston WJ. An evaluation of divergent perspectives on customer relationship management: Towards a common understanding of an emerging phenomenon. Industrial Marketing Management. 2004;**33**:475-489

[67] Coltman T. Why build a customer relationship management capability? Journal of Strategic Information Systems. 2007;**16**:301-320

[68] Hollebeek LD. The CE/value interface: An exploratory investigation. Australasian Marketing Journal (AMJ). 2013;**21**(1):17-24. DOI: 10.1016/j.ausmj.2012.08.006

[69] Borges B. Marketing 2.0: Bridging the gap between seller and buyer through social media marketing. Wheatmark Publishers; 2009

[70] Stone M, Woodcock N. Social intelligence in CE. Journal of Strategic Marketing. London: Routledge; 2013; **21**(5):394-401

[71] Sashi CM. CE: Buyer–seller relationships and social media. Management Decision. 2012;**50**(2): 253-272

[72] Hristov D, Ramkissoon H. Leadership in destination management organizations. Annals of Tourism Research. 2016;**61**:230-234

[73] Wu SI, Lu CL. The relationship between CRM, RM, and business performance: A study of the hotel industry in Taiwan. International Journal of Hospitality Management. 2012;**31**(1): 276-285

[74] Woodcock N, Green A, Starkey M). Social CRM as a business strategy. Journal of Database, Marketing & Customer Strategy Management. 2011; **18**(1):50-64

[75] Lemon KN, Verhoef PC. Understanding customer experience throughout the customer journey. Journal of Marketing. 2016;**80**(6):69-96

[76] Van Hagena M, Brona M. Enhancing the experience of the train journey: Changing the focus from satisfaction to emotional experience of customers. Transportation Research Procedia. 2013;**1**:253-263 41st European Transport Conference, Frankfurt, Germany

[77] Aaker DA, Joachimsthaler E. Brand Leadership. New York, NY: The Free Press; 2000

[78] Mulyono H, Situmorang SH. E-CRM and loyalty: A mediation effect of customer experience and satisfaction in online transportation of Indonesia. Academic Journal of Economic Studies. 2018;**4**(3):96-105

[79] Boohene R, Agyapong GKQ. Analysis of the antecedents of customer loyalty of telecommunication industry in Ghana: The case of Vodafone (Ghana). International Business Research. 2011; **4**(1):229-240

[80] Kim HS, Yoon CH. Determinants of subscriber churn and customer loyalty in the Korean mobile telephony market determinants of subscriber churn and customer loyalty in the Korean mobile telephony market. Telecommunications Policy. 2004;**28**:751765

[81] Wirtz J, Loveloch C. Essentials of Services Marketing. Essex, England: Pearson Education Limited; 2018

[82] Anderson H, Jacobsen PN. Creating loyalty: Its strategic importance in your customer strategy. In: Brown SA, editor. Customer Relationship Management. Ontario: John Wiley; 2000

[83] Oliver RL. Whence consumer loyalty. Journal of Marketing. 1999;**63**: 33-44

[84] Leong MK, Syuhaily O, Laily P. Relationship between consumer involvement and CE with consumer loyalty in tourism and hospitality industry. International Journal of Academic Research in Economics and Management Sciences. 2017;**6**(4):72-91

[85] Reichheld FF. Learning from customer defections. Harvard Business Review. 1996;**74**:56-69

[86] Srinivasan SS, Anderson R, Ponnavolu K. Customer loyalty in e-commerce: An exploration of its antecedents and consequences. Journal of Retailing. 2002;**78**(1):41-50

[87] Shankar V, Smith AK, Rangaswamy A. Customer satisfaction and loyalty in online and offline environments. International Journal of Research in Marketing. 2003;**20**(2): 153-175

[88] Hapsari R, Clemes MD, Dean D. The impact of service quality, CE and selected marketing constructs on airline passenger loyalty. International Journal of Quality and Service Sciences. 2017; **9**(1):21-40. DOI: 10.1108/IJQSS-07-2016-0048

[89] Harris LC, Goode MMH. The four levels of loyalty and the pivotal role of trust: A study of online service dynamics. Journal of Retailing. 2004; **80**(2):139-158. DOI: 10.1016/j.jretai.2004.04.002

[90] Rather RA, Sharma J. Barnd loyalty with hospitality brands: The role of customer brand identification, brand satisfaction, and brand commitment. Pacific Business Review International. 2016;**1**(3):76-86

[91] Brodie RJ, Illic A, Juric B, Hollebeek L. CE in a virtual brand community: An exploratory analysis. Journal of Business Research. 2013;**66**:105-114

[92] Khan I, Rahman Z, Fatma M. The role of customer brand engagement and brand experience in online banking. International Journal of Bank Marketing. 2016;**34**(7):1025-1041

[93] Sigala M. Designing Servicescape and experience with art: Learnings from the d'Arenberg cube, Australia. In: Sigala M et al., editors. Case Based Research in Tourism, Travel, Hospitality and Events. Gateway East, Singapore: Springer Nature Singapore Pte Ltd; 2022. DOI: 10.1007/978-981-16-4671-3

[94] Arnould E, Price L, Zinkhan G. Consumers. New York, NY: McGraw-Hill/Irwin; 2004

[95] Avidar R. Engagement, interactivity, and diffusion of innovations: The case of social businesses. In: Johnston, Taylor, editors. The Handbook of Communication Engagement. Hoboken, USA: John Wiley & Sons, Inc; 2018

[96] Chu S-C, Kim Y. Determinants of CE in electronic word-of-mouth (e-WOM) in social networking sites. International Journal of Advertising. 2011;**30**(1):47-75

[97] Serra-Cantallops A, Ramon-Cardona J, Salvi F. The impact of positive

emotional experiences on e-WOM generation and loyalty. Spanish Journal of Marketing – ESIC. 2018;**22**(2): 142-162. DOI: 10.1108/SJME-03-2018-0009

[98] Chen H, Papazafeiropoulou A, Chen T, Duan Y, Liu H. Exploring the commercial value of social networks: Enhancing consumers' brand experience through Facebook pages. Journal of Enterprise Information Management. 2014;**27**(5):576-598. DOI: 10.1108/JEIM-05-2013-0019

[99] Rather RA. Consequences of CE in service marketing: An empirical exploration. Journal of Global Marketing. 2018;**0**(0):1-20. DOI: 10.1080/08911762.2018.145995

[100] Dwivedi A. A higher-order model of consumer brand engagement and its impact on loyalty intentions. Journal of Retailing and Consumer Services. 2015; **24**:100-109

[101] Mackenzie SB, Podsakoff PM. Common method bias in marketing: Causes, mechanisms, and procedural remedies. Journal of Retailing. 2012; **88**(4):542-555

[102] Koch N. WarpPLS user manual: version 7.0. ScriptWarp Systems, Laredo, Texas, USA. 2020. Online Edition. Available from: www.scriptwarp.com

[103] Hair JF, Risher JJ, Sarstedt M, Ringle CM. When to use and how to report the results of PLS-SEM. European Business Review. 2019;**31**(1):2-24

[104] Salem SF. Do relationship marketing constructs enhance consumer retention? An empirical study within the hotel industry. Sage Open. journals.sagepub.com/home/sgo. 2021. pp. 1-12. DOI: 10.1177/21582440211009224

[105] Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. United Kingdom: Cengage Learning, EMEA; 2019

[106] Pallant J. SPSS Survival Manual. 7th ed. Berkshire, England: Open University Press; 2020

Section 3

Consumer Protection and Sustainability

Chapter 10

A Consumer Behavior Perspective of Adopting Mobile Contact Tracing Apps in a Public Health Crisis: Lessons from ABTraceTogether for COVID-19 Pandemic

Glen Farrelly, Houda Trabelsi and Mihail Cocosila

Abstract

Responses to the COVID-19 pandemic included m-Health innovations, such as contact tracing and exposure notification applications to track virus exposure. Such apps were released by over 45 international governments throughout 2020, becoming the first m-Health innovation with such widescale deployment. Most regions relied on voluntary adoption, and many failed to receive a critical mass of users. Some of these apps can track and share user's locations, social contacts, and health information, which sparked concerns and misperceptions about the privacy and security of user data. It is important to understand consumer behavior and adoption challenges based on people's perceptions of benefits, barriers, and risks. To investigate this, we sent an online questionnaire to over 600 participants with open-ended questions asking about their experience with one such app, ABTraceTogether. This chapter covers qualitative findings regarding device and application-level issues participants identified as barriers to their adoption and continued usage of the app, which are accessibility, battery life, downloading challenges, device memory, network connectivity and costs, operating system compatibility, performance issues, and usability. Insight on consumer behavior gained from this study can guide m-Health design and promotion to aid future health crises and personal wellbeing.

Keywords: contact tracing application, exposure notification application, COVID-19, technology adoption, user experience, m-health, mobile application

1. Introduction

In response to the tremendous human and economic costs of the COVID-19 pandemic, many governments around the world sought ways to curtail the spread of the disease. The pandemic spurred innovation and changes to consumer behavior in

dramatic ways. One such change is the widescale adoption of m-Health applications. m-Health refers to mobile applications that promote an individual's physical and mental wellbeing. The benefits of m-Health to consumers include their "portability (anywhere), immediacy (any time) and convenience (easy access)" ([1], p. 245). m-Health applications are used, for example, to help track the location of dementia patients [2], to allow people with diabetes to monitor their diet [3], for people with disabilities or environmental allergies to avoid barriers or health risks [4], and other purposes. Within health crises contexts, prior to the COVID-19 application, mobile applications were used in limited capacities for tracking influenza [5] and ebola [6], but the scale of use of contact tracing apps was unprecedented prior to COVID-19. With over 45 countries launching a contact tracing app [7], this is the most widescale deployment of m-Health technology.

It can thus be seen that the COVID-19 pandemic providing a test ground for widescale adoption of an m-Health application. In a post-pandemic world, lessons learned from the challenges and responses to this disease can be useful to understand consumer behavior regarding the challenges surrounding adoption and use of m-Health applications, as well as any digital media that collect data about consumers' location, social contacts, and personal data, such as health status. It is worthwhile to determine what limited the uptake of contact tracing applications to ensure that these issues are fully understood and can be addressed not only for future crises management, such as pandemic or public health emergencies, but also for a wide range of individual health and wellness issues. Using a consumer behavior research perspective to study these issues is important as the individual adoption of a non-mandatory information technology application can be regarded as a decision to purchase a product or service based on their value (i.e., the difference between anticipated benefits and costs) perceived by potential consumers.

Despite the urging of government officials and marketing campaigns, the adoption rates of contact tracing often failed to receive critical mass levels in most regions. Although studies have been conducted on the adoption challenges of contact tracing apps (as covered in the literature review) most of these studies utilized methods that limited the ability of participants to identify their own issues and provide their experiences and beliefs in their own words. Insight gained from qualitative participant data is valuable as it can provide a more complete picture of the overall factors and context influencing user adoption.

The use of contact tracing apps for COVID-19 was voluntary in most jurisdictions. One major drawback of optional usage is that it can be difficult to obtain a critical mass of users. The apps only work if the people users come in contact with are also running the same app at the same time, hence a critical mass of users is needed for the app to be effective. Yet, adoption rates for contact tracing worldwide have been lower than governments hoped for, with one study finding a 22.9% adoption rate in 21 countries [8]. High adoption rates are difficult to accomplish, even in countries with populations with widespread smartphone ownership, given the difficulty of overcoming data security, surveillance, and privacy concerns [9], as well as informing and marketing to the public about the existence of the app, and convincing them to download it and use it continuously. It is therefore crucial to gain an understanding of adoption concerns.

Our study focuses on the adoption and usage challenges surrounding one contact tracing app, ABTraceTogether [10]. The app was launched for iPhone and Android smartphones by the province of Alberta, Canada in April 2020, many months before Canada launched its national contact tracing application. ABTraceTogether uses a

proximity-based approach via Bluetooth and decentralized data storage. The app anonymously encrypts and records on a user's device all other app users that a person comes in contact with for 15 minutes or longer within a two-meter radius. Infected app users are asked to share their log of anonymous contacts with public health officials so that the contacts can be informed of their exposure risk. ABTraceTogether was the first contact tracing app to be launched in North America [11]. Alberta is a province in western Canada with a population of 4 million centered in the urban centers of Calgary and Edmonton. The app was built through a partnership between the provincial government and the private sector and was based on the open-source code provided by Singapore. Despite government and media marketing efforts for the app, within several weeks after launching the app, only about 5% of Albertans had downloaded it [12]. As of January 2021, it had been downloaded by 7.5% of the Alberta population, and it had led to the detection of only 32 COVID-19 cases [13].

Several weeks after becoming available to the populace of Alberta, we launched a questionnaire to approximately 300 users and 300 non-users of the application to understand their motivations for either using or not using ABTraceTogether. From the users of the app, we wanted to learn their motivations and what worked for them, as well as any installation or usage barriers or concerns. From the non-users, we wanted to learn what factors discouraged or prevented them from using the app or caused them to stop using it. This paper reports on the qualitative findings from our study regarding application and device related issues. These findings reveal a range of issues that both encouraged and stymied the adoption and continued usage of the app. Findings from our study detail the microcosm of issues at play that affect whether consumers will sufficiently adopt a technological innovation. Despite the possible health benefits and social value of m-Health, user barriers and concerns must be considered to help achieve widespread adoption and continued usage. It is important for application developers, promoters, and sponsors to address adoption and usage challenges that can result in insufficient uptake or discontinued usage.

2. Background

Contact tracing is an established practice involving public health workers manually contacting people who were exposed to an infected individual [14]. They inform people of their potential exposure and encourage them to get tested and to quarantine, thus limiting the spread of an infectious disease. This manual approach is limited, however, as it requires extensive skilled labour to do the contact tracing interviews and it relies on infected people remembering where they have been and whom they have been in contact with [15]. Expedient contact tracing is crucial with COVID-19 as half or more of infections occur prior to any symptoms appearing [16]. Yet the vast number of COVID-19 infections made it very difficult for public health workers to keep up with manual contract tracing [16]. As a result, many governments decided to use technology-based solutions, such as smartphone applications, to assist with contact tracing. In March 2020, Singapore was the first government to launch a contact tracing app for COVID-19 [17]. Contact tracing apps have two main benefits. First, they record all contacts an individual has with other app users so there is not a reliance on people's limited memory [15]. Second, they scale up to vast multitudes of users and provide results faster than human-only processes [16].

These apps use various methods for tracking possible virus exposures, but most use either Global Positioning System or wireless signals (e.g., Bluetooth).

Bluetooth-based applications are known as proximity-based apps as they do not track the user's location but rather the device's proximity (generally two meters) to other devices with the app installed after a designated number of minutes [14]. The Bluetooth approach became the favored approach in Western nations [14] as it ensures the privacy of users and their contacts by logging other nearby app users anonymously. With contact tracing applications apps, such as ABTraceTogether, if a user becomes infected, they are requested to report this information to the app [10]. The app either sends an anonymous alert to those who have come in contact with that individual (as with "exposure notification apps") or alerts a public health agency who manually conducts contact tracing using the supplied contact data (as with "contact tracing apps"). For the purposes of this article, the term contact tracing app will be used to encompass the various types of similar apps.

The proximity-based approach has limitations as it can generate incorrect or incomplete results, such as requiring a longer time for devices to be in proximity than is needed for virus transmission. As well, Bluetooth signals can travel through walls even though viruses cannot [18]. Another important distinction between contact tracing apps is whether the app uses a centralized or decentralized architecture and data storage model [19]. With centralized applications, the user's application data is stored on a shared, external server (such as from the app sponsor), which entails greater data privacy concerns. Decentralized applications store user's data only on the user's device, thus limiting risks of third-party surveillance or hacking of private data.

From the first launch of COVID-19 contact tracing apps, discourse in popular media and among pundits often centered around privacy and surveillance concerns. Despite some skepticism, contact tracing apps have made a meaningful contribution to limiting the spread of COVID-19 [20]. For instance, one study found that even a 1% increase in uptake of a COVID-19 contact tracing app can reduce cases from between 0.8% to 2.3% [21]. Abueg et al. [22] determined via mathematical modeling that with 15% of a population using a contact tracing app, infections and deaths could be reduced by approximately 8% and 6%. Despite the potential of such apps, adoption rates were often not at the desired level, thus research into consumer behavior aspects of this technology is helpful.

3. Literature review

The main factors found to affect whether a person chooses to use a contact tracing app include usability issues and poor app design [8, 23]. Walrave et al. [24] found that a person's perception of how well they are able to use mobile applications affects their decision whether or not to use a contact tracing app. A study by Jansen-Kosterink et al. [25] found that attitudes towards technology, privacy concerns, fear of the disease, and age were prime factors driving adoption. A study by Redmiles and Hargittai [26] also found that technical familiarity as well as a person's risk of health problems were main factors. A survey by Guillon and Kergall [27] found that adoption of France's contact tracing app was influenced by people's trust of the government (the app sponsor) and their perceived risk of illness. A study comparing the use of contact tracing apps in five countries, Scotland, Cyprus, Iceland, Ireland, and South Africa, found eight factors present in each jurisdiction that affected adoption contact tracing apps. These factors include, "perceptions of data collection and management, sense of community, communications and misinformation, accessibility and inclusion, trust in public/private institutions, policy and governance, response infrastructure and

digital capability" [28]. An Australian survey found that "effort expectancy, perceived value of information disclosure and social influence are critical for adopting contact tracing apps" [29].

Different nations varied in the types of adoption issues for local populations. A study by Hassandoust et al. [30] in the United States found that privacy issues as well as perceived health risk were the main reasons why users decided to use a contact tracing app, while in Germany, offering a financial incentive was found to be effective [31]. Fox et al. [32] found that users specifically are motivated by the health benefits of using the app. Kokkoris and Kamleitner [33] and O'Callaghan et al. [34] found that prosocial beliefs, that is a desire to help the public or one's community, were leading factors motivating people to use contact tracing apps. A Canadian survey of Alberta doctors found only 27 percent recommended that their patients use the ABTraceTogether app due to reasons such as security and privacy concerns, distrust of the government, and a belief that recommending the app to patients was not their role [35].

Although our study focuses on one government-sponsored application, there are other approaches, such as apps offered by private companies (e.g., Google & Apple), academic institutions (e.g., MIT's Pact https://pact.mit.edu), and non-profit NGOs (e.g., COVID Watch https://www.covid-watch.org). Indeed, such a multifaceted approach and a lack of standardization has been criticized as an adoption limitation [36].

The literature on adoption and usage challenges of contact tracing apps revealed that studies have largely utilized quantitative instruments, specifically surveys and mathematical modeling. Few studies have used qualitative methods to enable the public to share their issues and concerns more openly for and against using such an app. These approaches limit the ability of actual users of the apps to identify their own issues and provide their experiences and beliefs in their own words. In discussing the "thorny problems of COVID-19 contact tracing apps", Osman et al. [37] call for a holistic understanding of the issues. Our study offers a more holistic approach than prior studies, providing insight from the public to gives a fuller picture of the overall factors and context.

4. Method

This study was conducted via an anonymous online questionnaire sent to over 600 participants in the summer of 2020. This article focuses on one dimension of our study (see [38, 39] for additional information on our study), specifically the qualitative data gained from three open-ended questions asked to participants. Qualitative data was gathered via a questionnaire that asked participants to respond to open-ended questions that solicited their thoughts and feelings on this issue in an unstructured manner [40]. The questions asked of users and non-users pertained to their concerns and challenges downloading or using the app as well an open question to comment about any dimensions of their experience with the app. This method has the advantage of enabling participants to share their views in an environment free of real or perceived judgment, enabling participants to openly share their thoughts on what proved to be a controversial issue. Participants were drawn from two groups 1) self-identified users of contact tracing app, ABTraceTogether and 2) self-identified non-users of the app to provide a wider spectrum of views. Participation was open to anyone who lived in Alberta, used a smartphone, was 18 or older, and was able to

provide informed consent. An external company hosted the questionnaire and for participant recruitment. A small financial incentive was offered to participants. We received participation from 309 users and 306 non-users.

We received a rich depth and variety of responses. The qualitative data from all users was analyzed by the researchers using data analysis software using categories established from the literature and as emerged from the data using Dey's suggested methodology [41]. All responses from participants were imported into the software, reviewed for a match to existing codes or for new patterns, and was coded as applicable. Subsequently, Dey's methods of splicing, splitting, linking, and connecting categories were used by the researchers to develop a codebook. This codebook with sample coding was shared with fellow researchers to validate the coding before an additional, final round of focused coding was conducted. The final stage entailed analyzing patterns and establishing connections to established literature to arrive at overall conceptual findings.

This study was approved by the ethics review board of a North American university and followed all established procedures for conducting ethical research. As a qualitative study, the findings presented are not attempting to rank issues or find correlations, but to identify issues and offer insight and context on pertinent factors.

5. Findings & discussion

The qualitative findings covered a diverse array of issues including technological, geo-political, and personal values and beliefs. Our findings can be grouped into two top-level categories, specifically issues at an application and device level and issues at a personal level. These issues are grouped together as the interface or programming structure of the application itself, ABTraceTogether, impacts the individual's device. For example, the need for the application to be constantly running and active on a user's device, which drains user battery, is both an application level and device level issue.

This paper covers participant concerns at an application and device level as [39] addresses participants' personal level issues, so they will only be briefly highlighted here. Personal-level issues center around individual's personal beliefs and values as they pertain to their willingness to use ABTraceTogether and general beliefs about the pandemic. Despite efforts by officials to assuage participants that their privacy was protected, and their location was never being tracked with ABTraceTogether, participants were nonetheless concerned with the privacy of their data. Other personal issues include one's level of altruism or pro-social beliefs, sense of personal agency (i.e., that one's use of the app can make a difference), confidence in the efficacy of the app, personal concern for safety or the safety of loved ones, social pressure, and level of trust in the app sponsor (i.e., the government). Beyond the scope of app developers, issues about the pandemic generally, such as belief in the reality of the pandemic (i.e., that it is a hoax) and the presence of misinformation, was raised by participants as having a detrimental effect on their app adoption and usage.

The remainder of this paper focuses on participants' barriers and concerns at an application and device level. It should be noted that some participants expressed positive feelings and user experiences with ABTraceTogether and indicated their downloading and usage of the app was seamless. This paper predominantly reports on

the barriers and concerns of participants as these are areas that should be addressed to aid adoption and usage.

Our findings include both factors that are genuine (actual problems with the app) as well as participant perceptions that are not based on fact (they are based on faulty understanding or misinformation). For example, there were numerous participants claims that the app was tracking them via GPS. Despite assurances that this were not the case from the app developers, from the government, and from the news – these false beliefs were nonetheless raised a barrier. We also uncovered misunderstandings at a smaller scale, such as that the app would quickly drain one's battery. Whether actual or perceived problems, these issues are nonetheless crucial as they indicate areas that app sponsors and developers need to address, if not in the app design and functionality itself, then in the educational, support, and promotional material. A final concern regarding some participants' responses is that at times they appear to be accounts [42], that is, excuses to justify their unwillingness to use the app. Some fundamental barriers identified by participants could be addressed through minimal effort or a small sacrifice, such as removing other apps to make room for the app or contacting tech support. Whether real or perceived concerns, the responses raised by participants should all be considered so as to design and launch apps that are as free of user barriers and concerns as possible, and thus will increase the likelihood of an app being seamlessly downloaded, installed, and continually used.

Participants raised various issues relating to the application and its impact on their smartphone device. Based on our findings from participants' responses to the open-ended questions, we have grouped their application and device level issues into the following domains, ordered alphabetically: 1) Accessibility, 2) Battery, 3) Download, 4) Memory, 5) Network, 6) Operating system, 7) Performance, and 8) Usability. There is an additional level of issues within these domains. To view these issues and their groupings, we included a diagram below, see **Figure 1**.

The following paragraphs cover the main dimension of participants' concerns within these areas. Sample participants' quotations were selected for inclusion based on their representativeness for addressing salient dimensions of a given issue or for their degree of insight offered.

5.1 Accessibility

Accessibility refers to barriers in downloading or use of the application based on the device owner's abilities (such as physical or cognitive disabilities), language abilities, or financial constraints (i.e., ability to afford a device). There were only a few comments regarding accessibility based on language or abilities as barriers, but for the people who noted this, it was a profound barrier. One participant was concerned about the cost of running the app and suggested that they "make it cost-effective for all people [with] low income or disabled." Another was concerned that the app was too hard to use and thought that the makers should "make it easier for the uneducated to understand." Other participants were concerned about language issues and suggested that there should be "more language options". Another participant thought that, "The app wouldn't translate well between other diverse Canadians."

The bulk of participant accessibility concerns related to financial barriers, both in terms of the necessity to have a newer Android or Apple smartphone and the perceived costs of network connectivity. Some users noted that their phones were too old for the app. For example, one participant expressed frustration that the app would

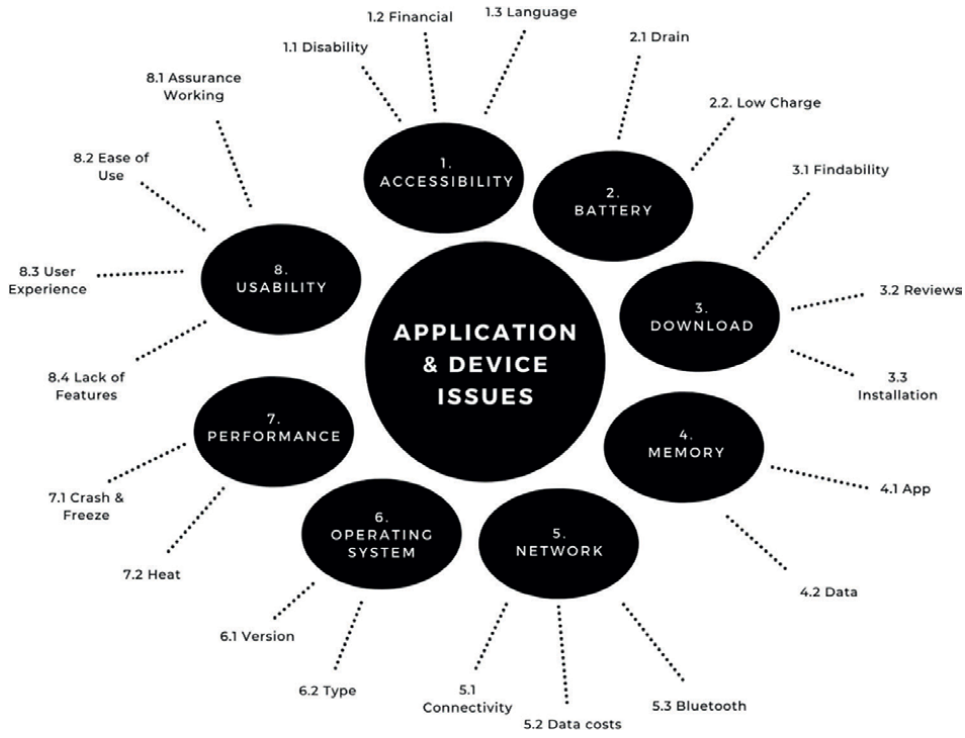

Figure 1.
Diagram of the application and device related issues with ABTraceTogether.

not function on their Blackberry device, noting "I have a refurbished Blackberry with a pre-paid plan of only calling and texting but no data or Wi-Fi. I cannot afford to upgrade my phone or be on a plan where I receive a bill. I feel like this is a program for the majority of society but leaves out those who do not have access to this technology due to income or social standing." These comments reflect the inequities in availability of contact tracing apps for those who cannot afford newer smartphones. Governments need to look at other solutions to reach all citizens. For instance, Singapore distributed Bluetooth-enabled tokens to citizens who do not have access to smartphones, which can also track and store anonymous contact data [43].

Some people who owned Bluetooth enabled smartphones but had financial concerns about data usage decided not to use the app based on false beliefs and misunderstandings about how the application worked. In particular, a number of participants thought they needed a data plan to use the app, and that it would incur high data costs which would make it too expensive to use. They were unaware that the app uses Bluetooth technology and does not require a constant internet connection or a data plan. The app does need Wi-Fi to initially download the app, for updates, and to share the data if requested by government health officials, but this can be accessed through publicly available free Wi-Fi connections. One participant concerned about data costs stated that they chose not to use the app because, "I have a cell phone that I cannot afford to get a provider for, thus financial hardships makes me decide between many more life needs." Another participant noted that they thought there would be high data costs and said, "Do not make me feel discriminated against or slighted because I am not able to access this program." Another user concerned about high

data costs noted that, "The people who are at risk for Covid are those in low socioeconomic status...with lack of access to technology. Therefore this app is inappropriate for this." Participants expressed valid concerns about the inequity of the app being unavailable to those who cannot afford the latest devices. However, the false belief that the app would incur high data charges served as a barrier to people using the application and also seems to have contributed to ill-will and a sense that the Alberta government was only helping the rich by implementing the contact tracing app. Outreach was needed to educate individuals about how the app works and to address these misunderstandings and concerns.

5.2 Battery

One of the main concerns of participants was the misconception or false belief that using the contact tracing app would drain their mobile phone's battery, presumably because the app requires Bluetooth to be on constantly. A number of participants noted that they stopped using the app because of the battery drain. One stated, "It was using over 60% of my battery life. I can't use it" while another noted that, "My iPhone 11 Pro's battery life is terrible when I enable the app, usually I get 20 hours worth of battery life, but with the app I get around 5." Another participant said, "I use my phone a lot and can't miss work calls or emails because of a drained battery." Another was convinced the app was draining the battery and suggested that the government should, "Make the app drain less battery. This app sucks battery in no time." Participants also expressed concerns that they thought they could not use the app because their device's battery was not up to the demands required by the app or that it constantly lacked a sufficient charge. Comments from participants included, "My battery is often low" and "My phone is quite old and doesn't hold a charge." Another participant thought that using the app would be "...wasting my phone battery 'cause the charge doesn't hold" and another noted that one reason they were not using the app was, "My phone is quite old and does not hold a charge." Another participant did not want to use the app because, they "...don't have an opportunity throughout the day to charge my phone." While the ABTraceTogether website does not address the issue of battery drain, the Singapore website for their almost identical contact tracing app offers an FAQ to concerned users explaining that Bluetooth technology uses almost no battery and provides screen captures showing device battery usage with Bluetooth enabled (See support.tracetogether.gov.sg). Addressing battery misconceptions may have encouraged some participants to use the app.

5.3 Download

Although the ABTraceTogether app has a website with installation instructions and is available for downloading on Google Play and the Apple App Store, some participants indicated that they did not know how to download the app. Other participants expressed a general lack of knowledge of information about the app, such as whether or not it was freely available and questioned, "Is there a cost to use?" Participants also expressed difficulties finding the official app website or reported that the website did not work. One participant said that, "I tried to get on it but it says [the] site does not exist" while another said they could not download the app because "the site doesn't work right." One participant could not distinguish between the official app and other related apps, noting, "There are too many fake apps claiming to do the same." Other participants began the process of downloading the app but noticed poor user reviews

and stopped. One stated that, "I read reviews [and] almost everybody said battery drain was a huge issue so I'm not even going to attempted [sic] until some of the bugs are fixed." Another participant who decided not to use the app wrote that, "When I went to download it, I read the reviews and they were not good, so I didn't use it after all." Some participants expressed that it would not work on their devices (presumably due to incompatibility issues) or other installation problems. One participant noted that, "I have already tried to get it but it won't load on my phone" while another said they could not use the app because they, "Don't know how to activate it." The download and installation concerns of participants highlight that messaging surrounding downloads and installation needs to be very clear and easy to find, as some potential app users will decide not to use the app if they encounter any issues at all. As well, these concerns show again how important it is for the app sponsor to clearly address concerns and debunk false information spread in reviews and online.

5.4 Memory

After concerns about battery drain, the leading participant concern was the demands of using the app on the participant's smartphone memory. Comments about a lack of room on their device for the app in the first place include: "I'm always running out of storage so I'm not sure I'll have enough to download an app," "Phone has no room to add apps," and, "It does take up memory on my phone." Another memory concern with participants is that by the ABTraceTogether using a decentralized approach, it logs all contact data (in encrypted form) on the user's device. Participants were concerned they had insufficient device memory for this. One stated that, "I only have a limited amount of memory on my phone and don't want to use it unnecessarily if most people aren't using the app." These concerns about memory usage may be accounts or reflect an unwillingness on the part of some users to make accommodations to use the app, such as by uninstalling other apps or files to make room. However, this is also an area that should be clarified by the app developers.

5.5 Network

Participants expressed a variety of concerns related to the app's use of Bluetooth and their perception that the app required constant Internet access to function.

Many participants had the misconception that the ABTraceTogether app required a smartphone owner to have a data plan and regular internet connection for the app to work. The following quotes are samples of this false perception, "Poor connection is always a problem," and, "My cell often does not work in the rural area that I live." One participant noted that, "I visit places where sometimes there is little service so that may be a problem for connection," while another stated that, "[I] live in an area with low connectivity by which I'm not able to connect properly." Another participant thought they would not be able to use the plan because, "I am not connected to the internet on my phone, unless I turn a number of things on."

Some participants noted that although network connectivity was not an issue for them, they perceived that the app would constantly be connecting to their network and thus incurring costs for data use or overages. Participants noted, "I have a small data package so would not have it on", "Data cost: I don't want to end up spending money on more data because this app is running in the foreground of my phone while I'm away from home," and, "I only have 1 Gb data on a monthly basis. I can barely afford my cell phone plan as I'm retired." Again, better messaging from the app

sponsor and debunking of misinformation could help convince people that data plans and constant internet connectivity was not required to use the app.

ABTraceTogether, along with many contact tracing apps, relies on a user's Bluetooth network constantly being turned on. This raised concerns with a number of participants. The main concern was related to the possibility of a participant's device being hacked due to this perceived vulnerability. One participant wrote that, "The app runs on Bluetooth and Bluetooth is an easy hack, so this would open your phone to close quarter hacks like [on the] bus, [at the] store, malls, etc." Another thought that the app would make "it easier for hackers and my privacy on my phone being compromised." One participant stated they "don't like the idea of leaving my Bluetooth on. It could allow access to my data &/or information" while another was concerned about "...government or hackers being able to hack my phone easier because Bluetooth is always open." One participant raised the concern that it, "Sucks that it forces me to use Bluetooth when I want to use that for other things." Two participants expressed concern about the issue of "radiation exposure" from constantly having Bluetooth on. One participant noted that they were concerned that "...the radiation coming off our phones [is] only getting worse now with 5 g network."

Issues such as radiation exposure and data costs should be addressed by app sponsors in the educational and promotional material. Although this section only briefly addresses privacy and security concerns, this was a leading concern of participants both for users and non-users of the app. Although the Alberta government did make efforts to assure the public that privacy and security were addressed, more efforts in this area were needed.

5.6 Operating system

ABTraceTogether only works on newer versions of Android and Apple smartphones. This left people with older devices or other operating systems unable to use the app. One participant commented that, "I have already tried to get it but it won't load on my phone. Being an older phone." Some participants noted they could not use the app as they had an older smartphone that did not have Bluetooth. One participant noted that the app developers should "understand it is not compatible with iPhone 4s" while another noted they "have an older android smartphone that is incompatible with [the] app." One frustrated participant wrote, "Don't assume everyone has a smart phone that is not an Apple. If you are going to make an app that you WANT everyone to use for the good of all - make sure that it works for all the phones out there. This issue with Apple phones when the app first came out could have been avoided if you developed the app with every phone in mind." A few participants felt that the app would work only on iPhones such as one who wrote that they did not use the app because, "I don't have an iPhone." Whether this belief was based on false information or whether this was an excuse is not known. These operating system issues highlight how crucial it is for app developers to ensure that the contact tracing app works before it is released, and that it works on as wide a range of smartphones as possible, even older versions.

5.7 Performance

Performance issues cover genuine and perceived errors and bugs in the app and its impact on the device. ABTraceTogether had difficulties with an early requirement for iPhone users where it was required to always be on in the foreground. Participants also expressed a range of specific issues as well as vague reports or

unrelated problems with the app which could be genuine or could be accounts. Some users expressed vague concerns, such as a fear that the app was "damaging my phone" or "slowing down [my] phone." A few comments stated that the app caused their device to "crash sometimes" or that, "Every once [in] a while my phone randomly restarts now." Another participant wrote that "My app freezes and lags a lot. I don't know the cause but it could be on my end." Some participants expressed concerns that the app had a "slow startup" while another noted an issue with "heating up my phone on some occasions."

5.8 Usability

Usability refers to both the ability of a user to use the application as well as the degree of user friendliness of the app and any other user experience issues. Most concerns from participants in this domain pertained to the iPhone foreground issue, followed by concerns that expressed doubt about whether the application was working or not. Other issues expressed were ease of use and a lack of app features.

Many users of the ABTraceTogether app expressed doubts about whether the app was working correctly or even whether it was working at all. One participant wrote, "Luckily, I have no idea if it is even working when I go out. It is active on my phone but I don't know if it is working or not. When I say 'luckily', it is because I've hopefully never encountered someone who has later contacted COVID *and* informed AHS [Alberta Health Services].' Other users also reported that the app "never does anything so [I'm] unsure if [it's] working" and another stated "I don't know if it works as I've never been notified." Other users were concerned that they were doing something wrong. One said that they were "not sure I'm using the app right." An Apple iPhone user was worried that the app did not work correctly after the foreground issues with the app. They wrote, "I heard there were issues with the app and Apple users but never heard if this was fixed or if we should delete, then reload the app." Other participants suggested modifications to the app so that users are informed that it is working correctly. One wrote that the app "needs to give some type of daily update: covid numbers in area. To show it has purpose daily." Another suggested that "perhaps having a daily notice of how many phones it connects with each day would give an indication of it working." As the need for assurance that the app is working properly was expressed by many participants, this is a main participant issue that should be addressed when designing applications.

Many users expressed concerns that the app was not easy to use with many simply commenting that it was not "user friendly" or "too complicated". One participant stated that, "The app also is somewhat confusing to use, I didn't fully understand how to use the app nor really knew what it was for a while." A participant said that they "would like it to be more user friendly," while another said that they are "not sure how to use it." Some participants from the non-user group reported that they did not like using any mobile apps as they were generally not comfortable with technology. While it is possible that some reports about the app being difficult to use are accounts raised by individuals who are trying to justify their unwillingness to use the app, some of the concerns were also likely raised by participants who lack technological knowledge and confidence. Issues with ease-of-use highlight that it is crucial for app sponsors to ensure that there is clear and easy to understand messaging about how to download and use the app, as well as extensive support available for those who are less comfortable with technology.

Some participants wanted the app to have more features. One participant complained that the app "does not give real time updates." Another participant thought

the developers should "put a live chat in case you need help" while another suggested that the app should offer a "notification if entering a high Covid area." Other users thought the app could be improved by having "notifiers when leaving a Wi-Fi zone" as this would be helpful when the app needs to update. Another user suggested that the developers should, "Make it possible to turn the location tracker on and off so people can turn it on when in crowded locations but don't need it to track them on walks through the woods". Other suggestions participants offering for features including offering general information about the pandemic, personal healthcare tips, a map of infection hot spots, offering a vaccination clinic finder, and adding gamification elements. These suggestions indicate that making an app more useful might encourage more people to download and use it regularly.

Many participants were concerned that the ABTraceTogether app initially ran in the foreground on iPhones. A number expressed that they wanted the developers to, "Allow [the] app to run in the background." One participant who decided not to use the app wrote that, "I think it's great in theory and I fully support using it for contact tracing. If it was better to use with my iPhone I would absolutely use it. Right now I don't because I'm not going to keep it open all the time." Another user stated, "I don't want to have to think about using it, I need it to just work seamlessly in the background." These user experience concerns again highlight the importance for app developers to get usability right the first time, as potential users may not give an app another chance after encountering problems and deciding not to use it.

6. Conclusion

With ABTraceTogether, we see a fascinating situation for m-Health applications. In response to the increasing casualties of the COVID-19 pandemic, the government of Alberta quickly launched their contact tracing application in an effort to combat the spread of the disease. Our study participants identify various genuine issues with the app as well as concerns based on faulty beliefs or misinformation that combined prevented them from downloading or continually using the application. These were early adopters of an application that was in early stages of deployment, at that time there was an emotional component in responses about this disease as we were just a few months into the pandemic, and participants self-selected for the study.

We can speculate that had the application sponsors spent additional time in development and user testing as well as addressing consumer behavior adoption challenges, it may have improved the adoption and usage rates. The ABTraceTogether developers did attempt to address some user concerns in a subsequent app update. However, this update may have come too late and did not substantially increase the user uptake.

In addition to m-Health's role in health crises, such as COVID-19, this technology has the potential to aid consumers in maintaining their personal health and wellbeing. Yet, for future m-Health or related technology to be successful, understanding consumer behavior relative to people's adoption and usage issues will help attain sufficient uptake, continued usage, and the resulting consumer benefits.

Acknowledgement

This research and publication was funded by grants from Athabasca University.

Author details

Glen Farrelly*, Houda Trabelsi and Mihail Cocosila
Athabasca University, Athabasca, Canada

*Address all correspondence to: gfarrelly@athabascau.ca

IntechOpen

References

[1] Norris AC, Stockdale RS, Sharma S. A strategic approach to m-health. Health Informatics Journal. 2009;**15**(3):244-253. DOI: 10.1177/1460458209337445

[2] Kasliwal MH, Patil HY. Smart location tracking system for dementia patients. 2017 International Conference on Advances in Computing, Communication and Control. Mumbai, India. 2017. DOI: 10.1109/ICAC3.2017.8318786

[3] Ledderer L, Møller A, Fage-Butler A. Adolescents' participation in their healthcare: A sociomaterial investigation of a diabetes app. Digital Health. 2019;**5**. DOI: 10.1177/2055207619845448

[4] Ribeiro FR, Silva A, Barbosa F, Silva AP, Metrôlho JC. Mobile applications for accessible tourism: Overview, challenges and a proposed platform. Information Technology & Tourism. 2018;**19**(1):29-59. DOI: 10.1007/s40558-018-0110-2

[5] Yoneki E. FluPhone study: Virtual disease spread using haggle. Proceedings of the 6th ACM Workshop on Challenged Networks. New York, NY. 2011. pp. 65-66. DOI: 10.11 45/2030652.2030672

[6] Tom-Aba D, Nguku PM, Arinze CC, Krause G. Assessing the concepts and designs of 58 mobile apps for the management of the 2014-2015 West Africa Ebola outbreak: Systematic review. JMIR Public Health and Surveillance. 2018;**4**(4):e9015. DOI: 10.2196/publichealth.9015

[7] Ryan-Mosley T. MIT Technology Review Covid Tracing Tracker. 2021. https://public.flourish.studio/visualisation/2241702/

[8] Kahnbach L, Lehr D, Brandenburger J, Mallwitz T, Jent S, Hannibal S, et al. Quality and adoption of COVID-19 tracing apps and recommendations for development: Systematic interdisciplinary review of European apps. Journal of Medical Internet Research. 2021;**23**(6). DOI: 10.2196/27989

[9] Sharma S, Singh G, Sharma R, Jones P, Kraus S, Dwivedi YK. Digital health innovation: Exploring adoption of COVID-19 digital contact tracing apps. IEEE Transactions on Engineering Management. 2020;**67**:1-17. DOI: 10.1109/TEM.2020.3019033

[10] Government of Alberta. ABTraceTogether. 2022 https://www.alberta.ca/ab-trace-together.aspx

[11] Mertz E. Alberta Launches ABTraceTogether App to Improve Contact Tracing, Fight COVID-19 Spread. Global News; 2020 https://globalnews.ca/news/6894997/covid-19-alberta-health-contact-tracing-app/

[12] Epp C. Not Enough Albertans Downloading COVID-19 Tracing App. CTV News; 2020 https://calgary.ctvnews.ca/not-enough-albertans-downloading-covid-19-tracing-app-province-1.4992413

[13] Mertz E. Alberta Contact-Tracing App Has Been Used in Just 32 COVID-19 Cases to Date. Global News; 2021 https://globalnews.ca/news/7576483/alberta-contact-tracing-app-32-covid-19-trace-together/

[14] O'Neill P, Tate RM, Johnson B. COVID Tracing Tracker Database. MIT Technology Review; 2020 https://www.technologyreview.com/2020/05/07/1000961/launching-mittr-covid-tracing-tracker/

[15] Altmann S, Milsom L, Zillessen H, Blasone R, Gerdon F, Bach R, et al. Acceptability of app-based contact tracing for COVID-19: Cross-country survey study. JMIR mHealth and uHealth. 2020;**8**(8). DOI: 10.2196/19857

[16] Abeler J, Bäcker M, Buermeyer U, Zillessen H. COVID-19 contact tracing and data protection can go together. JMIR mHealth and uHealth. 2020;**8**(4):e19359. DOI: 10.2196/19359

[17] Han K. Broken Promises: How Singapore Lost Trust on Contact Tracing Privacy. MIT Technology Review; 2021 https://www.technologyreview.com/2021/01/11/1016004/singapore-tracetogether-contact-tracing-police/

[18] Newton C. Why Bluetooth Apps Are Bad at Discovering New Cases of COVID-19. The Verge; 2020 https://www.theverge.com/interface/2020/4/10/21215267/covid-19-contact-tracing-apps-bluetooth-coronavirus-flaws-public-health

[19] Fraser D, Abeler-Dörner L, Ferretti L, Parker M, Kendall M, Bonsall D. Digital Contact Tracing: Comparing the Capabilities of Centralised and Decentralised Data Architectures to Effectively Suppress the COVID-19 Epidemic Whilst Maximising Freedom of Movement and Maintaining Privacy. Oxford, UK: University of Oxford; 2020. https://github.com/BDI-pathogens/covid-19_instant_tracing/blob/master/Centralised%20and%20decentralised%20systems%20for%20contact%20tracing.pdf

[20] Wang CJ. Contact-tracing app curbed the spread of COVID in England and Wales. Nature. 2021;**594**:336-337. DOI: 10.1038/d41586-021-01354-8

[21] Wymant C, Ferretti L, Tsallis D, Charalambides M, Abeler-Dörner L, Bonsall D, et al. The epidemiological impact of the NHS COVID-19 app. Nature. 2021;**594**:1-5. DOI: 10.1038/s41586-021-03606-z

[22] Abueg M, Hinch R, Wu N, Liu L, Probert W, Wu A, et al. Modeling the effect of exposure notification and non-pharmaceutical interventions on COVID-19 transmission in Washington state. Npj Digital Medicine. 2021;**4**(1):1-10. DOI: 10.1038/s41746-021-00422-7

[23] Elkhodr M, Mubin O, Iftikhar Z, Masood M, Alsinglawi B, Shahid S, et al. Technology, privacy, and user opinions of COVID-19 mobile apps for contact tracing: Systematic search and content analysis. Journal of Medical Internet Research. 2021;**23**(2):e23467. DOI: 10.2196/23467

[24] Walrave M, Waeterloos C, Ponnet K. Adoption of a contact tracing app for containing COVID-19: A health belief model approach. JMIR Public Health and Surveillance. 2020;**6**(3):e20572. DOI: 10.2196/20572

[25] Jansen-Kosterink S, Hurmuz M, den Ouden M, van Velsen L. Predictors to use mobile apps for monitoring COVID-19 symptoms and contact tracing: Survey among Dutch citizens. JMIR Formative Research. 2021;**5**(12):e28416. DOI: 10.2196/28416

[26] Redmiles E, Hargittai E. Will Americans be Willing to Install COVID-19 Tracking Apps? Scientific American; 2020 https://blogs.scientificamerican.com/observations/will-americans-be-willing-to-install-covid-19-tracking-apps/

[27] Guillon M, Kergall P. Attitudes and opinions on quarantine and support for a contact-tracing application in France during the COVID-19 outbreak. Public

Health. 2020;**188**:21-31. DOI: 10.1016/j.puhe.2020.08.026

[28] Phillips J, Molnar P, Babcock R, Putric T, Goldstein D, Balasubsramaniam L, et al. Exploring User-Uptake of Digital Contact Tracing Apps—A Practitioner Guide. Toronto: York University; 2021. DOI: 10.6084/m9.figshare.14423861.v2

[29] Duan SX, Deng H. Hybrid analysis for understanding contact tracing apps adoption. Industrial Management & Data Systems. 2021;**121**(7):1599-1616. DOI: 10.1108/IMDS-12-2020-0697

[30] Hassandoust F, Akhlaghpour S, Johnston AC. Individuals' privacy concerns and adoption of contact tracing mobile applications in a pandemic: A situational privacy calculus perspective. Journal of the American Medical Informatics Association. 2021;**28**(3):463-471. DOI: 10.1093/jamia/ocaa240

[31] Munzert S, Selb P, Gohdes A, Stoetzer LF, Lowe W. Tracking and promoting the usage of a COVID-19 contact tracing app. Nature Human Behaviour. 2021;**5**(2):247-255. DOI: 10.1038/s41562-020-01044-x

[32] Fox G, Clohessy T, van der Werff L, Rosati P, Lynn T. Exploring the competing influences of privacy concerns and positive beliefs on citizen acceptance of contact tracing mobile applications. Computers in Human Behavior. 2021;**121**:106806. DOI: 10.1016/j.chb.2021.106806

[33] Kokkoris MD, Kamleitner B. Would you sacrifice your privacy to protect public health? Prosocial responsibility in a pandemic paves the way for digital surveillance. Frontiers in Psychology. 2020;**11**. DOI: 10.3389/fpsyg.2020.578618

[34] O'Callaghan M, Buckley J, Fitzgerald B, Johnson K, Laffey J, McNicholas B, et al. A national survey of attitudes to COVID-19 digital contact tracing in the Republic of Ireland. Irish Journal of Medical Science. 2020;**190**:863-887. DOI: 10.1007/s11845-020-02389-y

[35] Jerome D, Pietrosanu M, Dhillon K. A cross-sectional population survey of physicians in Alberta, Canada about a novel provincial contact tracing smartphone app. Journal of Public Health. 2020;**44**(1):141-148. DOI: 10.1093/pubmed/fdaa183

[36] Marhold K, Fell J. Format wars hampering crisis response – The case of contact tracing apps during COVID-19. Social Science Research Network. 2020. DOI: 10.2139/ssrn.3598143

[37] Osman M, Fenton NE, McLachlan S, Lucas P, Dube K, Hitman GA, et al. The thorny problems of COVID-19 contact tracing apps: The need for a holistic approach. Journal of Behavioral Economics for Policy. 2020;**4**:57-61

[38] Cocosila M, Farrelly G, Trabelsi H. Perceptions of users and non-users of an early contact tracing mobile application to fight COVID-19 spread: A value-based empirical investigation. Information Technology and People. 2022. DOI: 10.1108/ITP-01-2021-0026

[39] Farrelly G, Trabelsi H, Cocosila M. COVID-19 contact tracing applications: An analysis of individual motivations for adoption and use. First Monday. 2022;**27**(6). DOI: 10.5210/fm.v27i6.12324

[40] Dillman DA, Smyth JD, Christian LM. Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method. 3rd ed. Hoboken, NJ: Wiley; 2009

[41] Dey I. Qualitative Data Analysis: A User-Friendly Guide for Social Scientists. London, UK: Routledge; 1993

[42] Scott MB, Lyman SM. Accounts. American Sociological Review. 1968;**33**(1):46-62

[43] Wong C. Vulnerable seniors begin receiving Trace Together tokens from Sunday. The Straits Times; 2020 https://www.straitstimes.com/singapore/vulnerable-seniors-begin-receiving-tracetogether-tokens-from-sunday

Chapter 11

The Alternative Disputes Resolution System in the European Union: Consumer Protection in Cross-Border Disputes

Vincenzo Senatore and Emanuele di Prisco

Abstract

Consumer protection is defined as a field of study that protects individual consumers against unfair selling practices for goods, services, and digital content. The globalization expansion allows opportunities for increased sales and revenue but is also accompanied by considerable risk that impacts the protection of the economic interests of consumers. This, in fact, may involve misleading advertising and unfair contract terms in cross-border transactions. This paper analyzes the existing European Union ('EU') consumer rights protection legislation, including alternative online dispute resolution procedures. The paper also aims to provide a summary of the achievement in the area of consumer protection and internal market in the post-pandemic era. At the same time, the goal of this paper is to present comprehensive coverage on the protection of financial consumers in cross-border disputes, especially in cases where the other party resides in a different country. Explanation are also provided on how the Italian legislative framework may be considered the best example of crisis management and resolution, by providing more confidence for consumers in cross-border transactions in the post-pandemic era.

Keywords: alternative disputes resolution, ADR, COVID-19, consumer rights, European Law, cross-border disputes

1. Introduction

European measures for consumer protection are intended to protect the health and safety, and economic and legal interests of European consumers, wherever they live, travel, or shop in the EU. The EU provisions regulate both physical transactions and e-commerce and contain rules of general applicability together with provisions targeting specific products, including medicines, genetically modified organisms, tobacco products, cosmetics, toys, and explosives. For this very reason, this area has always been subject to great attention on the part of the European Union, which has sought to establish and fix general guidelines that could protect, in the most efficient way possible, the "weak" party in transnational negotiations.

The present analysis builds on the studies and evaluations performed to date by the EU bodies, and their methodologies in order to identify the most relevant parameters for an evaluation of achievements and benefits. It also presents the interaction and convergence between consumer protection and the measures implemented following the COVID-19 outbreak.

In the light of the above, the analysis covers the period before and following the pandemic, and the enquiry is based on legislative acts proposed, proceeds and enacts during this period, and contains a complete and systematically arranged list of rights created or strengthened for European consumers as well as a list of legislative acts introduced, implemented and also issued on the basis of EU legislation aimed at consumer protection.

The EU in the Treaty on the Functioning of the European Union (TFEU) represents the substantial law on the welfare of consumers and explicitly dedicates several articles to consumer protection, specifically:

- Article 4(2)(F), which establishes consumer protection as a shared competence between the EU and the Member States, obviously, as a result, both legal systems (national and European) will be free to regulate in this area but subject to the condition that the Member States may exercise their competence if the EU has not already done so and, if not, may exercise it only if the EU ceases to do so;

- Article 12, which recognizes the cross-cutting nature of consumer protection, i.e. consumer protection must always be taken into account in all other matters;

- Art. 114, which places the harmonization of national laws within the internal market as a legal prerequisite, focuses on the need to also ensure consumer protection within the framework of new policy developments;

- Article 169, which instead analyses the fundamental principles of consumer protection, stressing that the EU shall contribute to protecting the health, economic interests and safety of consumers as well as safeguarding and promoting their right to education, information and to organize themselves in order to safeguard their interests. In order to do this, the EU will have to adopt measures to support, integrate, and monitor the policies of the various Member States, as well as introduce increasingly effective protective measures against the current background of the establishment of the single internal market.

Similarly, the Charter of Fundamental Rights of the European Union also emphasizes, in Article 38, that a high level of consumer protection must always be guaranteed in EU policies. In the light of this, all the major EU institutions have begun to focus on the figure of consumers and the protection of their interests in the development of their own policies and competences, also setting up *ad hoc* systems to safeguard them—just think of the Committee on Petitions of the European Parliament, competent to deal with petitions, in the form of requests or complaints, in which, clearly, in addition to all the matters in which the EU law intervenes, the area of consumer protection also comes into play.

At the same time, the European Economic and Social Committee (EESC)—the EU's consultative body—has also focused its work on consumer protection, emphasizing the obligation for the major institutions (Council and European Commission) to consult the EESC before making decisions. In addition, the EESC also organizes major

initiatives every year to strengthen the *"weak"* figure of the consumer in the global policy arena, promoting the European Consumer Day and the European Consumer Summit in order to raise the awareness of the "digital transition" and respect for consumer rights, as well as ensuring the transparency of online markets—last summit took place on 10 February 2022. Since the 2000s, therefore, EU started to place consumer protection at the core of its policies, both explicitly and implicitly.

Undoubtedly, among the most significant, in this sense, is the EEC Directive No. 34/1999, which introduced the strict or no-fault liability of the producer in the event of damage caused by defective products, recognizing the possibility for the injured consumer to claim compensation, subject to proof, within 3 years, of the damage suffered, the defect in the product and, obviously, the causal link between them. Furthermore, the EC Directive No. 95/2001 established a system for general product safety in the market, according to which a product, once it has entered the market, will have to comply with certain rules on information provided to consumers as well as precise instructions in order to avoid safety risks, monitoring, and traceability of products.

The novelty of the Directive was also to attempt to focus on possible consumer remedies such as rights to repair, reimbursement, or replacement of the product as well as fines of up to 4% of annual turnover for non-compliant companies in a specific Member State.

Equally important were the EC Directive No. 29/2005, which defined unfair business-to-consumer commercial practices—*i.e.* those that persuade the consumer to take a commercial decision that he or she would never have taken, in particular aggressive and misleading commercial practices—and the EC Directive No. 114/2006 with the aim of protecting consumers from misleading advertising by also setting up a system of supervision by the Courts and administrative bodies of the Member States that would be able to suspend or prohibit unlawful advertising.

Subsequently, starting with the EU Directive No. 83/2011 then updated by the EU Directive No. 2161/2019, the EU began to focus directly on the subject of contracts between consumers and sellers, harmonizing the legislation and establishing a regime applicable to the contracts concluded, specifically for contracts for the supply of water, gas, electricity and contracts for online digital content—whereby, after the 2019 update, the consumer also undertakes to provide his or her personal data as well as the seller will have to comply with various information obligations toward the consumer, such as product characteristics, terms of payment, delivery, and withdrawal—sales and service contracts, including both "in house" and remote (online) contracts.

A turning point in the field of consumer protection, however, was the EU Directive No. 11/2013, which began to guarantee to the consumers the possibility of raising a contractual dispute against an EU supplier regarding a product or service before an Alternative Dispute Resolution ("ADR") body. Fundamental principles behind this directive were, without a doubt, the desire to guarantee the consumer's rights to transparency, effectiveness, independence, and fairness by imposing on the seller the obligation to inform the consumer of these means—ADR—and when he may or may not use them.

Following this, with the evolution of the market on online platforms, the EU decided to intervene also through an online dispute resolution mechanism to defend the interests of the "*weak*" party in transnational contracting in an ever more stringent manner. In this sense, the EU Regulation No. 524/2013 established an online telematic platform through which the consumer, who has purchased goods or services online, can activate an online out-of-court dispute resolution procedure, so-called Online Dispute Resolution ("ODR").

Directive	Legislation	Article	
Consumer Rights Directive 2011/83/EU	Article 114 of the TFEU	Article 169(1) and point (a) of Article 169(2), Article 26(2) of the TFEU	
Directive 2013/11/EU on alternative dispute resolution	Article 114 of the TFEU	Article 169(1) and point (a) of Article 169(2), Article 26(2) of the TFEU; Article 38 of the Charter of Fundamental Rights of the EU.	
Mortgage Credit Directive 2014/17/EU	Article 114 of the TFEU		
Package Travel Directive 2015/2302/RU	Article 114 of the TFEU	Article 169(1) and point (a) of Article 169(2), Article 26(2) of the TFEU	
Resolution	**Legislation**	**Article**	
Regulations (EU) No 524/2013 on online dispute resolution	Article 114 of the TFEU	Article 169(1) and point (a) of Article 169(2), Article 26(2) of the TFEU	–10
Consumer Protection Cooperation Regulation (EU) No 2017/2394	Article 114 of the TFEU		
Regulations (EU) No 524/2013 on online dispute resolution	Article 114 of the TFEU	Article 169(1) and point (a) of Article 169(2), Article 26(2) of the TFEU	
Proposal Proposal for a Directive on a representative actions for the protection of the collective interests of consumers	(Proposal 2018/089 COM/2018/00184 final	Article 114 of the TFEU (cfr. P. 6 of the proposal).	

Table 1.
Treaty foundation of EU instruments orientated toward consumer protection.

Among the most recent interventions, the EU Directive No. 1828/2020 undoubtedly stands out, which, as of 25 June 2023, will replace the previous EC Directive No. 22/2009 and will introduce several relevant procedures aimed at protecting consumers' collective interests by establishing ad hoc procedures for actions of a compensatory nature (aimed at compensation or reparation or replacement or reimbursement and price reduction) and injunctive relief (aimed at having a practice stopped or prohibited) by groups of consumers through a system of representative actions, also cross-border actions, against companies operating in the fields of financial services, tourism, energy, and telecommunications (**Table 1**).

2. The alternative consumer dispute resolution ('CADR') in the European Union

To strengthen consumer confidence in the internal market without barriers, and to allow them to fully benefit from it, it is necessary for consumers to have access to simple, efficient, fast, and low-cost ways of resolving disputes that arise from the sale of good or the supply of services, in particular when shopping cross-border.

The Directive 2013/11/EU of the European Parliament and of the Council of 21 May 2013 on alternative dispute resolution for consumer disputes aims to contribute to the proper functioning of the internal market and to protect consumers by ensuring that consumers can, on a voluntary basis, submit complaints against traders to entities offering alternative dispute resolution procedures.

The ADRs were born in the United States during the 1970s to lighten the load of the Courts by trying to identify, especially for the simplest and most modest disputes, an alternative dispute resolution solution. The idea was immediately a huge success to the point that it was the subject of a conference at the American Bar Association where it was discussed the best way to introduce this new litigation settlement instrument, still dominant in the United States today, by transferring the competence to hear low-value cases to bodies outside the Courts through a more informal and very flexible procedure [1].

In the EU, on the contrary, interest in ADRs was born and developed mainly with reference to the objective of creating a single market that sets the figure of the consumer and his fundamental protection as its core.

In this sense, the ADRs, from being mainly instruments for the deflation of ordinary litigation, end up becoming instruments suitable for guaranteeing to every individual an easy access to justice, in a simplified manner, for the fast and low-cost resolution of even complex (transnational) but low value disputes (so-called small claims) as well as a simplified guarantee of the rights recognized at a European level [2].

As a result, the ADRs gradually began to play an increasingly important role in the resolution of consumer disputes in the EU and became the subject of numerous interventions by the EU institutions, such as the Green Paper on consumer access to justice of 1993, as well as the Conclusions of the Tampere European Council of 15 and 16 October 1999, which emphasized the need for Member States to establish alternative out-of-court procedures to speed up and simplify the resolution of transnational low-value commercial disputes involving consumers. This was followed by two recommendations (98/57/EC and 2001/310/EC) that provided various guarantees such as effectiveness and independence in the application and establishment of ADRs that Member States had to comply with [3, 4].

On the basis of these recommendations—non-binding instruments—and in the absence of uniform harmonized standards [5], therefore, numerous Member States began to introduce different ADR procedures. According to studies conducted in 2012, there were more than 750 of such procedures [6] which, however, in the absence of harmonized standards and with only a set of identified common principles, led to the spread of indefinite forms of ADRs that were heterogeneous among themselves but differed according to the national legal traditions of the various Member States.

However, these recommendations also had the great merit of beginning to outline, for the first time, the basic features of the CADR, outlining the basic principles of ADR procedures in order to ensure a balance between the protection of consumer rights and, at the same time, the principles of defense and due process.

This also led to an identification of ADRs in two different typologies: adjudicative ADRs and conciliative ADRs. With reference to the first type, they must respect the principles of transparency, independence, effectiveness, legality, cross-examination, and freedom. The consumer must be provided with specific information with reference to the dispute resolution procedure as well as on its possible outcomes and on possible subsequent appeals, on how to introduce the complaint, on the establishment

of the cross-examination (as an expression of the principle of defense), on the value of the decision whether it will be binding or not, as well as on the costs and their allocation. Moreover, in adjudicative ADRs, there will be no kind of obligation to be assisted by a lawyer and the focus will clearly be on the short time frame in which a decision must be reached, which, in order to guarantee the principle of legality, will have to be motivated by applying the consumer protection rules based on the national law of the State where the adjudicating body is established or where the consumer is habitually resident or, at least, guarantee the minimum EU standard laid down in the relevant EU directives.

By contrast, with reference to conciliatory ADRs, they simply require that the consumer be made aware of all the alternative possibilities and, therefore, be able to go to the Court or apply to an ADR body to have his rights safeguarded. In the light of this, therefore, this second type of ADR, governed by the Recommendation No. 2001/301/EC, is certainly less stringent than adjudicative ADR, as it simply requires that consumers be made aware of all their possibilities and then consciously choose the solution proposed in ADR or decide to go to the Court. In fact, precisely in this regard, the consumer in conciliatory ADR must always be informed of the issue in a clear and comprehensible manner, advising him of his possibility of accepting or not the outcome of the procedure as well as of the fact that a more favorable solution could be reached in Court; it always remaining understood that, the completion of an ADR procedure does not preclude the consumer from being able to apply, at any time, to an ordinary court or other ADR body to have his interests safeguarded.

2.1 The harmonization of "CADR" procedures in the European Union: EU Directive No. 11/2013 and EU Regulation No. 524/2013

It was, however, with the EU Directive No. 11/2013 that all the aforementioned principles were finally extended and all the ADR procedures that had arisen in the various Member States, with reference to the subject of ADR in consumer disputes—so-called "CADR"—were harmonized.

The essential objective of this Directive was precisely to provide ADR procedures for any type of dispute, both domestic and cross-border, concerning contractual obligations arising from sales or service contracts between EU established sellers or suppliers and EU resident consumers, through ADR procedures that meet the requirements of quality and effectiveness by facilitating an amicable settlement of the dispute, especially if cross-border [7, 8].

In addition, the Directive has a very broad scope of application, in fact, pursuant to Article 2, it will apply to all the above-mentioned types of disputes including contracts concluded online, as long as they have, as their purpose, the sale of goods or services, including digital ones. On the contrary, it will not apply to B2B disputes, to transactions and negotiations between the parties, to B2C procedures, and to dispute resolution systems managed directly by the professional or company (so-called "in-house").

Again, a fundamental aspect is that the Directive No. 11/2013, however, will apply only and exclusively to intra-community disputes, since consumers and businesses must both be resident or domiciled in the European Union or must have a secondary branch there.

Clearly, the Directive also establishes, for the purpose of the proper conduct of the ADR procedure for the comprehensive protection of consumer rights, a number

of principles that will have to be respected in order to guarantee the necessary procedural standards.

In this sense, based on Article 6 *et seq.*, the compliance with these principles will have to be ensured:

- Principle of competence, independence, and impartiality of ADR bodies;

- Principle of transparency, since ADR bodies will have to provide specific information to consumers through easily accessible websites, also clarifying the requirements for access to the procedure and the rules of the procedure itself;

- Principle of effectiveness and efficiency, according to which ADRs must always be easily accessible to all parties, regardless of their location, without prejudice to the possibility of discontinuing the procedure at any time and submitting the matter to the ordinary Courts without incurring a duplication of procedure costs in that case—obviously, the use of the procedure free of charge must not lead to its excessive use by the consumer, since the consumer is obliged to contact the professional/company beforehand to try to settle the matter;

- Principle of equity, according to which each Member State may ensure that the parties are properly informed of their rights, as well as having complete freedom in accepting or not accepting the proposed solution—which by resorting to the ordinary procedure could be more favorable—and that it must necessarily be done in writing and must be reasoned;

- Principle of freedom, according to which any C2B agreement before an ADR body will not be binding on the consumer if it was reached before the dispute arose or if it would deprive the consumer of his right to subsequently pursue an ordinary procedure. It is therefore clear from this that the consumer will not be able in any manner to bind himself, through compromissory clauses, to the outcome of an ADR procedure before the dispute arises [9].

- Principle of legality, according to which the outcome sought in ADR must not, in any way, deprive the consumer of the protection guaranteed by the mandatory national provisions of habitual residence of the consumer and of the professional/company.

An additional recently introduced tool of fundamental importance for safeguarding consumer rights is the ODR system, governed by the European Regulation No. 524/2013. The ODR system provide a platform that allows consumers, resident in European Members States, to resolve, out-of-court, a dispute arising from contracts for goods and services, concluded online.

In this respect, major websites and e-commerce applications of companies based in the European Union or in a non-member country, which sell their goods and services to consumers residing in the European Union, from the entry into force of the aforementioned Regulation No. 524/2013/EU, will have to mandatorily inform consumers about the possibility of using the ODR instrument in case a dispute arises. Moreover, with ODR, the consumer, after having purchased online on a website or an e-commerce application, has the possibility to submit his complaint to a competent body and speed up the dispute procedure by trying to avoid lengthy litigation and try to solve the dispute out of court.

A major problem still unresolved with regard to the ODR system, however, is that only large companies have equipped themselves with such in-house mechanisms, making it practically inaccessible for smaller companies to set up such an internal dispute resolution system. As a result, such a system ends up facilitating only the in-house dispute resolution systems of the large multinationals, handling consumer complaints quickly and swiftly, leaving the provision of such a tool inaccessible for smaller companies, against which consumers will have to resort to the other ADRs provided.

2.2 The numerous dark issues of EU Directive No. 11/2013 and the tricky balance between the CADRs and national laws

The Directive No. 11/2013 has undoubtedly tried to protect the position of the "*weak*" party in transnational negotiations, attempting to create a common discipline for CADRs, harmonizing all the principles and bringing together the various types of ADRs that have arisen in the Member States but, nevertheless, many critical aspects remain unresolved by the Directive that require, perhaps, a new and more effective intervention by the European legislator.

First of all, as indicated in recital 6, many professionals/companies established in a specific Member State, with low-quality standards and where no ADR mechanisms are provided for, will undoubtedly be at a competitive disadvantage with respect to professionals/companies established in Member States that guarantee not only well-defined ADR procedures but also much higher quality standards. Precisely for this reason, States have been required to set up consumer-to-business dispute resolution bodies—"C2B"—on their territory that guarantee high-quality standards that are accessible to all. In the light of this, an initial criticism is evident since the directive does not extend to Business to Consumer disputes—the extension of ADR procedures is left to the States' discretion also to "B2C" disputes—but the scope of application is circumscribed solely to C2B disputes.

Secondly, the provision of the enforceability of the Directive No. 11/2013 only to consumers/companies established in the European Union will result in an unjustified exclusion in the access to the CADR procedures for those consumers who have contracted with a company established outside the EU territory, even if the same one, perhaps through an online contract, has addressed its activity to European consumers. In fact, referring also to the EU Regulation No. 1215/2012, it is clear that the aforesaid consumers will have no choice except to file an ordinary judicial proceeding to see their interests protected—a procedure that is certainly much more expensive and much longer and that will therefore cause a potential consumer to think twice about interfacing with a non-EU company.

Thirdly, with reference to respect for the principle of legality and the non-derogation of the mandatory rules of each Member State of the consumer's habitual residence, pursuant to Article 6 of the EC Regulation No. 593/2008, it is noted that ADR mechanisms may easily not be able to know the mandatory rules of a Member State since they only have to guarantee a general knowledge of the law. As a consequence, the Member States, then, will necessarily have to provide a parallel mechanism for reviewing the decisions taken in ADR in order to verify the effective application of and compliance with the national mandatory rules [10].

Furthermore, another fundamental aspect to which attention must be drawn is, without doubt, the difficult balancing between the discretionary power recognized to Member States, in their procedural autonomy in the field of ADR, and EU law. In this sense, with reference to recital 45 of the EU Directive No. 11/2013 and to Article 47

of the Charter of Fundamental Rights of the European Union, "the purpose of ADR procedures should be neither to replace judicial procedures nor to deprive consumers or professionals of the right to apply before the Courts," thus leaving the parties the right to choose between starting an ADR procedure or an ordinary procedure. However, this "freedom of choice" inevitably ends up clashing with the discretion of Member States to maintain mandatory mediation or conciliation systems as a condition for any possible or future ordinary proceedings. The European case law has dwelt on the issue establishing, in the light of the famous *Alassini Case-law* [11], that mediation/conciliation as a condition of procedural eligibility to be able to file a subsequent ordinary proceeding was not identifiable as contrary to the principles of effectiveness and efficacy, the cornerstones of the EU Directive No. 11/2013 as long as the outcome of the conciliation/mediation procedure itself is not binding, thus not affecting the parties' right to file an ordinary proceeding.

In the light of this, the Italian judge of the Court of Verona, section III civil division, requested a clarification from the European Court of Justice (ECJ) by way of a preliminary referral, by order of 28/1/2016, on the consistency between the compulsory mediation established by the Italian legislator in consumer disputes and the principles set forth in the Directive No. 11/2013, which is instead inspired by the purely voluntarist nature of the ADR procedures. In light of this, the ECJ [12] replied to clarify the issue definitively by emphasizing that *"Member States are free to choose the means they deem appropriate to ensure that access to the judicial system is not hindered, it being understood that, on the one hand, the fact that the outcome of the ADR procedure is not binding over the parties and, on the other hand, the fact that limitation or prescription periods do not expire during such a procedure represent two remedies which, among others, would be appropriate to achieve this objective"*—paragraph 56.

Further highlighting that, *"the requirement of a mediation procedure as a condition for the admissibility of a judicial remedy may thus prove to be consistent with the principle of effective judicial protection where such a procedure does not lead to a decision binding on the parties..."*—paragraph 61. On the basis of this, therefore, was emphasized the perfect admissibility of the Italian provisions on this matter. It being understood that the mediation procedure—for the performance of which the ECJ also stressed, at paragraph 65, the unnecessary need for the consumer to be assisted by a lawyer—preparatory to the commencement of subsequent ordinary proceedings, should not have any kind of binding character for the consumer who will therefore be fully free not to accept the outcome and to continue through ordinary proceedings to have his interests protected.

3. How the COVID-19 pandemic plagued European Consumer Rights: the Irish Airlines case

The impact of the COVID-19 pandemic has, without a doubt, caused huge problems in the sphere of consumer protection, contributing, in a period of such confusion and economic collapse for States, to consumer rights taking a back seat compared to the massive economic crisis that companies, often supported by necessary State intervention, had to contend with.

In this sense, the COVID-19 pandemic "*destroyed*" the economy of certain sectors such as primarily tourism and air transport, making State intervention in this regard inevitable. Emblematic, in this regard, was the Irish example where, as highlighted by the special report of the European Court of Auditors entitled *"Air passenger Rights*

during the Covid-19 Pandemic," it was pointed out that the fundamental rights of air passengers were in no way protected during the pandemic. Similarly, refunds for delays or cancelations did not follow a common guideline causing more than 5000 consumer complaints from across Europe to be lodged against Irish airlines, raising the total number of cross-border complaints before the Irish European Consumer Centre (ECC) by 130% in 2019. Furthermore, and perhaps even more importantly, it was that the Member States in providing state aid, however legitimate in the opinion of the European Commission, to airlines in great financial difficulty, never cared about the position of passenger reimbursement, focusing their state aid solely on keeping these companies in business.

As a result, consumers did not find any form of protection, based on the guarantees recognized to them by the EU law, receiving, following the various claims, only vouchers—which can only be issued with the explicit consent of the passenger—instead of financial reimbursements which, according to the EU consumer law, must be issued within 7 days after the cancelation of the flight. Again, such vouchers should normally have a maximum duration of 12 months to be cashed in, but, on the contrary, airlines have extended their duration without giving consumers the opportunity to proceed with the cashing in.

As a result, even bookings made through external sites—travel agencies or online platforms—suffered major delays in the refund process because the transition from airline to consumer had to interface with an external third party that had managed the booking process. This clearly complicated the situation enormously and the ECC found it very difficult to deal with the multitude of complaints filed, while also having to ensure that refunds—which during the pandemic period amounted to approximately EUR 4 million—would be made by the airlines as quickly and as reasonably as possible [13].

The COVID-19 pandemic also caused many other problems, leading to the increasing dependence of consumers on e-commerce, especially due to difficulties in finding certain goods. This has resulted in countless online purchases, especially cross-border and with non-EU countries with no or less regulated consumer protections, inevitably making it incredibly difficult for European institutions to maintain high standards of consumer protection and guarantees during the pandemic years. Furthermore, the absence of *ad hoc* legislation has led on the one hand to the establishment of specific, non-harmonized national procedures and, on the other hand, to the inability of the European institutions to cope with a legislative gap by not providing remedies for consumers in these specific situations.

3.1 The post-pandemic scenario regarding the consumer's rights in the EU

In light of the above, having overcome the first disorienting stage of the pandemic, also and above all at the regulatory level, the EU institutions began to focus attention once again on the recognition of fundamental consumer guarantees, through a series of new measures and guidelines for States. In June 2020, the European Commission started to promote the first public consultations to discuss how consumer protection could be improved and increased, especially in view of the health emergency caused by the pandemic.

As a consequence of this, from 2021 to date, various measures were promulgated to deal with the aftermath of the pandemic by allowing consumers to claim their rights, which had been infringed and sidelined, during such an emergency situation, while also trying to stimulate cross-border cooperation, thus ensuring an increasing

harmonization of consumer protection measures, seeing their rights and position strengthened, especially with regard to cross-border negotiations.

This was due to the European institutions' awareness of the strong consequences and changes that the pandemic has caused, such as, first and foremost, the abrupt acceleration of the digitalization of services, which can, in the same way, entail increasing risks for consumers to find themselves involved in online scams in a market that is often unregulated and unsecured toward them.

In light of these circumstances, on 22 February 2021, the New Consumer Agenda 2020–2025 (Agenda 2025) was officially released, which, updating the previous Agenda of 2012, promotes and incentivizes the digital and green transition in the freedom to provide services across the European Union. The Agenda 2025 establishes a long-term vision of consumer protection by designating consumers as playing an active role in the green and digital transition that will involve the EU working together with Member States to establish the rights to be protected, addressing the needs of different consumer groups—such as those with disabilities—and promoting higher standards of protection for European consumers who purchase goods from sellers established outside the EU [14].

In particular, the Agenda 2025 focuses on five different types of key interventions:

1. Digital transformation: countering misleading and manipulative online advertising of consumers' intentions and revising the Marketing of Financial Services Directive in order to strengthen consumer protection in the digitalization of financial services;

2. Effective enforcement of consumer rights: by strengthening coordination and support to Member States by supporting national authorities in tackling illegal or fraudulent online commercial practices;

3. Green transition: increasing transparency and access to quality information to enable consumers to make informed choices, ensuring the availability of sustainable products in the European market;

4. International cooperation: Increasing cooperation with international partners in an even more globalized world in which the cross-border market, through the digital instrument, is starting to play an increasingly leading role. In addition, a plan to strengthen the safety of products sold online has been promoted with China starting in 2021, and the aim is gradually to extend a comprehensive and sustainable technical and regulatory plan for all the EU's main trading partners.

5. Safeguarding the needs of certain groups of consumers who are particularly vulnerable—children, the elderly, etc.—or in economic difficulty as a result of the pandemic.

Furthermore, the EU, realizing that consumer spending now accounts for more than 54% of the GDP of the whole European territory, opted for a long-term plan in order to increase again, after the setback due to the pandemic, the position of consumers in the European economic dynamics. In light of this, the Agenda 2025 emphasizes how these outcomes can then be achieved through a series of actions needed to address the tricky challenges, highlighted even more in the context of the current

pandemic, and to strengthen cooperation among Member States, EU institutions, and stakeholders. This is the only way to provide a fundamental boost to the sustainable recovery and resilience of the EU economy and consumers in the post-pandemic scenario.

Clearly, however, the plan outlined in Agenda 2025 will have to constitute a starting point for subsequent interventions, by the European legislator, in the sphere of other matters related to the need for consumer protection, such as the directives on unfair commercial practices, energy efficiency of Energy-Related Products that will have to be revised in the logic of a new sustainable and "circular economy" that, inevitably, contrasts with the so-called "programmed obsolescence" idea. In addition, it will also be necessary to reinforce the responsibilities and obligations of intermediaries and online platforms—especially with reference to illicit products or illegal activities—as well as to strengthen civil liability for damages caused by Artificial Intelligence—used to induce consumers to take decisions even contrary to their own interests—which inevitably push toward a necessary reform of the EC Directive No. 95/2001 on general product safety.

4. Conclusions

While the presentation focuses on the substantive increase of consumer protection taking into account substantial law as well as procedural law, the analysis also points out the legislative initiatives that strive at the further development of the Internal Market and building a genuine EU economic arena. Although these initiatives are not labeled as consumer protection measures, they do intend to have a positive impact on the welfare of consumers.

Moreover, the impact of COVID-19 in the EU civil justice system has been analyzed and encouraged the ADR mechanisms to generate more confidence for consumers in cross-border transactions. As a matter of fact, Courts encourage disputing parties to explore the possibility of compromise via ADR mechanisms before agreeing to adjourn any hearings. Further, the online environment provides additional practical and economic benefits during a time of uncertainty and delays, and it represents the best mechanism to use when the parties reside in different countries.

In a scenario of uncertainty and lack of consumers' confidentiality, the Italian civil system is represented as best example of ADR resolution mechanism, by providing out-of-court settlements, collective redress, and crisis management procedures, with the aim to establish a systematic stability and financial consumer confidence in the cross-border transactions system in the new post-pandemic era [15].

Conflict of interest

The authors declare no conflict of interest.

Appendices and nomenclature

EU	European Union
TFEU	Treaty on the Functioning of the European Union
EESC	European Economic and Social Committee
ADR	Alternative Dispute Resolution

DOI: http://dx.doi.org/10.5772/intechopen.108539

ODR	Online Dispute Resolution
CADR	Alternative Consumer Dispute Resolution
B2B	Business to Business
B2C	Business to Consumer
C2B	Consumer to Business
ECJ	European Court of Justice
ECC	European Consumer Centre
Agenda 2025	New Consumer Agenda 2020–2025

Author details

Vincenzo Senatore[1]* and Emanuele di Prisco[2]

1 LLM, London, UK

2 LLM, Naples, Italy

*Address all correspondence to: vincenzo.senatore@giambronelaw.com

References

[1] Friedman B. Popular dissatisfaction with the administration of justice: A retrospective (and a look ahead). Indiana Law Journal. 2007;**82**(5):1192

[2] Sanco DG. Study on the Use of the Alternative Dispute Resolution in the European Union - Final Report Submitted by Civic Consulting of the Consumer Policy Evaluation Consortium (CPEC). 2009. Available from: http://www.civic-consulting.de/reports/adr_study.pdf

[3] Commission recommendation of 30 March 1998 on the principles applicable to the bodies responsible for out-of-court settlement of consumer disputes. Official Journal of the European Communities, L 115. 1998;**41**. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31998H0257and from=IT

[4] Commission recommendation of 4 April 2001 on the principles for out-of-court bodies involved in the consensual resolution of consumer disputes. Official Journal of the European Commission, L. 109. 2001;**44**. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001H0310and from=IT

[5] Wagner G. Private law enforcement through ADR: Wonder drug or snake oil. Common Market Law Review. 2014;**51**(1).165 p

[6] Hodges C, Benohr I, Creutzfeldt-Banda N. Consumer-to-business dispute resolution: The power of CADR. ERA Forum Springer. 2012. 199-225 p

[7] Cortes P. A new regulatory framework for extra-judicial consumer redress. Where we are and how to move forward. Cambridge University Press. 2015;**35**(1):114-141. DOI: 10.1111/lest.12048

[8] Belohlavek AJ. B2C Arbitration. Consumer Protection in Arbitration, 2012. 99-105 p. ISBN: 978-1-937518-12-7

[9] European Parliament—Directorate General for Internal Policies, Legal Instruments and Practice of Arbitration in the EU. 2014. pp. 52-53. Available from: https://www.europarl.europa.eu/RegData/etudes/STUD/2015/509988/IPOL_STU(2015)509988_EN.pdf

[10] Reich N. In: Micklitz H-W, Rott P, Tonner K, editors. European Consumer Law: Legal Protection of Individual and Collective Consumer Interest. Belgium: Intersentia; 2014

[11] European Court of Justice, Rosalba Alassini V. Telecom Italia, C-317/08, 2010. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:62008CJ0317

[12] European Court of Justice, L. Menini M. Rampanelli V. Bancsa Popolare Società Cooperativa, C-75/16, 2017. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:62016CJ0075

[13] Pope C. Protecting consumer rights during covid a 'gruelling task'. The Irish Times. 2021. Available from: https://www.eccireland.ie/media-coverage/irish-times-protecting-consumer-rights-during-covid-a-gruelling-task/

[14] European Commission. Communication from the Commission to the European Parliament and the Council New Consumer Agenda

Strengthening Consumer Resilience for Sustainable Recovery, COM/2020/696 Final. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0696

[15] Senatore V. Financial consumers and applicable provisions: A European and Italian perspective. International Review of Financial Consumers. 2017;**2**(1):17-41. DOI: 10.36544/irfc.2017.1-3

Chapter 12

The Future of Sustainable Consumption after the Pandemic, Optimism or Pessimism?

Carlos A. Trujillo

Abstract

The COVID-19 pandemic caused not only a temporal disruption in consumption habits but may have also triggered permanent changes in sustainable consumption. It was observed that during lockdowns, forced changes in consumption generated both positive and negative impacts on green-house emissions (e.g., less air travel but more plastic packaging). Furthermore, the consumer had to adjust their consumption decisions according to external circumstances in an unprecedented way. How much sustainable consumption will change in the long run? This chapter approaches that question from two possible angles based on consumer behavior theory. 1) We argue that changes in sustainable consumption may occur in both positive and negative directions depending on the way the disruption acted upon the interaction of drivers of behavioral change (social influence, habit discontinuation, individuality, emotions/beliefs, and tangibility) with consumption categories. 2) We argue that the influence of the disruption on sustainable consumption may accelerate the transition toward a post-consumerist society. We examine the potential validity of our propositions by reviewing empirical studies that captured sustainable consumption during the pandemic. The still scarce data indicate that in spite of both positive and negative short-term effects on sustainable consumption, there are reasons for optimism in accordance with our theories.

Keywords: sustainable consumption, COVID-19, habit disruption, post-consumerism, behavioral change

1. Introduction

Hundreds of millions of people around the world were confined to mitigate the spread of COVID-19. Following a few weeks of severe quarantines and lockdowns, many months of extended consumption restrictions remain in places around the world. This resulted in the largest natural consumption pattern modification experiment in history. The effects of lockdowns on the overall economic dynamics can be large and manifold, and the question to focus on is whether such measures could boost sustainable consumption permanently. Sustainable consumption is broadly defined as the consumption that "simultaneously optimizes the environmental, social, and economic consequences of acquisition, use, and disposition in order to

meet the needs of both current and future generations" [1]. Hence, it spans three dimensions, namely, sustainable development, consumption stages, and intergenerational considerations. The pandemic may influence the three: altering the balance and priorities of the social, environmental, and economic aspects of sustainable development, interrupting consumption stages, and refocusing the temporal considerations of consumers.

We posit that the issue of how the pandemic may influence sustainable consumption, in the long run, can be addressed based on at least two different approaches. The first is related to the short-term shock effect on people's decision-making brought about by the economic situation, leading to decision-making patterns, some of which are favorable toward sustainable consumption. Among such new patterns, some can be maintained in the long term. The second approach is the moderating effect of confinement as an accelerator of change in already emerging consumption patterns (e.g., voluntary simplification, collaborative consumption) toward a post-consumerist economy, brought about by boosting social and entrepreneurial innovation in keeping with sustainable development. In this chapter, we use consumer behavior theory to suggest plausible scenarios of post-pandemic sustainable consumption. In spite of the still high uncertainty regarding the actual changes in sustainable consumption after the pandemic, there is solid theory and knowledge to anticipate possible scenarios in order to inform both academic and practice-oriented readers. This is the objective of this chapter. The topics touched upon in this chapter are widely researched, but our purpose is not to undertake a full review, but instead, based on the most salient literature, we offer a framework to analyze the potential long-term effect of the pandemic on sustainable consumption. Hence, this chapter offers informed suggestions about potential scenarios. We complement such analysis using the still scarce empirical evidence available in recent publications. Such evidence, nonetheless, is mostly related to consumption during the lockdown, not after the pandemic. There are, nonetheless, industry reports that show post-pandemic significant changes in consumption patterns and rationales that may indicate good news for sustainability [2]. We discuss comparative data from a consumption survey conducted in Colombia right before the lockdown period (December 2019) and repeated when most of the major restrictions had been lifted (October 2020).

2. Approach 1: changes to consumption patterns conducive to sustainability

Conditions of confinement de facto and abruptly change supply and demand dynamics, significantly altering household consumption patterns. To identify whether lockdowns can cause a permanent shift toward more sustainable lifestyles, we need to ask at least three questions: (1) Does confinement activate behavioral change factors that consumer science has already identified as effective behavior modifiers: (2) Are these conditions juxtaposed with areas of consumption that have environmental impacts; and, perhaps the most difficult question, (3) could the positive effects on sustainable consumption that may appear during lockdowns spill over into post-confinement, and consolidate as stable patterns. We can anticipate that the post-confinement period will be characterized by a crisis of trust and confidence in the immediate surroundings, coupled with heightened global awareness of collaboration and interdependence. Moreover, Ramiksson [3] has theorized that the

combination of pro-social and pro-environmental behaviors observed during lockdowns may have long-lasting effects on well-being, which contributes to long-term adoption.

The following consumption categories, widely used by multilateral and national policies and interventions [4], will be used for the analysis: (1) Use of water, electricity, and gas; (2) Transportation; (3) Eating habits and forms of supply; and (4) Organization of consumption needs and priorities. Meanwhile, the following five categories of social mechanisms have been identified as having an influence on promoting pro-environmental consumption [5]: Social influence, habit change, individuality, emotions and beliefs, and tangibility. Based on its definition, each of these aspects is assessed to determine whether it has been triggered by confinement and whether such triggering has affected the aforementioned categories of sustainable consumption. **Table 1** summarizes the linkage between behavioral triggers and consumption categories. For those effects that are likely to have positive impacts on sustainable consumption, we examine whether they will continue in the medium and long term or whether they will disappear once the confinement measures are fully lifted.

2.1 Social influence

This is manifested through social norms, identification with influential groups, and social desirability of behaviors [6]. Confinement to mitigate COVID-19 triggers new social dynamics and the population tends to share a lot of information about the situation and their experiences in adapting to the conditions of consumption under confinement using electronic messaging [7]. This flow of information can give rise to descriptive norms, as well as increased communication and identification among influential groups, that share something in common such as place of residence or social, work, or study groups. The sustainable consumption categories that can be subject to this social dynamic are transportation, food, and some aspects of product and service consumption reordering and prioritization. For example, members of a WhatsApp group can start using certain food suppliers and share it through their social media, creating a descriptive social norm. These changes tend to favor sustainable consumption as they are related to reduced and optimized mobility and transportation, better eating habits including new places and modalities of purchase, and a reconsideration of necessary and non-necessary consumption. Early works on

	Social influence	**Habit discontinuation**	**Individuality**	**Emotions and beliefs**	**Tangibility**
Improved resource use	No impact	—	No impact	—	++
Transport	++	++	+/−	—	+
Food	++	+	+	—	+
Reordering of consumption priorities	+	+/−	+	+/−	++

No impact, + slight positive effect, ++ strong positive effect, and − negative effect.
Source: Own elaboration.

Table 1.
Effects of confinement as a result of triggers and sustainable consumption categories.

content analysis of social media during the pandemic reveal that lifestyle topics were part of the communications [8].

2.2 Changing habits

Consumption habits are repetitive and routine behaviors that play a key role in sustainanble consumption [9]. Confinement discontinues habits in a significant portion of consumption spaces, including the four categories of sustainable consumption mentioned above. In some cases, confinement includes different forms of penalties and incentives associated with specific behaviors (e.g., mobility). However, the impact on sustainable consumption categories can be both positive and negative. Under lockdown, households tend to increase their resource use (e.g., longer baths, greater use of household appliances, and frequent washing of clothes with low loads and high temperatures), while they reduce their use of transportation to the bare essentials, and eating habits tend to be regulated and balanced with new products and smaller portions. Finally, the reordering of consumption priorities can shift in multiple directions; for example, the suspension of habits connected to the hyper-consumption of clothing, while sustainability criteria in recycling habits, use of plastic bags, etc., may diminish in favor of practicality and hyper-hygiene. Habit discontinuation for several weeks significantly opens the possibility of changing behaviors permanently toward whatever situational influence occurs during the interrupted period, including sustainable consumption [9]. We suggest that the consumption situations experienced during lockdown may have such an effect.

2.3 Individuality

Aspects of an individual's self-perception and identity are reflected in his or her consumption patterns [10]. Some of these aspects are self-efficacy, self-concept, self-consistency, and self-interest [5]. Confinement has mixed effects on these dimensions, which could indirectly affect sustainable consumption. On the one hand, the confined consumer's consumption range is radically restricted disrupting the connection between consumption and individuality, which is then coupled with a sense of disempowerment and lack of control, which is an antecedent of pro-environmental behaviors [11]. However, confinement also brings with it a persistent message of connection with others through the common purpose of safeguarding everyone's protection and health [3]. Thus, consumers' self-efficacy diminishes while they face greater difficulties in maintaining self-consistency. At the same time, lockdown poses a challenge to self-interest in favor of more pro-social behaviors, which may open the door to changes regarding selfless nature -concept, especially through consumption. This situation could be reflected in the emergence of more sustainable consumption patterns, especially in food and in the reordering of consumption priorities, guided by pro-social criteria and by renewed roles within the family dynamics [3]. The post-confinement choice and use of transport can become either more or less sustainable depending on the direction of the change in self-concept, the symbolic weight of this decision, and the contrast with other criteria such as safety, hygiene, and efficiency. For example, the intention to buy a vehicle may decrease if its social symbolic value has been reevaluated, but it is more convenient from a distancing and hygiene standpoint. With very little relation to self-concept and with reduced self-efficacy due to the effect of confinement, resource use would have a minor bearing.

2.4 Emotions and beliefs

Consumer behavior in general is influenced by a very complex mix of emotions, information, and beliefs. However, behaviors consistent with promoting sustainability have a distinctive feature, namely the so-called attitude-behavior gap or value-action gap [12]. That is, although people—in many cases, well informed—report a great concern about the environment [13, 14], behaviors change to a much lesser extent. Can lockdowns exert an effect in reducing such gap? Confinement has both emotional and cognitive effects that could influence sustainable consumption in different directions. On the one hand, the worrying negative emotions experienced during the confinement period trigger emotional self-regulatory effects aimed at reducing such emotions through immediate gratification [15]. This would increase resource use and food cravings and may lead people to imagine consumption scenarios that increase their intention to travel, buy vehicles, or reorder consumption priorities during and after the crisis, considering short-term satisfaction rather than sustainability criteria. However, the increased flow of information can promote learning about climate change and sustainable development. This in turn may enhance the perception of environmental protection being a collective challenge. In any case, the emotional effects of confinement are quite significant and its negative effects on sustainable consumption possibly outweigh the positive effects of increased information.

2.5 Tangibility

A significant percentage of consumers still think of sustainable development as something abstract and distant. Even if people believe that climate change is real and that companies should do something about it (see Nielsen global report, [14]), there may not be enough urgency in such beliefs to motivate short-term individual actions. This makes sustainable consumption changes difficult to define and incorporate into frequent consumption patterns. The occurrence of a pandemic and the reality of confinement elevates the perception of a subjective probability of events that could be considered distant and improbable. It brings a temporal and physical approach to an event with global concrete implications. This affects the way climate change is temporally construed [16]. That is, the psychological distance to the global level crisis is reduced. Such tangibilization can increase the proximity and reality of climate change as a global problem with real and intrusive implications in people's lives. This can have positive consequences in all categories of sustainable consumption, especially the most proximate and controllable ones, which in this analysis are resource use and the reordering of consumption priorities. Transportation and food decisions may be less affected because they are connected to aspects slightly further away from immediate control, such as available infrastructure and food availability.

Table 1 Summarizes the speculated crossed effects of the pandemic on behavioral change drivers and consumption category.

In short, the strongest and most generalized effect of lockdowns and restrictions on sustainable consumption through the impact on short-term consumption patterns occurs through the tangibilization of global challenges and high impact on people's lives that can result in stronger beliefs about the collective challenge of curbing climate change. Next in importance and generality is the effect of social influence on three of the sustainable consumption categories. Habit changes and ambivalent messages about individuality and collectivity have positive and negative effects

depending on the consumption category. Finally, the negative emotions engendered by confinement may decrease sustainable consumption.

3. Approach 2: accelerated replacement of the economic growth model based on hyper-consumption

The literature on sustainable consumption has identified signs of an evolution toward a post-consumerist society and a new economic model [17]. The paradigm of economic growth based on the promotion of fast-paced consumption, with great prominence on planned and perceived obsolescence, shows signs of weakness in North American and Western European economies. These weaknesses have been slowly growing but have led many industries to support their growth in emerging markets. Can global confinement accelerate the transition to post-consumerism and deepen the weaknesses of the hyper-consumerist model? According to Cohen's [17] review, such weaknesses include the following:

a. The demographic transition of major developed economies to older populations.

b. The disappearance of the middle classes as defined in the 1950s to 1980s (the golden age of consumerism), making the concept of mass consumption disappear, giving way to personalized models in more unequal societies where income distribution is bimodal.

c. The emergence of new consumer preferences that move away from traditional symbols of achievement such as vehicles, suburban housing, jewelry, and other possessions, directing spending toward experiences and services.

d. Reduced access to cheap and abundant natural energy resources, mainly hydrocarbons.

e. The disappearance of the political consensus that dominated the second half of the twentieth century in the face of the economic development model based on growth and consumption.

f. The proliferation of social innovations, inconsistent with a mass consumption economy (e.g., collaborative consumption), which favors business innovation in order to take advantage of these new social dynamics.

Confinement can accelerate the weaknesses described in b, c, and f. First, confinement and social distance negatively impact employment, income, and firm performance of the middle classes. This deepens inequalities and accentuates income bimodality. Sustainable consumption in these circumstances can be affected in opposite directions. On the one hand, families may reduce their total consumption volumes, but reorient their spending toward the satisfaction of more basic and immediate needs with little consideration of sustainability attributes and with greater sensitivity to price. Such a reduction in the perception of well-being does not favor the consolidation of sustainable consumption patterns, as it reduces consumers' willingness to pay for certified products and may result in a rebound effect when economic conditions recover. With respect to c, the drastic reduction of many consumption

spaces during the confinement and in the following months may accelerate the reconsideration of traditional symbols of consumption-based well-being and increase the search for experiences and services through technology and virtuality. If the consumer finds satisfaction and well-being in these new experiences, they will quickly share this on social media platforms and the great symbols of middle-class suburban life will weaken at an accelerated rate, favoring the search for sustainability through consumption.

Finally, regarding f, confinement interacts with emerging social innovations engendering greater collaboration among consumers. The quarantine has made local products visible and highlighted the importance of loyalty to reliable and local brands. This can deepen social and entrepreneurial innovation in favor of consumption and reuse communities; artisanal businesses; and, in the midst of this, the value of environmental care. In recent years collaborative consumption and voluntary simplicity have gained popularity and have triggered multiple entrepreneurial initiatives in many countries. They may play an accelerating role in the effect of lockdowns on new social dynamics. Voluntary simplicity is the free decision to reduce consumption and live a simpler life (see Rebouças and Soares [18] for a recent review of the concept), which is usually motivated by environmental concern, among other factors. Collaborative consumption [19] is based on facilitating access and sharing mostly services but also products among consumers. Moreover, forced teleworking and the combination of work and family life can open the door to completely new dynamics where companies take the risk of revising work models by permanently reducing the need for transportation for thousands of workers, especially office workers. It will also favor the rise of e-learning and the value of being at home. There will, however, be a hyper-hygienic social dynamic that will lead to an avoidance of mass transit, which may encourage individual and less sustainable forms of transportation.

4. Preliminary empirical evidence

During the severe lockdown weeks and the following months when various types of consumption restrictions remained, research in different contexts examined consumption patterns. A subset of such research has focused on sustainable consumption. One of the largest studies was conducted in Isreal during the confinement period by Tchetchik, Kaplan, and Blass [20]. They found significant increases in recycling and a remarkable intention to consume less. These behavioral changes were catalyzed by the perception of threats and coping mechanisms. Furthermore, ecocentric beliefs and informational associations between COVID-19 and climate change increased how serious the environmental crisis was perceived. This is consistent with the expected effects of increased tangibility explained before. In addition, food consumption patterns seem to be one of the most affected categories in different countries. Under lockdown, people significantly modified eating and cooking habits [21, 22], which may reduce food waste, as some its determinants are affected (e.g., planning meals). Consistently with our theorizing about the link between tangibility, beliefs, and more sustainable food consumption, Castellini et al. [23] found that in Italy, people exhibited increased awareness of environmental issues related to food (e.g., animal welfare) and sustainable diets. In other categories, there is still a dearth of academic research, but industry surveys [24] show some tendencies. For instance, consumers in Europe report to have increased their intention to use sustainability criteria in connection to lifestyles in general, and to recycling, sustainable packaging, and clothing

in particular, which supports our propositions about the effect of habit discontinuation on the reordering of consumption priorities.

The various studies mentioned above, show cross-sectional evidence of consumption patterns during the lockdown weeks. The question of how such patterns would unfold after the lockdown remains largely unanswered. Trujillo et al. [25] report comparative data on various sustainable consumption categories measured by the same questionnaire in Colombia, a few weeks before confinement (Decembre 2019) and right after the major restrictions had been lifted (October 2020). They found significant improvements in recycling/disposing but less sustainable consumption in water and energy use, as well as in sustainability criteria in purchases. However, they found an increase in ecocentric beliefs and a shift in the way such beliefs relate to sustainable consumption. These results may reflect some still short-term effects of lockdowns (e.g., longer showers and extremely hot laundry based on fear of contagion), but long-term belief changes toward sustainable behaviors. These findings are consistent with the proposed negative effects of emotion regulation and impulsive coping that may characterize the initial post-pandemic period, but also shows that structural beliefs may increase sustainable consumption in the long term. Furthermore, increased ecocentrism may accelerate the transition to a post-consumerist society by enabling the appearance of new innovations in the sense put forward by Cohen [17] as explained above.

5. Conclusion

This chapter offers a prospective argumentation of what may be the future of sustainable consumption in the post-pandemic period. There are possible positive and negative effects, but overall, we believe that there are reasons for optimism. We proposed a framework to examine the effect of lockdowns on the interaction between known drivers of behavior change toward sustainability [5] and target consumption categories [4]. We also argued that confinement impacts at least three factors that undermine the hyper-consumerist economic model. However, it does so by favoring sustainable consumption, and by accelerating the development of consumption preferences that privilege experiences and services through technology and virtuality, as opposed to the traditional symbols of suburban life (house and car). Preliminary empirical evidence seems to support not only some of the proposed specific effects (e.g. food, reordering of consumption priorities) but also the potential to accelerate the weakening of hyper-consumption by accentuating social and business innovations that harness the rise of collaborative consumption, voluntary simplification, teleworking, blended family dynamics, and minimalism. The way unemployment and income may reduce sustainable consumption remains an open question. Overall, we think there are enough reasons for optimism but it is necessary that both public environmental policy and private action take advantage of the potential positive effect of habit discontinuation on sustainable consumption in order to maximize the opportunities.

Author details

Carlos A. Trujillo
Universidad de los Andes, School of Management, Bogotá, Colombia

*Address all correspondence to: catrujill@uniandes.edu.co

IntechOpen

References

[1] Phipps M, Ozanne LK, Luchs MG, Subrahmanyan S, Kapitan S, Catlin JR, et al. Understanding the inherent complexity of sustainable consumption: A social cognitive framework. Journal of Business Research. 2013;**66**(8):1227-1234

[2] McKinsey. Now is the Time for Climate Action. 2022. Available from: https://www.mckinsey.com/featured-insights/themes/now-is-the-time-for-climate-action

[3] Ramkissoon H. COVID-19 Place confinement, pro-social, pro-environmental behaviors, and residents' wellbeing: A new conceptual framework. Frontiers in Psychology. 2020:2248

[4] UNEP (2016) A Framewor for Shaping Sustainable LifeStyles. Available from: https://wedocs.unep.org/bitstream/handle/20.500.11822/9995/-A_framework_for_shaping_sustainable_lifestyles__determinants_and_strategies-2016Sustainable_lifestyles_FINAL_not_for_print.pdf.pdf?sequence=1&amp%3BisAllowed=

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

[6] Abrahamse W, Steg L. Social influence approaches to encourage resource conservation: A meta-analysis. Global Environmental Change. 2013;**23**(6):1773-1785

[7] Costa E, Esteve-Del-Valle M, Hagedoorn B. Scalable co-presence: WhatsApp and the mediation of personal relationships during the Covid-19 lockdown. Social Medi a+ Society. 2022;**8**(1):20563051211069053

[8] Niknam F, Samadbeik M, Fatehi F, Shirdel M, Rezazadeh M, Bastani P. COVID-19 on Instagram: A content analysis of selected accounts. Health Policy and Technology. 2021;**10**(1):165-173

[9] Verplanken B, Roy D. Consumer habits and sustainable consumption. In: Handbook of Research on Sustainable Consumption. Edward Elgar Publishing; 2015

[10] Belk RW. Possessions and the extended self. Journal of Consumer Research. 1988;**15**(2):139-168

[11] Hartmann P, Apaolaza V, D'Souza C. The role of psychological empowerment in climate-protective consumer behaviour: An extension of the value-belief-norm framework. European Journal of Marketing. 2018;**52**(1/2):392-417

[12] Kollmuss A, Agyeman J. Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research. 2002;**8**(3):239-260

[13] Centro de los Objetivos de Desarrollo Sostenible CODS (2020) Estudio sobre patrones de consumo sostenible en America Latina

[14] Nielsen. The Education of the Sustainable Mindset. 2018. Available from: https://www.nielsen.com/us/en/insights/report/2018/the-education-of-the-sustainable-mindset/

[15] Yi S, Baumgartner H. Coping with negative emotions in purchase-related situations. Journal of Consumer Psychology. 2004;**14**(3):303-317

[16] Trope Y, Liberman N. Construal-level theory of psychological distance. Psychological Review. 2010;**117**(2):440

[17] Cohen MJ. Toward a post-consumerist future? Social innovation in an era of fading economic growth. In: Handbook of Research on Sustainable Consumption. Northhampton, MA, USA: Edward Elgar Publishing; 2015

[18] Rebouças R, Soares AM. Voluntary simplicity: A literature review and research agenda. International Journal of Consumer Studies. 2021;**45**(3):303-319

[19] Botsman R, Rogers R. What's Mine Is Yours: The Rise of Collaborative Consumption. New York: HarperCollins; 2010

[20] Tchetchik A, Kaplan S, Blass V. Recycling and consumption reduction following the COVID-19 lockdown: The effect of threat and coping appraisal, past behavior and information. Resources, Conservation and Recycling. 2021;**167**:105370

[21] Eftimov T, Popovski G, Petković M, Seljak BK, Kocev D. COVID-19 pandemic changes the food consumption patterns. Trends in Food Science & Technology. 2020;**104**:268-272

[22] Janssen M, Chang BP, Hristov H, Pravst I, Profeta A, Millard J. Changes in food consumption during the COVID-19 pandemic: Analysis of consumer survey data from the first lockdown period in Denmark, Germany, and Slovenia. Frontiers in Nutrition. 2021;**8**:60

[23] Castellini G, Savarese M, Graffigna G. The impact of COVID-19 outbreak in Italy on the sustainable food consumption intention from a "one health" perspective. Frontiers in Nutrition. 2021;**8**:90

[24] MacKinsey and Company. Survey: Consumer Sentiment on Sustainability in Fashion. 2020. Available from: https://www.mckinsey.com/industries/retail/our-insights/survey-consumer-sentiment-on-sustainability-in-fashion

[25] Trujillo C, Arias C, Diaz A. The effect of consumer lockdown on the relationship between environmental beliefs and pro environmental behaviors. Unpublished manuscript

Edited by Umut Ayman

The complexities of consumer behavior call for comprehensive and detailed analytical studies. The need for both businesses and academics across the world to understand the behavior of consumers in crisis situations has been clearly illustrated by the Covid pandemic. *A New Era of Consumer Behavior - In and Beyond the Pandemic* presents research on both theoretical and practical aspects of this topic in three sections: "Digital Shifts in Consumer Behavior", "Digitalization of Consumer Behavior in the Tourism Sector" and "Consumer Protection and Sustainability".

Taufiq Choudhry,
Business, Management and Economics Series Editor

ISSN 2753-894X
ISBN 978-1-80356-184-4
9 781803 561844

Published in London, UK

IntechOpen