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# Panic buying research: A systematic literature review and future research agenda

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## Abstract

Panic buying has re-emerged as a 'new' normal consumer behaviour and has become a coping mechanism for real and perceived dangers associated with COVID-19. Despite the need for a better understanding of the panic buying phenomenon, there has been a lack of scholarly research on this topic. This study seeks to fill this gap. In this article, we systematically review extant studies in panic buying from the last two decades. We analyse and categorize them according to Callahan's 4W (2014) review structure and Paul and Rosado-Serrano's (2019) TCCM framework. We found that the existing publications in panic buying are fragmented across multiple disciplines. Due to the nature of the panic-induced behaviour, most of them have been written as a reaction to the pandemic crisis. We contribute to marketing research by providing theoretical, contextual and methodological insights into the field of panic buying. Furthermore, we develop a research agenda related to retailer and consumer perspectives. Additionally, we identify research issues related to policymaking and governance, as well as broader societal impacts that need to be addressed in the future.

## KEYWORDS

consumer perspective, COVID-19, future research agenda, panic buying, retailer perspective, systematic literature review

## 1 | INTRODUCTION

Ever since the COVID-19 pandemic inflicted the world with anxiety and unprecedented unclarity, the global economies have borne a colossal negative impact. Many small and medium-sized entrepreneurs were required to cease their operations due to the government-imposed restrictions. The escalating numbers of infections and deaths caused ongoing uncertainty regarding the future, even causing extreme levels of fear in the public, as in an imminent holocaust. Current statistics of the COVID-19 global spread, as reported by WHO, have reached over 100 million infected cases and approaching 2.38 million deaths (WHO Corona Disease Dashboard, 2021). There is uncertainty regarding the availability of and efficacy of the vaccine.

As the situation worsened, countries all over the world were forced to adopt social distancing and other mandatory measures for preventing the spread of the virus. Using Personal Protective Equipment (PPE), wearing masks and adapting to lockdowns and quarantines have become new routines. It is reported that the pandemic also caused consumer behavioural shifts that have, since March 2020, been popularly addressed as the 'new normal' behaviour (The Straits Times, 2020). Stockpiling, aggressive in-store behaviours, compulsive hoarding and shop raiding have been some of the commonly reported shopping behaviours (Knotek et al, 2020; Yap & Chen, 2020; Zaidi & Hasan, 2020).

The question is whether people choose to be self-centred during trying times, or is it that humans are naturally wired to react this way? According to Loxton et al. (2020), panic buying has its roots in

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herd mentality. Kameda and Hastie (2015) describe herd behaviour as an '*alignment of thoughts or behaviours of individuals in a group*' (p. 2). An example of irrational herd behaviour is the inappropriate conduct directed at the pharmacy personnel due to the rationing of over-the-counter medicines (Zaidi & Hasan, 2020). To control herd behaviour, some retailers introduced limits on goods such as toilet paper, pasta and milk (Anderson, 2020).

In the current COVID-19 pandemic and the previous instances of crises and outbreaks, for example, the SARS and Avian flu, people tend to turn to alternative media such as word-of-mouth and independent web sources. These sources can function as extra-institutional channels that often challenge and contradict official media (Cheng, 2004; Ding, 2009; Nicosia, 2006; Sala, 2020). The overload of information can lead to confusion and increased anxiety among the public. The onslaught of mixed messages, the ambiguity that surrounds people and the influence of social media and imagery (e.g., empty shelves in supermarkets), will create panic buying in people and causes them to behave irrationally (Chen et al., 2020).

Panic has been identified as a product of a postmodern culture that emphasizes individual gains over the collective ones, which in excess, can become a social problem (Kroger et al., 1990). Already, two decades ago, Kroger et al. (1990) compared our societies with 'the catastrophic implosion within a whole series of panic scenes at the *fin-de-millennium*' (p. 443), with panic, including panic buying, being 'the environmental mood of postmodern culture' (p. 443). In developing nations, consumers compete for limited resources daily while learning to live under conditions of scarcity (Gupta & Gentry, 2019). It is argued that the established models of consumer behaviour, for example, the Theory of Planned Behaviour (TPB) (Ajzen, 1985) and the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1988), cannot fully explain panic buying behaviour. This is because panic buying is a response to a perceived external or internal uncontrolled context and is not completely performed because of a premeditated intention or decision to perform the behaviour.

Despite the growing importance of understanding the panic buying phenomenon, there is a shortage of academic studies in this field (Li et al., 2020; Yuen et al., 2020). In addition, the published research in panic buying is dispersed across multiple disciplines. This misalignment was a major motivation to pursue and advance the understanding of existing panic buying behaviour studies. To align the different perspectives in the status of the area, the method of a systematic literature review was deemed as most appropriate. We were guided by robust methods of conducting systematic literature reviews (see Callahan's 4W 2014 and Paul & Rosado-Serrano's, 2019 TCCM frameworks), focusing on sub-themes, research methods and constructs/variables used in previous research. The uniqueness of our study is that, first, it builds on only academic published research. Our motivation to exclude non-scientific studies is that they provide only a general overview of the panic buying issue. Second, our study establishes deeper connections and cross-points with seminal and classic theories. Furthermore, we provide a comprehensive future research agenda. We believe that this can serve as an inspiration for

researchers in their efforts to develop a pathway towards a more established and independent field of panic buying research.

Our review answers the following questions--*What do we know about panic buying as an academic context? Where is the research happening? How was the research conducted? Why should academicians, practitioners and policymakers know more about panic buying?* By answering them, we seek to achieve the following objectives: (a) to analyse existing studies in panic buying fragmented across various disciplines; (b) to understand what we know about the panic buying phenomenon and how it is evolving in COVID-19 times; (c) to understand where these studies have been conducted and how they were conducted methodologically; (d) to identify gaps in the existing studies; (e) to develop a comprehensive future research agenda and (f) to suggest policy implications.

We structure our paper as follows:

Section 2 reports on panic buying phenomenon and sets a base for the systematic literature review. Section 3 presents the study methodology. Section 4 presents the review structure.

Section 5 is a discussion. Section 6 that provides a future research agenda. Finally, we present the study implications and end with conclusions.

## 2 | TOWARDS AN UNDERSTANDING OF THE PANIC BUYING PHENOMENON

As Yap and Chen (2020) report, the escalation of the COVID-19 pandemic has resulted in the raiding of shops for products such as hand sanitizers, medicines, masks and PPEs as well as food and household goods. One can see images of stores in Singapore facing a sudden and heavy demand for toilet paper and noodles (South China Morning Post, 2020), armed robbery in Hong Kong for toilet rolls (BBC, 2020) and frenzy buying events even in countries where the rate of infection in the early stage of the pandemic was minimal (Cochrane, 2020). Media reports from Australia, the United States, China, the United Kingdom and India have shown how panic buying has caused chaos and herd behaviour (e.g., Dexter & Sakkal, 2020). Panic buying also occurs in contexts beyond pandemics and crises. For example, in December 2020, the British government appealed to its citizens to abstain from panic shopping due to the tensions associated with the Brexit EU trade deals (Anderson, 2020).

What psychological and behavioural reasoning do people have when they line up for things they perceive as essential, even if authorities suggest that such panic is unnecessary? We try to provide an explanation of panic buying behaviour. When confronted with an uncontrollable situation, people try to resolve inadequacies and distortions by understanding their own capabilities and constraints (Bandura, 1977). Subjective behaviours manifest because of how personal happiness is expressed vis-a-vis universal helplessness (Abramson et al., 1978). Some reports attribute panic buying to an embedded distrust in the government (Sala, 2020). Others attribute it to the impacts of herd mentality and mass behaviours (Bouffanais & SunSun, 2020; Loxton et al. 2020). The situation becomes further

complicated by the infusion of information from digital platforms. Ambiguous information and market stimuli lead to a possible miscomprehension of the product availability exacerbating consumer confusion and causing reactive buying (Dholakia, 2020). Consumers are, therefore, less likely to be intellectually involved with the decisions regarding the type and quantity of the purchases to be made (Mitchell et al., 2005).

Chen et al. (2017) indicate that the consumer desire to acquire control is primarily responsible for product acquisition. As Bonneux and Van Damme (2006) state: *'The threat of a pandemic is particularly scary as we lack control, which in turn tempts us into aimless activity'*. (p. 787). Typical products bought for perceived control acquisition include utilitarian products such as household and medical goods over hedonic products (Chen et al., 2017). In line with Chen et al. (2017), Knotek et al. (2020) report that consumers prioritized basic things and postponed larger or expensive purchases.

Kroker et al. (1990) explain panic and its diversion from the classical sense as *'in antiquity, the appearance of the god Pan meant a moment of arrest, a sudden calm, a rupture point between frenzy and reflection. Not so in the postmodern condition'* (p. 444), where panic is now associated with feelings of loss, cancellation, extermination and even hysteria. Li et al. (2020) classify panic buying as a kind of impulsive consumer behaviour that is grounded in deep emotions such as human fear. Behavioural therapy research suggests that impulsive buying is a part of compulsive buying (Mueller et al., 2007). It was further found that compulsive buyers may also suffer from compulsive hoarding (see Mueller et al., 2007).

The current pandemic situation bears an association with the theory of learned helplessness (Kuhl, 1984; Maier & Seligman, 1976). In reference to panic buying, learned helplessness means that when events such as the COVID-19 pandemic become uncontrollable, consumers show greater emotional disruption than for controllable aversive events (Maier & Seligman, 1976). In other words, panic buying is a natural behavioural response to the perceived loss of control and a speculated lack of commodities in the market. Slovic et al. (2004) argue that there exists a complex interplay between rational behaviour and emotional responses and one is guided by the other. In line with Slovic et al. (2004), we view panic buying as a holistic phenomenon that has its roots in both human cognition and emotion. The extent to which panic buying behaviour manifests, depends on the balance between perceived risks and perceived benefits in each risk analysis situation. The following section outlines the methodology and the research approach used to conduct our literature review.

### 3 | METHODOLOGY

This study uses a systematic literature review to analyse and synthesize relevant studies to identify gaps and highlight synergies within them (Booth et al., 2012; Hao et al., 2019; Kennedy, 2007). Systematic review papers can be of several types, namely-- Structured review focusing on widely used methods, theories

and constructs (Canabal & White, 2008; Dhaliwal et al., 2020; Kahiya, 2018; Paul & Singh, 2017), Framework-based (Paul & Benito, 2018), Hybrid-Narrative with a framework for setting future research agenda (Kumar et al., 2020; Paul et al., 2017), Theory-based review (Gilal et al., 2019; Paul & Rosad-Serrano, 2019), Meta-analysis (Barari et al., 2020), Bibliometric review (Randhawa et al., 2016), Review aiming for model/framework development (Paul, 2019; Paul & Mas, 2020). In this article, we examined the scholarly literature related to panic buying and created a framework of extant knowledge following the research approach used in Kumar et al. (2020) and Rosado-Serrano et al. (2018).

#### 3.1 | The search process

We began the search process with One Search and other databases including Business Source Premier, Google Scholar, JSTOR, Science Direct, Scopus and Web of Science. In the first screening, we used keywords such as panic buying, panic shopping and consumer buying in COVID-19. The second screening was based on the keywords such as consumer spending in COVID-19, scarcity and hoarding in COVID-19 and stockpiling in COVID-19. In the third screening, we used keywords such as compulsive buying in COVID-19, compulsive hoarding in COVID-19 and adaptive consumer behaviours during COVID-19. All three screenings led to a large number of hits that exceeded four-digit numbers and were a mixture of scholarly and non-scholarly publications. Many of these publications were newspaper articles, blog posts and special journalistic impressions from different parts of the world. Therefore, to ensure a more targeted search for relevant scholarly works, we opted for publisher-specific databases to look for peer-reviewed journal publications, conference proceedings, reports, book chapters and working papers. The publisher-specific search gave us the following number of published works: Emerald insight (38), Elsevier (51), One search (79), Sage (38), Wiley (84), Taylor and Francis (81) and Springer (49). The cover period for this search was 1990–2020. The authors had no pre-determined time frames for the studies during the inception of the literature review. The period of 1990–2020 emerged organically from our search as the relevant papers included in this study were published over this period. A similar two-decade approach is also seen in Paul and Rosado-Serrano (2019) that further served as our orientation for our literature search.

#### 3.2 | The inclusion criteria and the resultant pool of studies

The validity of the resultant pool of papers depends on the specific parameters for qualifying studies (Kahiya, 2018; Krippendorff, 1989). Therefore, we developed and applied the following inclusion criteria to further funnel the search process:

1. Only scholarly research studies were included in the final pool.

2. Studies that examined panic buying in COVID-19 and other contexts, for example, SARS.
3. Panic buying research across different countries.
4. Studies, with sufficient information regarding methodological and research design parameters, were provided.

After assessing the papers against these criteria, the final data set comprised 53 relevant research papers. The resultant pool of studies examined the issue of panic buying from various perspectives, including consumer research and marketing, retail and supplier chain management psychology, psychiatry, behavioural research and therapy, management sciences, social sciences and humanities. We also came across some studies related to recent observations (post-April 2020) of panic buying in pre-printed versions of SSRN's eLibrary and ResearchGate. We have limited our investigation to peer-reviewed scholarly publications. This approach differentiates our work from some recently published literature reviews on panic buying, which included both academic and non-academic sources (see Yuen et al., 2020, for an example).

Our review is a combination of a domain-based review (Paul & Criado, 2020) and a framework-based review (Callahan, 2014; Paul & Rosado-Serrano, 2019). To structure the tables, we reviewed the papers through the lenses of Callahan's (2014) review format of 4 W--What, Where, HoW and Why. To ensure an in-depth analysis of the panic behaviour domain, we complemented Callahan (2014) with the TCCM framework (Paul & Rosado-Serrano, 2019). TCCM is a robust method of conducting systematic literature reviews with a clear and categorical placement for Theory, Context, Characteristics and Methodology. We drew parallels between *What* and Theory development, *What* and Characteristics, *Where* and Context and *How* and Methodology. Callahan's fourth question *Why*, led us to develop directions for future research consisting of thematic areas and proposed topics (Kahiya, 2018).

We begin our analysis of panic buying studies with a tabular presentation of the selected research articles in Table 1. It reports on the aspect of *What* and answers the question--'What do we know about panic buying as an academic context?'. In Table 2, we address the question 'Where is the research happening?' and list the geographical location of the studies. Table 3 reports on the methods employed for the study and answers 'How was the research conducted?'. Table 4 addresses the question 'Why should academicians, practitioners and policymakers know more about panic buying?' and lists the research objectives and findings. It also reports the gaps addressed and directions for future research as underlined by each study. Our main analysis is presented in Tables 2 and 3. Two foci emerged from the analysis--the consumer and buyer focus and the retailer and supply chain management focus.

## 4 | REVIEW STRUCTURE

This section outlines the structure of our literature review. It categorizes the papers in the study based on Callahan's 4W (2014) and

Paul and Rosado-Serrano's (2019) TCCM framework. Corresponding tabular presentation of the categories are presented below. The 4W framework-based questions guide the purpose and contents of each table.

### 4.1 | What do we know about panic buying as an academic context?

This section presents all papers of the resultant pool included in this literature review and the forthcoming analysis. The cover period for the pool was 1990-2020. The table presents the name of the journal, title and the number of citations wherever available.

The distribution of the above papers in terms of discipline or research field is as follows: consumer research and marketing (16), retail and supplier chain management (10), psychology (7), psychiatry (4), behavioural research and therapy (4), management sciences (5) and social sciences and humanities (7).

### 4.2 | Where is the research happening?

The information in Table 2 focuses on the geographical context of the papers used in the study. It shows that most published research in panic buying comes from studies conducted in the United States, followed by studies that did not indicate a geographical context. The United Kingdom, China and Australia are the next most research-active regions after the United States.

### 4.3 | 'How was the research conducted?'

The information in Table 3 focuses on the methodology applied in the papers used in the study. Table 3 is divided into two major foci--focus on buyers and consumers and focus on retailers/supply chain management. It demonstrates the different methodologies used in the studies analysed. Analysis reveals that secondary data were the most popular methodology, followed by quantitative surveys and mathematical modelling. Conceptual and qualitative methods were not frequently used, indicating that the field of panic buying is in its inception and calls for more attention. The least employed was the case study method.

### 4.4 | 'Why should academicians, practitioners and policymakers know more about panic buying?'

Table 4 presents research objectives, findings and limitations as identified by the studies used in the analysis. The table also lists the directions of future research identified in each paper. Most papers indicate a need for a more robust and consistent approach to more research in this area such as broader consumer samples, theory-driven studies and focus on real contexts beyond

**TABLE 1** List of scientific papers on panic buying used in the literature review (1990–2020)

No.	Journals		Title	References	Citations (based on google scholar)
1	Personality and Individual Differences	1	I fear; therefore, I shop! exploring anxiety sensitivity concerning compulsive buying	Gallagher et al. (2017)	27
2	International Journal of Retail & Distribution Management	1	An exploratory study of grocery shopping stressors	Aylott and Mitchell (1998)	283
3	Behaviour Research and Therapy	1	Hoarding is a compulsive buying sample	Mueller et al. (2007)	123
4	Management Science Journal, underprint (working paper)	1	Consumer panic buying and fixed quota policy	Shou et al. (2011)	5
5	The Service Industries Journal	1	COVID-19: fear appeal favoring purchase behaviour towards personal protective equipment	Addo et al. (2020)	30
6	Pre-print (PsyArXiv) Elec. Version	1	Science knowledge and trust in medicine affect individuals' behaviour in pandemic crises	Sailer et al. (2020)	7
7	Industrial Marketing Management	1	Product substitution in different weights and brands considering customer segmentation and panic buying behaviour	Tsao et al. (2019)	17
8	Journal of Affective Disorders	1	An analysis on the panic during COVID-19 pandemic through an online form	Nicomedes and (2020)	6
9	2011 International Conference on Management Science & Engineering Proceedings	1	Research on emergency information management based on the social network analysis—A case analysis of panic buying of salt	Wei et al. (2011)	9
10	Omega – the International Journal of Management Science	1	Supply disruption management under consumer panic buying and social learning effects	Zheng et al. (2020)	20
11	European Journal of Marketing	1	Immediacy pandemic: consumer problem-solving styles and adaptation strategies	Zolfagharian and Yazdanparast (2019)	6
12	Annals of 'Dunarea de Jos' University of Galati Fascicle I. Economics and Applied Informatics	1	Consumer behaviour in crisis situations: Research on the effects of COVID-19 in Romania	Stanciu et al. (2020)	6
13			I'll trade you diamonds for toilet paper: Consumer reacting, coping, and adapting behaviours in the COVID-19 pandemic	Kirk and Rifkin (2020)	34
14	Journal of Business Research	3	Competing during a pandemic? Retailers' ups and downs during the COVID-19 outbreak	Pantano et al. (2020)	31
15			The Impact of COVID-19 pandemic on corporate social responsibility and marketing philosophy	He and Harris (2020)	79
16	Studies in Indian Place Names	1	A Critical analysis to comprehend panic buying behaviour of Mumbaikar's in COVID-19 era	Singh and Rakshit (2020)	9
17	Advances in Consumer Research	1	Consumers and disaster: Observing 'Panic Buying' during the winter storm and hurricane seasons	Kulemeka (2010)	9
18	Psychiatry Research	2	Psychological underpinning of panic buying during pandemic (COVID-19)	Arafat et al. (2020)	45
19			The anatomy of panic buying related to the current COVID-19 pandemic	Sim et al. (2020)	38
20	Social sciences and Humanities Open	4	Factor analysis of panic buying during the COVID-19 period in Indonesia	Wiyaya (2020)	N/A

(Continues)



TABLE 1 (Continued)

No.	Journals		Title	References	Citations (based on google scholar)
21			How does household spending respond to an epidemic? Consumption during the 2020 COVID-19 pandemic	Baker et al. (2020)	265
22			COVID-19 and panic buying: An examination of the impact of behavioural biases	Kuruppu and De Zoysa (2020)	4
23			Consumer spending responses to the COVID-19 pandemic: An assessment of Great Britain	Chronopoulos et al. (2020)	23
24	British Journal of Health Psychology	1	Demographic and attitudinal determinants of protective behaviours during a pandemic: A review	Bish and Michie (2010)	390
25	Journal of Consumer Research	1	Control deprivation motivates acquisition of utilitarian products	Chen et al. (2017)	70
26	IEEE Transactions on Intelligent Transportation Systems	1	Fuel panics: Insights from spatial agent-based simulation	Upton and Nuttall (2014)	6
27	Social Problems	1	Panic USA: hyper-modernism as America's postmodernism	Kroker et al. (1990)	31
28	International Journal of Environmental Research and Public Health	1	The Psychological causes of panic buying following a health crisis	Yuen et al. (2020)	38
29	The International Review of Retail, Distribution and Consumer Research,	2	Post-disaster consumption: analysis from the 2011 Christchurch earthquake	Forbes (2017)	10
30			Should I Buy, Hoard, or Hide?'-Consumers' responses to perceived scarcity	Gupta and Gentry (2019)	8
31	Behaviour Research and Therapy	1	A Cognitive-Behavioural model of compulsive hoarding	Frost and Hartl (1996)	879
32	Marketing letters	1	Coping with a natural disaster: Losses, emotions, and impulsive and compulsive buying	Sneath et al. (2009)	163
33	Psychological ownership and consumer behaviour (J. Peck, S. B. Shu (eds.)	1	Psychological ownership in hoarding	Chu (2018)	9
34	Transport Policy	1	Insights into the impact of COVID-19 on household travel and activities in Australia—The early days under restrictions	Beck and Hensher (2020)	9
35	Research in Social and Administrative Pharmacy	1	Personal protective practices and pharmacy services delivery by community pharmacists during COVID-19 pandemic: Results from a national survey	Zaidi and Hasan (2020)	1
36	Journal of Operations Management	1	I'm not hoarding, I'm just stocking up before the hoarders get here: Behavioural causes of phantom ordering in supply chains	Sterman and Dogan (2015)	88
37	International Journal of Research in Marketing	1	Less of this one? I'll take it: insights on the influence of shelf-based scarcity	Robinson et al. (2016)	16
38	UNSW Business School Research Paper Series	1	Consumer panic in the COVID-19 pandemic	Keane and Neal (2020)	12
39	Journal of Risk and Financial Management	1	Consumer behaviour during crises: preliminary research on how coronavirus has manifested consumer panic buying, herd mentality, changing discretionary spending and the role of the media in influencing behaviour	Loxton et al. (2020)	10
40	Journal of Service Management.	1	Beyond panic buying: consumption displacement and COVID-19	Hall et al. (2020)	27

(Continues)

No.	Journals		Title	References	Citations (based on google scholar)
41	Sustainability (journal)	1	Policy response, social media and science journalism for the sustainability of the public health system amid the COVID-19 outbreak: The Vietnam lessons	La et al. (2020)	85
42	Journal of Contingencies and Crisis Management	1	Media frames across stages of health crisis: A crisis management approach to news coverage of flu pandemic	Pan and Meng (2016)	27
43	Journal of Retailing and Consumer Services	2	Panic Buying in the COVID-19 Pandemic: A Multi-Country Examination	Islam et al. (2020)	1
44			Timed intervention in COVID-19 and panic buying	Prentice, Chen, et al. (2020)	6
45	Journal of Psychiatric Research	1	Panic buying or good adherence? Increased pharmacy purchases of drugs from wholesalers in the last week prior to Covid-19 lockdown	Kostev and Lauterbach (2020)	N/A
46	Journal of Safety Science and Resilience	1	A discussion of irrational stockpiling behaviour during crisis	Chen et al. (2020)	6
47	Heliyon	1	Development and initial psychometric properties of a panic buying scale during COVID-19 pandemic	Lins and Aquino (2020)	N/A
48	International Conference on Practical Applications of Agents and Multi-Agent Systems	1	An agent-based simulation to study the effect of consumer panic buying on supply chain	Dulam et al. (2020)	2
49	Journal of Retailing and Consumer Services	1	Do social media platforms develop consumer panic buying during the fear of Covid-19 pandemic	Naeem (2020)	3
50	Applied Psychology: Health and Well-Being.	1	COVID-19 Increases Online Searches for Emotional and Health-Related Terms	Du et al. (2020)	2
51	Learning and Motivation	1	Food shopping under risk and uncertainty	Dickins and Schalz (2020)	N/A
52	Modern Supply Chain Research and Applications	1	Enhancing supply resilience in the COVID-19 pandemic: a case study on beauty and personal care retailers	Chowdhury et al. (2020)	N/A
53	International Journal of Consumer Studies.	1	Antecedents and consequences of panic buying: The case of COVID-19	Prentice, Quach, et al. (2020)	N/A

simulation studies. There is also a lack of literature reviews and mixed method-based papers that could have assisted in theory building.

## 5 | DISCUSSION

Based on the review of extant literature, we infer that panic behaviour is not frequently defined in consistent terms or using consistent frameworks. Our findings also reveal that the studies in panic buying have been fragmented across different disciplines. To address these limitations and to establish conceptual clarity, we first summarize the extant research on panic buying. Second, based on our gap's analysis, we propose a broader framework to guide scholars in their future research in the field of panic buying. The below section presents the themes and sub-themes emerging from the clustering of papers in the literature review.

### 5.1 | Theme 1: The aspect of What—What do we know about panic buying as an academic context?

We start the discussion by addressing the aspect of 'What' (Callahan, 2014) knowledge emerged about the phenomenon of panic buying. This corresponds to the 'Theory development' (T) aspect of the TCCM framework (Paul & Rosado-Serrano, 2019). We categorized our findings into the following four clusters:

#### 5.1.1 | External environment factors

Our literature review showed that the previously established landscape in the seminal stakeholder theory (i.e., Freeman, 1984) has expanded to highlight actors such as local and national health authorities and non-profit organizations. The community stakeholders are taking an increasingly active role in enhancing transparency and accountability within society (ABC Four Corners Programme,



TABLE 2 Geographical focus of the literature

Number of papers	Geography	References
12	USA	Kulemeka, O. Frost, R. O., & Hartl, T. L. Zolfagharian, M., & Yazdanparast, A. Gupta, S., & Gentry, J. W. Kroker, A., Kroker, M., & Cook, D. Sneath, J. Z., Lacey, R., & Kennett-Hensel, P. A. Sailer, M., Stadler, M., Botes, E., Fischer, F., & Greiff, S Loxton, M., Truskett, R., Scarf, B., Sindone, L., Baldry, G., & Zhao, Y. Baker, S. R., Farrokhnia, R. A., Meyer, S., Pagel, M., & Yannelis, C. Serman, J. D., & Dogan, G. Robinson, S. G., Brady, M. K., Lemon, K. N., & Giebelhausen, M. Prentice, C., Quach, S., & Thaichon, P.
5	Australia	Beck, M.J. and. Hensher, D. A. Loxton, M., Truskett, R., Scarf, B., Sindone, L., Baldry, G., & Zhao, Y. Prentice, C., Chen, J., & Stantic, B. Prentice, C., Quach, S., & Thaichon, P. Chen, Y., Rajabifard, A., Sabri, S., Potts, K. E., Laylavi, F., Xie, Y., & Zhang, Y.
6	United Kingdom	Chronopoulos, D. K., Lukas, M., & Wilson, J. O. Upton, E., & Nuttall, W. J. Aylott, R., & Mitchell, V. W. Zaidi S.T.R. and Hasan S.S. Naeem, M. Dickins, T. E., & Schalz, S.
4	China	Addo, P. C., Jiaming, F., Kulbo, N. B., & Liangqiang, L. Wei, K, Wen-wu, D., and Lin, W. Zheng, R., Shou, B., & Yang, J. Pan, P. L., & Meng, J.
2	New Zealand	Hall, M. C., Prayag, G., Fieger, P., & Dyason, D. Forbes, S. L.
2	Germany	Mueller, A., Mueller, U., Albert, P., Mertens, C., Silbermann, A., Mitchell, J. E., & De Zwaan, M. Kostev, K., & Lauterbach, S.
4	Multi-country	Keane, M. P., & Neal, T.  Islam, D.T., Pitafi, D.H., Wang, D.Y., Aryaa, D.V., Mubarik, D.S., Akhater, D.N., Xiaobei, D.L.

(Continues)

TABLE 2 (Continued)

Number of papers	Geography	References
		Du, H., Yang, J., King, R. B., Yang, L., & Chi, P. Bish, A., and Michie, S.
1	Canada	Gallagher, C., Watt, M.C., Weaver, A., Murphy, K.
1	Romania	Stanciu, S., Radu, R. I., Sapira, V., Bratoveanu, B. D., & Florea, A. M.
1	Indonesia	Wiyaja, T.
1	Philippines	Nicomedes, C. J. C., & Avila, R. M. A.
1	Vietnam	La, V. P., Pham, T. H., Ho, M. T., Nguyen, M. H., P Nguyen, K. L., Vuong, T. T., ... & Vuong, Q. H.
1	India	Singh, C. K., & Rakshit, P.
1	Brazil	Lins, S., & Aquino, S.
1	Japan	Dulam, R., Furuta, K., & Kanno, T.
1	Bangladesh	Chowdhury, M.T., Sarkar, A., Saha, P.K. and Anik, R.H.
11	N/A	Arafat, S. Y., Kar, S. K., Marthoenis, M., Sharma, P., Apu, E. H., & Kabir, R. Sim, K., Chuaa, H.G., Vietab, E., Fernandez, G. Chen, C. Y., Lee, L., & Yap, A. J. Kuruppu, G. N., & De Zoysa, A. Yuen, K. F., Wang, X., Ma, F., & Li, K. X. Kirk, C. P., & Rifkin, L. S. Tsao, Y. C., Raj, P. V. R. P., & Yu, V. Chu, C.K. Shou, B., Xiong, H., & Shen, Z. M. He, H., & Harris, L. Pantano, E., Pizzi, G., Scarpi, D., & Dennis, C.

2020; Bornstein, 2010). If stakeholder participation is to have practical significance, it must be able to yield an action-oriented approach with clear relationships with various groups and individuals (Freeman, 2010). Clear and coherent communication from key stakeholders is crucial to being well regarded by the public (Anisimova & Mavondo, 2010).

Consumers have been bombarded with information and visuals from all parts of their surroundings (local, national and global sources). They also have been active in accessing various sources of information and are influenced by reference groups (Kulemeka, 2010). We argue that such a constant onslaught of information has been dominating consumer thinking, purchasing and coping behaviour. As a result, it may manifest in two types of effects on society. A positive effect occurs when the public follows government recommendations and accepts necessary interventional strategies (e.g., Bish & Michie, 2010). In addition, risk avoidance increases when the public has access to credible information from health authorities and medical knowledge (Sailer

**TABLE 3** Methodology-based clustering of the literature

No.	References	Methodology
<i>Focus on buyers and consumers</i>		
1	Gallagher, C., Watt, M.C., Weaver, A., Murphy, K.	A quantitative survey on a sample of undergraduate students
2	Kulemeka, O.	An observational study on which this study develops a model describing how consumers make purchasing decisions regarding emergency supplies. The second part of their model focuses on how people seek information and help with critical needs
3	Arafat, S. Y., Kar, S. K., Marthoenis, M., Sharma, P., Apu, E. H., & Kabir, R.	A commentary on the possible psychological explanations behind the panic buying behaviour during the pandemics
4	Sim, K., Chuaa, H.G., Vietab, E., Fernandez, G.	A commentary on the psychosocial responses of the general population towards recent emerging infectious disease outbreaks
5	Stanciu, S., Radu, R. I., Sapira, V., Bratoveanu, B. D., & Florea, A. M.	Secondary online data analysis and materials from Romanian public institutions
6	Bish, A., and Michie, S.	Literature review. Papers were included only if they reported associations between demographic factors, attitudes, and behavioural measures (reported, intended, or actual behaviour)
7	Addo, P. C., Jiaming, F., Kulbo, N. B., & Liangqiang, L.	Published statistics (suspected, confirmed, and fatality) on the COVID-19 alongside the purchase of personal protective equipment to examine the swings in online purchase behaviour through a serial mediated analysis
8	Wiyaja, T.	Exploratory study. A mixed-method approach to survey and focus groups.
9	Chronopoulos, D. K., Lukas, M., & Wilson, J. O.	The authors use a high-frequency transaction dataset comprising 98,796 consumers and 19.8 million transactions made available by a financial institution
10	Zolfagharian, M., & Yazdanparast, A.	Exploratory research. Open-ended, in-depth interviews with 37 consumers, as well as personal essays
11	Sailer, M., Stadler, M., Botes, E., Fischer, F., & Greiff, S.	Cross-sectional survey
12	Wie, K, Wen-wu, D., and Lin, W.	The social network analysis theory is applied to the case of 'panic buying of salt' post-tsunami in Japan, in China.
13	Zheng, R., Shou, B., & Yang, J.	Mathematical modelling
14	Upton, E., & Nuttall, W. J.	Mathematical and simulation modelling
15	Mueller, A., Mueller, U., Albert, P., Mertens, C., Silbermann, A., Mitchell, J. E., & De Zwaan, M.	Interviews and questionnaires
16	Chen, C. Y., Lee, L., & Yap, A. J.	Multi-study research design
17	Kuruppu, G. N., & De Zoysa, A.	Secondary data from online sources combined with a literature review
18	Frost, R. O., & Hartl, T. L.	Interviews with hoarders
19	Gupta, S., & Gentry, J. W.	Questionnaire on a sample of 254 students to measure perceived scarcity, the urgency to buy, and in-store hiding
20	Yuen, K. F., Wang, X., Ma, F., & Li, K. X.	Literature review
21	Aylott, R., & Mitchell, V. W.	Focus groups with buyers
22	Kirk, C. P., & Rifkin, L. S.	Conceptual. This study proposes a structure of consumer panic behaviours during the COVID-19 pandemic
23	Kroker, A., Kroker, M., & Cook, D.	The narrative analysis is also referred to by the authors as a series of meditations on panic as a dominant mood of postmodern culture
24	Sneath, J. Z., Lacey, R., & Kennett-Hensel, P. A.	This study proposes and empirically tests the structural model based on life event theory
25	Nicomedes, C. J. C., & Avila, R. M. A.	Convergent parallel mixed methods design
26	Beck, M.J. and. Hensher, D. A.	Online survey with Australian households. A sample of 1073 usable responses
27	Robinson, S. G., Brady, M. K., Lemon, K. N., & Giebelhausen, M.	Multiple studies to explore shelf-based scarcity and buyer behaviour with different sample sizes in each

(Continues)

TABLE 3 (Continued)

No.	References	Methodology
28	Keane, M. P., & Neal, T.	This study develops an econometric model of consumer panic buying during the COVID-19 pandemic and constructs a daily index of consumer panic for 54 countries from January to late April 2020
29	Loxton, M., Truskett, R., Scarf, B., Sindone, L., Baldry, G., & Zhao, Y.	This study is a literature review which involves consumer spending data (volume and timing of consumer spending patterns)
30	Tsao, Y. C., Raj, P. V. R. P., & Yu, V.	Mathematical model
31	Chu, C.K.	An examination of hoarding behaviour as a form of psychological ownership
32	La, V. P., Pham, T. H., Ho, M. T., Nguyen, M. H., P Nguyen, K. L., Vuong, T. T., ... & Vuong, Q. H.	Review of secondary online sources
33	Hall, M. C., Prayag, G., Fieger, P., & Dyason, D.	Analysis of consumer spending data
34	Islam, D.T., Pitafi, D.H., Wang, D.Y., Aryaa, D.V., Mubarik, D.S., Akhater, D.N., Xiaobei, D.L.	Online survey
35	Prentice, C., Chen, J., & Stantic, B.	Semantic analysis, secondary data search, and big data analytics. Three studies were undertaken to understand the timing effect and identify a connection between timed measures and consumer behaviours.
36	Chen, Y., Rajabifard, A., Sabri, S., Potts, K. E., Laylavi, F., Xie, Y., & Zhang, Y.	Conceptual paper
37	Lins, S., & Aquino, S.	Online survey
38	Naeem, M.	Qualitative method
39	Du, H., Yang, J., King, R. B., Yang, L., & Chi, P.	Secondary data from Google trends and websites of resource centres
40	Dickins, T. E., & Schalz, S.	Optimality models of foraging
41	Prentice, C., Quach, S., & Thaichon, P.	Online survey
<i>Focus on retailers/supply chain management</i>		
42	Baker, S. R., Farrokhnia, R. A., Meyer, S., Pagel, M., & Yannelis, C.	Utilizes transaction-level household financial data, transaction-level data from linked bank-accounts from SaverLife and 2018 Gallup Daily Tracker Data. This study investigates the impact of the COVID-19 virus
43	Shou, B., Xiong, H., & Shen, Z. M.	Rational expectation equilibrium analysis
44	Forbes, S. L.	Scanner data of purchases made in Christchurch supermarkets before and after the 2011 earthquake was used to identify immediate and short-term changes in consumer behaviour
45	Singh, C. K., & Rakshit, P.	Exploratory study based on the review of the secondary online data
46	Zaidi S.T.R. and Hasan S.S.	Online survey with 206 community pharmacists.
47	Sterman, J. D., & Dogan, G.	Experimental study
48	He, H., & Harris, L.	Commentary
49	Kostev, K., & Lauterbach, S.	Cross sectional data obtained from regional pharmaceutical database
50	Pantano, E., Pizzi, G., Scarpi, D., & Dennis, C.	A commentary on the challenges faced by retailers during COVID-19 emergency
51	Pan, P. L., & Meng, J.	Mixed-methods
52	Dulam, R., Furuta, K., & Kanno, T.	Agent-based model
53	Chowdhury, M.T., Sarkar, A., Saha, P.K. and Anik, R.H.	Case-study

et al., 2020). Subsequently, communication between individuals, households and communities also contributes to mediating panic behaviour (Upton & Nuttall, 2014; Wijaya, 2020).

The disruptive effects on the public have been associated with several aspects. Government policies such as restrictions and lockdowns in the initial stages of the pandemic caused substantial panic among the public (Keane & Neal, 2020). Such panic led to elevated

levels of anxiety, chronic distress and excessive buying (Prentice, Quach, et al., 2020). Our review highlights that excessive and missing information (Kuruppu & De Zoysa, 2020), along with mal-information (Frost & Hartl, 1996) leads to panic behaviour. What further exacerbates panic buying is misleading retailer strategies (Singh & Rakshit, 2020) such as visual images of product scarcity (Arafat et al., 2020; Gupta & Gentry, 2019; Islam et al., 2020; Robinson

TABLE 4 Summary of gaps analysis and future research agenda

References	Research objective	Findings	The study limitations	Future research
1. Gallagher et al. (2017)	To examine the role of anxiety sensitivity on the relationship between negative affect and compulsive buying	Findings show that compulsive buying is linked to both negative affect and anxiety sensitivity	The student sample, preventing generalizability; the correlation analysis of the study	Future researchers are recommended to examine emotion regulation strategies (e.g., mindfulness) in the relationship between the negative effect of panic and compulsive buying
2. Kulemeka (2010)	To develop a model describing consumer behaviour and purchasing decisions of emergency supplies	Consumer purchasing decisions before the disaster are rational and are determined by how constrained they feel, their level of involvement and problem recognition. How people seek information and help is often shaped by the group to which they belong	The paper lacks information on data collection and method of analysis. No details of consumers surveyed are provided	Future research is recommended on how people purchase emergency supplies during disaster times
3. Arafat et al. (2020)	To explain what psychological triggers cause consumer panic behaviour	The authors claim that fear of scarcity and losing control over the environment, insecurity, social learning, exacerbation of anxiety and the basic primitive response of humans are the core factors responsible for the panic buying phenomenon	It is a commentary paper / letter to the editor, so this paper does not fall under the standard paper types that carry limitations	Further observational, as well as qualitative studies, are warranted to explore the psychological perspective of panic buying behaviour systematically during the crisis moments which in turn would help to find out preventive measures in future pandemics
4. Sim et al. (2020)	To explain what psychological reasons, cause consumer panic behaviour	The reasons identified for panic buying behaviour: (1) underlying conflict between the desire to maintain regular routines versus the uncertainty of the duration of the pandemic; (2) not coping with a stressful situation, for example, COVID-19 related information (3) reaction in response to one's loss of control about the future and social pressures.	It is a commentary paper / letter to the editor and is more a viewpoint than empirical or conceptual paper	Authors suggest future research into creating psychological supports for the most vulnerable to cope with panic and confinement that is, through various health-based platforms
5. Stanciu et al. (2020)	The article aims at analysing the buying behaviour of Romanian consumers in the context of COVID-19	The results showed that imposing home isolation conditions has led to consumers only meeting their necessities, that is, visit to the physician, purchase of medicines or food or financial activities	Limited to secondary data	More research is warranted for a better understanding of consumer fears and needs, adapting retailers' product offers and distribution system to facilitate sales
6. Bish and Michie (2010)	To identify the key demographic and attitudinal determinants of three types of protective buying behaviour during a pandemic: preventive, avoidant and management of illness behaviours	The findings suggest that intervention and communication strategies should focus on raising consumer belief in the effectiveness of measures designed to protect them from the pandemic	This review is not exhaustive and caution needs to be exercised when generalizing from the findings of these studies	Future research should focus on prospective, theory-driven studies of predictors and demographic factors impacting consumer buying behaviour during the pandemic
7. Addo et al. (2020)	The study investigates the swings in purchase behaviour due to the fear appeal caused by the COVID-19 pandemic	The study demonstrated the association between fear appeal, social presence, e-loyalty and online purchase behaviour for PPEs	The data used in this study is limited to China	Future research is recommended to examine fear appeal in the purchase behaviour of products other than PPEs in a panic behaviour situation

(Continues)

TABLE 4 (Continued)

References	Research objective	Findings	The study limitations	Future research
8. Wijaya (2020)	Aims to describe the factors that shape consumer panic buying during COVID-19	Their results from their EFA revealed four panic buying factors such as (1) information, and knowledge; (2) a family; (3) other people and (4) a risk avoidance factor.	The authors do not test how these factors impact consumer panic shopping. This preprint research paper has not been peer-reviewed	Calls for future research into broader consumer samples and the impact of government-driven social distancing programmes consumer panic buying behaviour
9. Chronopoulos et al. (2020)	To observe consumer spending behaviour over the 4 stages of the pandemic, such as incubation, outbreak, fever and lockdown phases	There was a strong increase in grocery spending consistent with panic buying and stockpiling behaviour in the two weeks following the WHO announcements and this behaviour declined with the imposition of lockdown	This preprint research paper has not been peer-reviewed with preliminary results and the sample is skewed towards younger individuals	Future research should extend to a regression-based analysis to observe consumer patterns across locations and demographic
10. Zolfagharian and Yazdanparast (2019)	The term pandemic is used metaphorically and positioned as the consumers' state of mind or attitude in conditions of immediacy	The findings discuss how mobile and virtual technology contribute to consumers' pandemic expectation of immediacy and how they use adaptation strategies and problem-solving attitudes	Limitations associated with qualitative studies such as in-depth interviews and personal essays	Quantitative studies are suggested that, could allow for testing various moderators, such as individual consumer traits or cultural differences
11. Sailer et al. (2020)	This study investigates how consumer knowledge and trust in medicine can influence reasonable behaviour and prevent panic buying	Findings show that medical knowledge helps individuals to understand coronavirus better and avoid panic buying. Trust in medicine is particularly important for individuals with low science knowledge	Limitations associated with the cross-sectional method of data collection	Future research recommends educating the public and facilitating medical science knowledge and trust through longitudinal and experimental designs with multiple measures
12. Wei et al. (2011)	This study applies the social network analysis theory to the case of 'panic buying of salt' in China	Findings show that based on the topological structure of the social network, information diffusion during emergencies has dynamic and complex characteristics	Limited to one product- salt and case study design limitations	N/A
13. Zheng et al. (2020)	This study investigates the impact of consumers' social learning behaviour on their purchase decisions under supply disruption risk and how retailers react to this to optimize their inventory ordering strategy	Their findings show that a certain level of consumer panic buying and social learning behaviour can be beneficial for the retailer and social welfare. If the panic intensity increases beyond a limit it can hurt retailer profit while on moderate levels social learning behaviour can mediate panic among consumers	Limited to the study of stockpiling behaviour as a special situation and limited to mathematical modelling	They suggest understanding the information asymmetry between retailer and consumer in the area of stockpiling
14. Upton and Nuttall (2014)	This study examines simulation-based models for panic buying of fuel	It was found that natural bias in communication between individuals can give rise to baseless panic	Limitations associated with simulation of the context	Future research should focus on real contexts as results may be different from simulated conditions

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TABLE 4 (Continued)

References	Research objective	Findings	The study limitations	Future research
15. Mueller et al. (2007)	To investigate hoarding in a compulsive buying sample	Results support the assumption that many but not all compulsive buyers suffer from compulsive hoarding	Assessment of compulsive hoarding was based only on the self-report measure	Further research is needed on the relationship between compulsive buying and compulsive hoarding and the possible consequences for treatment
16. Chen et al. (2017)	Investigate how the consumer's fundamental desire for control affects product acquisition either hedonic or utilitarian	Consumers purchase utilitarian goods as it helps motivate the feeling of control rather than hedonic goods. Negative emotions, such as sadness and anxiety, are associated with the appraisal of the situational-control loss	The study does not establish if control is achieved after the utilitarian products are acquired	To examine the interplay between control motivation and negative-affect regulation in consumer behaviour
17. Kuruppu and De Zoysa (2020)	The study aims to explain individual panic buying behaviours using some established behavioural theories	Excessive information and misinformation on social and news media have played a major role in generating panic buying during the COVID-19 pandemic	Their study relies primarily on materials found in periodical literature, for example, newspapers and various online data sources	To better understand the way people behave during the pandemic future studies should focus on an in-depth analysis of an individual's characteristics such as personality, cultural background and previous experience
18. Frost and Hartl (1996)	The authors propose a tentative cognitive-behavioural model of compulsive hoarding	In this model hoarding is conceptualized as a multifaceted problem stemming from: (1) information processing deficits; (2) problems in forming emotional attachments; (3) behavioural avoidance; and (4) erroneous beliefs about the nature of possession	The proposed facets of hoarding are not exclusive and overlap in certain ways	The proposed model is based on preliminary research and observation and is meant as a guide to future research on consumer hoarding
19. Gupta and Gentry (2019)	This study examines the effects of consumer-experience that is externally imposed to influence consumer behaviour	The results of the study suggest that, under the conditions of perceived scarcity, consumers tend to exhibit behaviours like in-store hoarding, and in-store hiding, due in part to the increased urgency to buy	Limitations associated with the survey method; the extreme case of fast-fashion retailers, which limits generalizability.	Recommend future research into consumer behaviour under conditions of scarcity to create more sustainable consumption efforts in developed and developing cultures.
20. Yuen et al. (2020)	The paper reviews extant literature to identify and synthesize the psychological causes of panic buying	Panic buying is influenced by (1) individuals' perception of the threat of the health crisis and scarcity of products; (2) fear of the unknown (3) coping behaviour (4) social psychological factors	It is based on limited literature to provide underlying causes of panic buying behaviour	Recommend exploring other causes of panic buying not covered by the study through surveys and correlational analysis
21. Aylott and Mitchell (1998)	To explain the antecedents of store patronage	The research identified stressors that impact store design and its marketing mix. Most respondents associate stress with grocery shopping than other forms of shopping. Crowding, queuing and the role of panic were frequently observed stressors	The limitations associated with the exploratory nature of this research	Future research must be conducted with less affluent groups and women as the primary shoppers in a household. Other factors that need to be investigated include the amount of information, level of involvement and stress

(Continues)



TABLE 4 (Continued)

References	Research objective	Findings	The study limitations	Future research
22. Kirk and Rifkin (2020)	Their study documents some of the consumer behaviour patterns that dominate at the beginning of the COVID-19 pandemic and explore how this may catalyse consumers' longer-term adaptive responses	They examine consumer panic buying behaviour and identify three phases: reacting (e.g., hoarding and rejecting), coping (e.g., maintaining social connectedness, do-it-yourself behaviours, changing views of brands) and longer-term adapting (e.g., potentially transformative changes in consumption and identity)	The limitations associated with the exploratory nature of this research.	They recommend research into the economic and financial impacts on consumers and their survival during the pandemic; the effects on women and minority populations and prosocial consumer behaviour and gratitude for front-line health workers
23. Kroker et al. (1990)	To conceptualize and define the phenomenon of panic in postmodern culture with panic shopping as one of the key dimensions	Defines panic as an environmental mood for postmodern culture and argues about the pressures from rapid technological changes	The limitations associated with their authors' research method and narrative research design of meditations on panic	More research is warranted into the impact of postmodern culture on consumer panic
24. Sneath et al. (2009)	Investigates the relationship between emotional distress caused by catastrophic events leading to impulsivity and compulsivity	The perceived lack of control and loss of possessions contributes directly to stress and depression	Unclear if event-induced changes lead to differences in long-term behaviour and if marketing efforts can mediate panic buying	Future research can study consumer response to marketing activities such as pricing strategies, communications, product assortment and accessibility
25. Nicomedes and Avila (2020)	Their study analyses the panic responses of the people as well as their perception regarding the COVID-19 pandemic and the relationship between illness anxiety and resultant reaction	Some urban residents show a higher fear and avoidance behaviour than semi-urban residents. A range of emotions was identified in the panic spectrum	Lack of explanation as to how the data was analysed and how the data reliability and validity were assessed. Limited to one country of the Philippines	Not provided in the paper
26. Beck and Hensher (2020)	Examines the impact of COVID-19 on travel and activities, including shopping activities, of Australian households	80% of respondents experienced problems shopping for toilet paper, along with food (73%) and tissues (63%). Females were more likely to report difficulty in shopping for toilet paper, food and non-prescription medicine, and males more likely to report shopping for sanitary products. Older respondents were less likely to report difficulty in shopping for food, sanitary products and non-prescription medicine	Limitations associated with cross-sectional survey and online data collection	Future research should continue examining the impact of COVID-19 on households in more detail, that is, households of people working from home
27. Robinson et al. (2016)	To investigate the cues from shelf-based scarcity and its impact on consumer behaviour	It was found that shelf-based scarcity is an effective signal, with broad implications that may circumvent other established choice heuristics. It affects brand familiarity and increases the willingness to pay	The findings question whether shelf-based scarcity may be good for the brand but not good for the retailer	Future research highlights the need to examine scarcity cues in digital environments where behavioural tendencies could be mediated by the marketer

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TABLE 4 (Continued)

References	Research objective	Findings	The study limitations	Future research
28. Keane and Neal (2020)	To develop a predictive model of how government policies impact panic buying via a panic index of 54 countries from January to April 2020	Both domestic and world virus transmission were found to contribute significantly to consumer panic. Government policies and internal movement restrictions in the initial stages generated substantial short-run panic than those announced later	Consumer panic from the retailer perspective has been little studied from an econometric point of view due to the difficulty of obtaining suitable data, and the lack of variation in the determinants of panic	It is important to have a research-based coordinated effort between government policies and retailers to reduce consumer panic buying
29. Loxton et al. (2020)	To review the literature on the coronavirus and the role of media on panic buying and herd mentality behaviours based on Maslow's hierarchy of needs	Behaviours during the Corona pandemic are aligned with previous shock events such as pandemics and disasters	A preliminary review of the literature. The paper does not establish causality between herd mentality, panic buying and prioritization of purchase decisions	Future studies must establish a relationship between the 3 constructs through quantitative means
30. Tsao et al. (2019)	To determine the optimal numbers for ordering quantities and substitutions to maximize total profit in a panic buying situation	Results suggest that in a panic situation, accepting substitution and satisfying high indexed customers generates more profit	Limitations related to the methodology	Future research can focus on customer-driven substitution, as well as a focus on consumer purchasing behaviours or retailer preference substitution
31. Chu (2018)	Examines hoarding behaviour as an extreme form of psychological ownership exhibited by consumers	Discourse on the framework for understanding both difficulties with the disposition and ways to encourage disposition in the context of psychological ownership theory	Limitations related to the methodology	Future research on expanding the perspectives of disposition
32. La et al. (2020)	Study of policy responses, social media and science journalism on COVID-19 in Vietnam.	Showcases how Vietnam handled the crises despite its proximity to China and controlled the impact of the coronavirus	Limitations related to the methodology.	Need for more research on sustainability and resource optimization.
33. Hall et al. (2020)	The study explores consumption displacement as a change in consumption behaviour in the hospitality sector	Evidence of increased spending in some consumption categories confirms stockpiling behaviours. The hospitality sector experiences a sharp decline in consumer spending over lockdown	Limitations related to secondary data and consumer spending data	Need for further research on consumption displacement in different locations and crises
34. Baker et al. (2020)	Aims to explore how household consumption responds to epidemics	The findings across several major categories indicate that initial spending that increased sharply, particularly in retail, was followed by a sharp decrease in overall spending	This preprint research paper has not been peer-reviewed. Hard to assess the quality of data collection given the method	Suggest that future research examines the impact of COVID-19 using household transaction data

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TABLE 4 (Continued)

References	Research objective	Findings	The study limitations	Future research
35. Shou et al. (2011)	Examine consumer panic buying under supply disruption and investigate how the retailer should respond to panic buying through inventory, pricing and fixed quota policy	Their findings show that the disruption of normal product supply in retailing as one of the primary reasons for consumer panic shopping	The information on consumers is not available. This preprint research paper has not been peer-reviewed and appears in the status of the submission	Not provided
36. Forbes (2017)	Studies the effect of a disaster (Christchurch) on consumption behaviour	The study found increased levels of consumption for utilitarian products, for example, water and non-perishable foods, but not for hedonic or potentially harmful products, except in the few weeks following the disaster	The main limitation was that data was collected only on purchases made in Christchurch supermarkets and does not include those in smaller retail outlets	Future studies can compare pre- and post-disaster data and see if purchasing behaviour returns to normal
37. Singh and Rakshit (2020)	Studies the effect of COVID-19 pandemic on consumption behaviour (Mumbai) such as the impact of lockdown and psychological impact on buyers	Results show that the 'Black ocean strategy' of retailers leads to misleading panic and consumer hoarding. As a result, consumers hoard products that are low priced, perceived as high value and scarce in the near future	The research is not empirically substantiated and conclusions are limited to Mumbai city	The paper calls for research to prevent retailers from exploiting consumers and instigating panic buying urges
38. Zaidi and Hasan (2020)	Surveyed community pharmacists across the UK to understand their protective practices, well-being and the delivery of pharmacy services during the COVID-19 pandemic	Most pharmacists (>75% or above) reported an increase in customer traffic to their pharmacy. 99% of pharmacists reported drug shortages and 88% reported inappropriate behaviour from customers	Potential respondent bias and limitations associated with cross-sectional survey and online data collection	Future research is recommended for developing a coordinated response between the pharmacies and local governments to ensure the safety and well-being of community pharmacists
39. Sterman and Dogan (2015)	To investigate hoarding and phantom ordering as a response to limited supply and the sense of uncertainty and capacity constraints	Environmental stressors can trigger the impulse to hoard and overwhelming rational decision making	Limitations associated with experimental research design. The research is limited to a single product—beer	Future studies must help in the formation of simpler systems to streamline supply chain management and offset phantom hoarding and stockpiling.
40. He and Harris (2020)	To investigate how COVID-19 influenced CSR and marketing	The pandemic offers many opportunities for firms to engage in CSR activities leading to more development of the field	Limitations associated with the initial examination approach of the article and lack of empirical data	Future studies must focus on changes in ethical decision making, marketing philosophy and consumer responses to pandemics

(Continues)

TABLE 4 (Continued)

References	Research objective	Findings	The study limitations	Future research
41. Islam et al. (2020)	By applying the S-O-R model and the Competitive Arousal Model, to investigate how external stimuli such as Limited Quantity Scarcity and Limited-Time Scarcity affect consumer impulsive and obsessive buying behaviours	LQS and LTS significantly increase the perceived arousal in consumers which further affects compulsive and obsessive buying	Limitations associated with online surveys and limited resources with data collection	Future studies should validate the findings in European countries and employ other methods such as experiments to diversity and complement data resources
42. Prentice, Chen, et al. (2020)	To examine the timing effect between government measures and panic buying	Findings reveal a connection between the timing of government measures and panic buying	The findings are based only on one Australian state. The causal relationship is not guaranteed based on the findings from secondary data and big data analytics	Future research should use quantitative methods to establish the existence of a causal relationship
43. Kostev and Lauterbach (2020)	To examine the development of drug purchases during the corona crisis	Findings show that the Covid-19 lockdown in Germany was associated with a significant surge in purchasing behaviour in pharmacies for different markets	Limitations associated with the cross-sectional method of data collection	Further studies are needed to investigate the sell-out data and to estimate the differences in panic buying by age and gender
44. Chen et al. (2020)	To examine the stockpiling phenomena during disasters like the COVID-19 pandemic and discuss its immediate and long-term impact on the economy, society and local communities	Findings show that limited, distorted and exaggerated information during a crisis disturbs people's judgement and results in aberrant actions	Limitations associated with the method of impact analysis	Future studies are needed to investigate the impact of irrational stockpiling behaviour on household and local communities
45. Lins and Aquino (2020)	To develop a Panic Buying Scale (PBS) during the COVID-19 pandemic	Findings show that men buy more by panic than women and behaviour is negatively correlated with optimism and age	Limitations associated with the cross-sectional method of data collection	Future studies should use the scale in other contexts
46. Pantano et al. (2020)	To synthesize the challenges that retailers are facing during the COVID-19 emergency	The commentary provides implications for retailers to tackle the challenges from the covid-19 crises	Not based on empirical findings	Future studies suggest how retailers must reshape consumers' well-being and satisfaction. In addition, it suggests how local retailers can cope with emergency-induced changes in demand
47. Pan and Meng (2016)	To examine media frames across different stages of a health crisis during the swine flu pandemic.	Results revealed that various framing strategies were used in news media at different stages of the flu crisis	The study did not investigate how TV news was developed and its role in managing the swine flu crises	Future research may analyse how the public would interpret public health policies or medical/scientific frames

(Continues)

TABLE 4 (Continued)

References	Research objective	Findings	The study limitations	Future research
48. Dulam et al. (2020)	To develop an agent-based model to study the response of a supply chain of bottled water due to consumer panic buying	Results assist in understanding the performance of the supply chain due to the sudden rise in demand and the strategies applied to control it	Limitations associated with agent-based modelling and its validation	Future research should use more factors concerning the consumer decision process to obtain more realistic results
49. Naeem (2020)	To explore what consumers think and feel at an individual and collective level on the role of social media to create panic behaviour	Findings describe how social platforms influence consumer panic buying due to fear during the COVID-19 pandemic	Limitations associated with the limited number of interviewees and purposeful sampling	Future research should be extended to include quantitative techniques
50. Du et al. (2020)	To investigate the emotional and behavioural reactions people experience in response to COVID-19 through their internet searches	Findings show that increased prevalence rates of COVID-19 were associated with more searches for protective behaviours, health knowledge and panic buying	Limitations associated with internet data-based research	Future research should be extended to include primary empirical methods
51. Dickins and Schalz (2020)	To investigate food shopping in risk and uncertainty by applying optimality models of foraging	The study relates to panic buying to food caching. They develop six hypotheses about how this behaviour should present under food insecurity and perceived threat to life	Not based on empirical findings	Future research should test the proposed hypotheses. Observational methods are also recommended
52. Chowdhury et al. (2020)	To identify how the supply of retailers of these products is interrupted and how they can overcome the interruptions to ensure supply resilience	The findings show that retailers should minimize the negative impacts of the pandemic by using strategic intervention strategies	Limitations associated with the case study methodology	Future research using Quantitative the method can be conducted to enhance the generalizability of the findings
53. Prentice, Quach, et al. (2020)	To identify the antecedents and consequences of panic buying during COVID-19	The findings show that the antecedents such as government measures, Fear of missing out, peers and media influenced panic buying	Limitations associated with cross-sectional online survey method	Future research should conduct longitudinal studies to better understand panic buying

et al., 2016; Yuen et al., 2020). Reported incidences of queuing and crowding are additional stressors of consumer shopping activities (Aylott & Mitchell, 1998).

Also, demands of the new technology-based living (Zolfagarian & Yazdanparast, 2019) and disordered use of the internet contributes to 'marked distress and/or significant impairment in personal, family, social, educational, occupational or other important areas of functioning' (Király et al., 2020, p. 2). The above effects have been especially disruptive for the minority groups (Kirk & Rifkin, 2020), the elderly and the vulnerable (Knotek et al., 2020; Sim et al., 2020).

Our findings are in line with Duncan and Moriarty (1998) and Van Waterschoot and Van de Bult's (1992) communication theory that advocates the importance of an integrative communication approach among stakeholders. We also agree with Van Waterschoot and Van de Bult (1992) that communication and persuasion should not be equated since they have different objectives and outcomes. While persuasion is effective in achieving short-term goals, long-term communication should be aimed towards integrating stakeholders for effective societal management.

### 5.1.2 | Consumer internal factors: Affective reactions

The affective consumer reactions captured in the literature review included anxiety and fear (Addo et al., 2020; Gallagher et al., 2017), fear of missing out (Prentice, Quach, et al., 2020) and sadness due to loss of situational control (Chen et al., 2017). These conditions are connected to the notion of negative affect regulation and control motivation (Chen et al., 2017). The consequences of consumer sadness was shown to lead to an increase in hedonic consumption (e.g., unhealthy comfort foods such as M&Ms and buttered popcorn) (Garg & Lerner, 2013; Garg et al., 2007). Consumers are seen to experience a disconnect between their innate desire to maintain regular routines and the uncertainty due to the pandemic (Sim et al., 2020). A difficulty of coping with the effect of the pandemic that consumers experience (Kirk & Rifkin, 2020; Sim et al., 2020; Yuen et al., 2020) can lead to a lack of control and loss of possessions contributing to stress and depression (Sneath et al., 2009).

### 5.1.3 | Consumer internal factors: Cognitive responses

Some consumers show a pragmatic and rational approach in their coping behaviour and panic does not overshadow their rational thinking and actions. Common consumer cognitive responses have been knowledge accumulation and self-education (Sailer et al., 2020; Wijaya, 2020). Other cognitive responses have been social connectedness, do-it-yourself behaviours, changing views of brands and learning to live with disasters through transformative changes in consumption and identity (Kirk & Rifkin, 2020). Such rational consumers

tend to opt for utilitarian over hedonic products (Chen et al., 2017; Forbes, 2017; Singh & Rakshit, 2020). Another indication of rationality or cognition underlying panic behaviour is labelled as 'stocking up'. This type of response is a calculated action when consumers compete with each other for limited supplies (Kulemeka, 2010; Serman & Dogan, 2015).

In line with Sala (2020), we argue that there is an intricate connection between consumers' affective and cognitive responses in panic buying. Responses such as perceived scarcity (Arafat et al., 2020; Gupta & Gentry, 2019; Prentice et al., 2020; Robinson et al., 2016) and perceived threat (Yuen et al., 2020) are more complex as they are a mix of rational and instinctive responses to an external uncontrolled situation. This could be an interesting relationship to study in the context of the Theory of Planned Behaviour (TPB) (Ajzen, 1985) and Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1988). One research direction could be to investigate consumers' emotions as part of subjective norms and cognition as part of behavioural control.

### 5.1.4 | Pre-, during and post-panic behavioural responses

Kirk and Rifkin (2020) classified consumer panic buying behaviour in three phases--reacting, coping and long-term adapting. Literature has identified some pre-buying behaviours such as crowding and queuing (Aylott & Mitchell, 1998) and in-store hiding (Gupta & Gentry, 2019). Consumers are also shown to indulge in compulsive hoarding (Chu, 2018; Frost & Hartl, 1996; Mueller et al., 2007), impulsive hoarding, phantom hoarding (Serman & Dogan, 2015) and stockpiling (Chronopolous et al., 2020; Zheng et al., 2020). Some studies reported an increase in inappropriate behaviour and even abuse towards pharmacists and medical caregivers (see Zaidi & Hasan, 2020, for an example).

Increased online presence due to restrictions during COVID-19 has resulted in increased online shopping and subsequently e-loyalty (Addo et al., 2020). Excessive online consumption has also been reported as leading to addictive behaviours such as gambling, video gaming and uncontrolled shopping (Király et al., 2020). Concerning the latter there is minimal research-based evidence regarding post-purchase behaviours, though there is some indication that consumers try to gain control by acquiring utilitarian goods (e.g., Chen et al., 2020).

Some previous research demonstrates how individuals attempt to gain a sense of control through panic buying (e.g., Ballantine et al., 2014). Frost and Hartl (1996) found that some consumers even purchase seemingly worthless products to gain a sense of safety. It is yet to be established though if post-purchase, consumers experience safety and security as expected.

He and Harris (2020) highlight that some consumers exhibit altruistic behaviours by resisting panic buying and taking care of vulnerable residents. Others worked towards community well-being and contacted vulnerable people, such as the sick and aged, to supply them with essential goods (Knotek et al., 2020). A recent example



of altruistic behaviours was the charity work by the Sikh Association in Melbourne, Australia who fed the needy during lockdowns (ABC Four Corners Program, 2020). On a more individual level, increasingly, people portray responsible practices by being more careful regarding the quantity and frequency of shopping. There is increasing attention towards personal hygiene and avoidance behaviours. These behaviours were also seen during the Swine flu outbreak (Rubin et al., 2009).

From the above discussion, we draw connections to the theory of competitive arousal model (Russell & Mehrabian, 1977), where perceived arousal provides the basis for excitement and psychological feelings for consumer decision making. This has bearings with the S-O-R model (Woodworth, 1928), where Stimulus (S) from the environment is seen to influence consumers or Organisms (O) and drives their behavioural responses (R) (see, Islam et al., 2020). The above theories can assist to further develop panic buying as a field.

### 5.2 | Theme 2: The aspect of Where—Where is the research happening?

Callahan's (2014) 'Where' corresponds with the Context (C) in the TCCM framework (Paul & Rosado-Serrano, 2019) and reports on the geographical context of the study.

As is seen in Figure 1, most research on panic buying was conducted in the USA followed by studies that did not indicate a geographical context. The United Kingdom, China and Australia are the next most research-active regions after the USA. The authors did not come across any studies conducted in Scandinavia, Africa, Russia and South America (Table 5).

### 5.3 | Theme 3: The aspect of HoW? HoW was the research conducted?

Callahan's (2014) 'How' corresponds to the Methodology (M) in the TCCM framework (Paul & Rosado-Serrano, 2019). From the

consumer perspective, our review shows that different methodologies were applied such as quantitative (cross-sectional surveys, primarily online), mixed methods, mathematical models, literature reviews and qualitative (focus groups and interviews). Most literature reviews were based on secondary data analysis of a mix of scientific and non-scientific sources. The retailer and supply chain management research typically employed quantitative methodology, scanner data and exploratory data based on the review of secondary online data. No studies have been longitudinal and only two papers used cross-cultural data (Keane & Neal, 2020; Loxton et al., 2020).

TABLE 5 Methods and number of studies

	Methods	Number of papers
Consumer perspective	Secondary	8
	Quantitative	7
	Mathematical models	6
	Qualitative	5
	Literature review	3
	Conceptual	3
	Mixed methods	3
	Multi-studies	2
	Commentary	2
	Social network analysis	1
	Observations	1
Retailer perspective	Secondary	3
	Mathematical	2
	Quantitative	2
	Commentary	2
	Experimental	1
	Mixed methods	1
	Case study	1

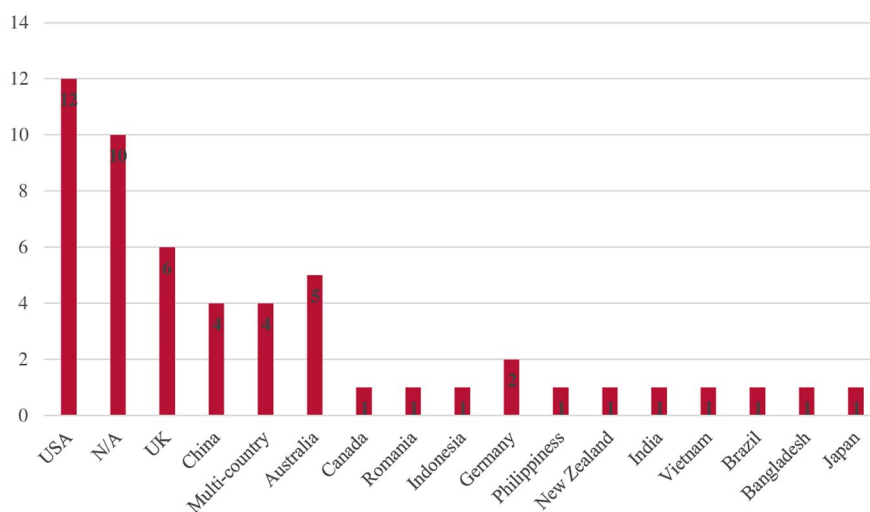


FIGURE 1 Geographical spread of the research on panic buying included in the literature review

#### 5.4 | Theme 4: The aspect of Why—Why should academicians, practitioners and policymakers know more about panic buying?

Callahan's (2014) 'Why' corresponds to Characteristics (C) in the TCCM framework (Paul & Rosado-Serrano, 2019). More specifically, we identify consumer characteristics and how they behave during panic, which is further integrated into the future research agenda. Panic buying behaviour has not been studied consistently in marketing and consumer research. The studies tend to appear as a reaction to external shocks and crises. We argue that the construct of panic buying has not been operationalized and deserves more consistent scholarly attention to build new and more in-depth knowledge that ties with consumer behaviour theories and frameworks. More research is needed, first, because current studies observed are dispersed and disparate. They brought in data from varied empirical contexts, however, most did not test the data against established frameworks or schools of thought (see Loxton et al., 2020 for an exception that utilized Maslow's Hierarchy of Needs and Herd Mentality).

Second, most cited research in this field belongs to behavioural research and psychiatry, specifically, compulsive buying and hoarding. Compulsive buying has been defined by Faber and O'Guinn (1989, 1992) as a chronic, repetitive and uncontrollable purchasing behaviour in response to negative events and/or feelings that can have harmful consequences for consumers. In this definition, compulsive buying appears to have similarities to the phenomenon of panic buying. Previous research has viewed compulsive buying as a behaviour for stimulating a euphoric state of mind and referred to as an impulse control disorder (Christenson et al., 1994). Panic buying is also defined as impulsive purchasing behaviour (see, Li et al., 2020). The above indicates that there seems to be conceptual unclarity in terms of how panic buying is defined. Moreover, compulsive and impulsive buying have been used interchangeably. Future research could examine differences between compulsive and impulsive behaviours in the context of panic buying by establishing discriminant validity.

The third reason why panic buying needs to be studied further is that most of the studies from our literature review only help in the initial understanding of panic buying. The phenomenon of panic buying can be analysed through the lenses of consumer herd mentality (e.g., Kameda & Hastie, 2015). This is because the knowledge of scarcity heuristics and consumer decision making can assist practitioners to reach consumers in a faster and more effective manner. Also, more in-depth research is needed to gain a better understanding of *risks as feelings* and *risks as analysis* (see Slovic et al., 2004, p. 311), thus, contributing to the interplay between cognition and emotion.

The fourth argument points to the importance of studying the psychological impacts of COVID-19 on various consumer cohorts and stakeholders. Policymakers, health workers and the government need to note this as important knowledge to mitigate negative emotions and encourage grassroots communication with the public. This

knowledge can also be used to prepare for possible new crises such as new waves of the pandemic.

#### 5.5 | Limitations

The first limitation is that our literature review is not exhaustive. New research is appearing every day and we have tried to integrate as much published work as possible, with the latest from December 2020. Second, there is a lack of information where some studies have been conducted which limits the geographic scope of the paper. Third, the focus on scholarly papers limits the number of studies covered in this literature review. Due to the recent occurrence of the COVID-19 pandemic, access to a larger quantity of scholarly papers published in 2020 is limited.

### 6 | RESEARCH GAPS AND FUTURE RESEARCH AGENDA

This section discusses the emergent topics for future research agenda and develops thematic areas as well as specific research topics presented in Table 6. The future research agenda builds beyond the retailer and consumer perspectives and draws attention to research that is related to governmental policy implications and broader societal impacts.

#### 6.1 | Retailer perspective

Within the retailer perspective, comparing pre- and post-disaster consumption behaviour, based on household transaction data, could lead to deeper insights into buying tendencies (Baker et al., 2020; Forbes, 2017). This can help in understanding how consumption behaviours converge or diverge when conditions normalize. Literature also points to the movement from brick and mortar to virtual shopping and e-loyalty (Addo et al., 2020). Recent research has pointed out that retailer-based unethical practices have led to an increase in consumer panic buying (He & Harris, 2020; Singh & Rakshit, 2020). To combat this issue, He and Harris (2020) suggest an increased adhering to CSR principles in retailer businesses. Retailers can play two important roles—first, to mitigate the impact of panic buying among the market and, second, to encourage conscious consumption in times of crises. More research is warranted to explore in-depth the antecedents and consequences of such retailer-based initiatives.

#### 6.2 | Consumer perspective

Within the consumer perspective, the psychological causes of panic buying dominated the bulk of the studies (Arafat et al., 2020; Gallagher et al., 2017; Nicomedes & Avila, 2020; Sim et al., 2020; Yuen et al., 2020; Wijaya, 2020). Wijaya (2020) mentions that more research

TABLE 6 Proposed topics for future research

Thematic area	Proposed topics based on identified research gaps
Retailer perspective	<p>Comparison of pre- and post-disaster consumption behaviour based on household transaction data</p> <p>The increased transition from brick and mortar to virtual shopping due to pandemic-induced restrictions</p> <p>The link between retailer-based unethical practices and consumer panic buying</p> <p>How CSR principles reduce retailer unethical practices during crises and pandemics</p> <p>The link between consumer psychographics and panic buying patterns</p> <p>The impact of different governmental policies on the nature of small retailers</p>
Consumer perspective	<p>The link between the nature of consumer's psychological state and panic buying behaviours</p> <p>Impact of socio-cultural characteristics on panic buying behaviours</p> <p>The effect of past experiences of crises on panic buying behaviours</p> <p>Ethical and sustainable consumption behaviour</p> <p>The link between coping behaviours and consumer resilience during panic</p> <p>The relationship between herd mentality and panic buying</p> <p>The differences between reactive and proactive panic buying behaviours</p>
Crisis management and policymaking	<p>How social distancing programmes and government interventions impact panic buying</p> <p>The role of digital platforms in generating responsible social behaviour</p> <p>The role of government-led initiatives for societal coping with the pandemic and crises</p> <p>Communication voids and impact on panic buying</p> <p>Governmental policies to reduce media hype and fake news</p>
Broader societal impacts	The shift towards prosocial and altruistic behaviour

TABLE 6 (Continued)

Thematic area	Proposed topics based on identified research gaps
	<p>How panic behaviour applies to the disadvantaged /minority populations</p> <p>Cross country and cross-cultural studies comparing stringent and lenient lockdown strategies on social and economic well-being</p> <p>Relationship between community behaviour and resource optimization</p> <p>A link between other domains such as innovation, circular economy and e-commerce and panic buying behaviour</p> <p>The link between panic behaviour in developed countries and developing countries</p>

is needed on larger samples for studying how social distancing and government interventions impact panic buying. The link between demographic and attitudinal factors (Bish & Mitche, 2010; Chronopolous et al., 2020) and psychographics (Zolfagharian & Yazdanparast, 2019) on panic buying needs to be explored further. Previous experiences with pandemics and crises on panic buying behaviours (Kuruppu & De Zoysa, 2020) need to be studied more thoroughly. This knowledge can assist the public, particularly vulnerable individuals (e.g., young people, single parents, elderly, single-income families and contract workers) to cope with panic and confinement (Sim et al., 2020).

How herd mentality plays out in crises is another research avenue. For example, people reacted counterintuitively and even showed hostility for those who wore masks in Sweden where lockdowns were not imposed (Edwards, 2020). It is, therefore, important to ask--How do recurrent pandemics and lockdowns impact emotional intensity and tolerance? Are there indications that people who have low confidence or self-doubt can be more easily led by herd mentality? Another example of public hostile behaviour found in Zaidi and Hasan's (2020) study on U.K. pharmacists reported multiple incidences of inappropriate behaviour from the public that led to elevated anxiety among pharmacists at work.

Research should focus on the need for community preparedness for lockdowns and its impact on the likelihood of individuals engaging in hoarding behaviour. Could an organized approach to community behaviour possibly impact sustainability and resource optimization? The pandemic involved the mass purchase of commodities such as hand sanitizers, toilet paper, noodles, pasta, canned food and candles to name a few. Future research could examine how businesses adjusted their production and warehousing to cater to the sudden escalated demands and what happens to the excess inventory when the panic buying subsides.

The role of media in inducing fear and negative hoarding and stockpiling trends should be investigated. Policymakers and

(Continues)

government bodies need to ensure effective and timely communication to the public so that the negative impacts of fake news and hyped content from the media can be controlled. Further, communication voids and their impact on the public's perception of safety in the context of panic behaviour should be investigated. Longitudinal studies are needed to better understand behavioural shifts and patterns of panic buying in countries that experienced stringent lockdowns. It is imperative to apply a cross-cultural lens to decipher the impacts of cultural parameters and psychographics on (new) consumption patterns within panic behaviour. Researchers should also use mixed methods to enrich and advance existing knowledge of panic behaviour.

### 6.3 | Broader societal issues

Several thematic areas concerning broader social issues that emerged due to the pandemic were revealed in our literature review. The role of government-led initiatives to support the society in coping with the crises and pandemics was emphasized (e.g., Keane & Neal, 2020; Sailer et al., 2020; Sim et al., 2020; Wijaya, 2020; Zaidi & Hasan, 2020). There should be a more emphatic focus on the economic and financial impacts on consumers, particularly women and minority groups, to assess their coping mechanisms (Beck & Hensher, 2020; Kirk & Rifkin, 2020). People with linguistic and educational constraints may be disadvantaged due to an information deficit and be susceptible to panic behaviour. Therefore, research into making digital platforms more effective and accessible for educating people about self-responsibility is important.

### 6.4 | Crisis management

Our research agenda extends to crisis management and policymaking avenues. During the COVID-19 pandemic, some countries imposed strict lockdowns, while others did not. For example, in Sweden, there have been no lockdowns and wearing masks was not compulsory. The social system relied largely on people's self-responsibility which over time has been largely compromised. Many countries, globally, experienced lockdowns and repetitive lockdowns, for example, Australia, India, China, Turkey, Germany and the United Kingdom. More qualitative and quantitative research on the nature of panic buying is warranted in non-lockdown countries, such as Sweden and countries with lenient social impositions.

Finally, based on the number of citations, some areas of research were cited more than others even though they were published in the 2020s and during the pandemic. Citations indicated popular themes that have received more attention from researchers than others. Topics such as household spending and their demographics and psychographic factors, policymaking, psychological causes of panic buying and the impact of COVID-19 on CSR and marketing strategies emerged as popular areas of research. The number of citations suggests that the field of hoarding behaviour has received scholarly

attention but it has been studied mostly in the context of psychological conditions. More attention is needed in the context of panic buying through quantitative analyses of the triggers of panic buying, post-purchase impacts and age and gender-based consumption patterns. An extension of compulsive hoarding such as compulsive and impulsive buying behaviour during disasters and the pandemic needs further study.

## 7 | IMPLICATIONS FOR POLICYMAKERS AND PRACTITIONERS

Marketers and policymakers are responsible for ensuring that sustainable development goals (SDGs) are not compromised due to the COVID-19 pandemic. This can be achieved by developing proactive policies so that herd mentality and collective anxiety can be reduced through a collaboration among governments, consumers, corporates and communities. Policymakers and practitioners need to aim for a better understanding of panic consumption patterns. Leaner business models and innovative practices for integrating various stakeholders should be designed to create sustainable supply chains that can buffer panic consumption.

Previous knowledge combined with current knowledge should be used as a benchmark to create new policies and marketing mix strategies to effectively respond to emergency and disaster situations. Allaying public fears and anxieties is a primary tool of chaos control and indications are that people need to be informed and educated. The COVID-19 crisis can be an opportunity for governmental agencies to reframe old practices in education, health awareness and public responsibility. This can improve government and citizen collaboration to foster positive change in these environments.

During the COVID-19 pandemic, irresponsible behaviours from different parts of the world, (particularly the youth) have been reported by the media. Ilesanmi and Alele (2016) point out that public health education should communicate to the public about the sources of infection and prevention. Social marketing and educational campaigns need to be designed to make people realize the danger of the pandemic and prevent further outbreaks of COVID-19. These include public awareness campaigns, precautionary measures and prevention campaigns by the government and NGOs, among others. For example, women canvassers in Afghanistan created about 4,000 self-help groups and their use of video messages on health and hygiene has proven effective to control the spread of COVID-19 among illiterate and poor communities (worldbank.org, 2020).

Long-term sustainable behaviours such as taking responsibility for personal hygiene and safety to reduce the spread of the virus need to be encouraged (Johnson & Hariharan, 2017). Boehmer et al., (2020) in a report on the Center for Disease Control and Prevention (CDC) emphasize that young adults are likely to spread the COVID-19 virus to older and vulnerable populations. The report states that shaming the younger generation is not constructive. Alternatively, relatable campaigns should be implemented that resonate with younger people. This is in line with an earlier

observation that called for the promotion of health messages and training of students during the Ebola pandemic (Ilesanmi & Alele, 2016).

Policymakers, regulators and local governments should focus on marketers, health workers, educators, retailers and digital solutions providers to ensure that they present appropriate interventions. This can include regulations, sanctions and communications to curb the negative effects of the pandemic and to discourage panic buying. Raising awareness among the public regarding the issues of resource depletion, unsustainable marketing and subsequent harm to vulnerable consumers is crucial. Images of empty shelves by the media, for instance, may create panic. Therefore, policymakers should also independently monitor what the media presents and ensure a correct portrayal of information, symbols and themes. Written and spoken communication must constructively direct people's behaviour rather than instigate panic excitement. To this end, it is important to include key stakeholders such as media companies, health and social care professionals, regulators and the retail industry to promote sustainable buying behaviour.

## 8 | CONCLUSION

The topic of panic buying is gaining worldwide popularity with an increasing number of scientific and non-scientific publications. However, the domain remains insufficiently studied and extant literature is built on sparse empirical data. Our paper, to the best of our knowledge, is one of the first systematic literature reviews on panic buying that builds only on scholarly work. We consolidated 53 relevant scholarly studies and clustered them into a review structure based on Callahan's (2014) 4 Ws--What, Where, HoW and Why and Paul and Rosado-Serrano's (2019) TCCM framework. We found that the extant literature on panic buying is dispersed across various disciplines. The review revealed a lack of consistency or a 'red thread' regarding a common understanding of what panic buying is. Further, the review material was not supported by established consumer behaviour theories.

We contribute to the domain of consumer research in four ways--(a) we provide theoretical insights into *What do we know about panic buying as an academic context?* (b) we provide contextual insights into *Where is the research happening?* (c) we provide methodological insights into *'HoW was the research conducted?'* Based on the above contributions, we develop a nuanced research agenda that addresses the question *'Why should academicians, practitioners and policymakers know more about panic buying?'*

The closest metaphor for the domain of panic buying behaviour is that it is rather 'borderless' as there are no fixed sets of theories that encapsulate the concept of panic buying. One reason could be the inconsistencies in how panic buying plays out in different regions and contexts because consumers get influenced by culture, governances and policies. This knowledge gap opens the possibilities for developing fundamental panic buying behaviour theories to build it as a field of research. A good starting point would be to

conceptualize the panic buying phenomenon. We can infer from the review that the retailer behaviour and supply chain management in the context of panic buying has been insufficiently researched. Another notable inference is that most studies have been conducted in the United States and the United Kingdom. We draw attention to more empirical research for this field in other countries including Russia, Scandinavia, South Asia, South East Asia and Africa. Finally, we did not come across studies that compared the panic buying phenomenon in developing and developed countries.

### CONFLICT OF INTEREST

The authors have no conflict of interest.

### DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no data sets were generated or analysed during the current study.

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