A systematic literature Review of Panic Buying During Unknown Risks: The Covid-19 Pandemic as an Example

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ARTICLE DETAILS	ABSTRACT
	This study aims to systematically review the literature on panic buying phenomenon during the COVID-19 pandemic, its triggers, causes, and consequences and to identify the determinates of panic buying during the COVID-19 crises based on the articles' participating countries, research methods, and theories. The systematically literature review methodology is done through searching multiple databases which are Google scholar, ScienceDirect, Emerald and ProQuest. The systematic literature review has been conducted by analyzing 38 papers. The study found that panic buying behavior forms vary as rational or irrational, conscious or unconscious, and imitative or deliberate based on the buyer's mentality and the surrounding situational cues. The findings highlighted the need for better understanding of panic buying phenomenon during the pandemic and more insightful investigations on the role of government, media and society in exacerbating or controlling the situation.

1. INTRODUCTION

According to Islam et al. (2021), panic buying is the "the action of buying large quantities of a particular product or commodity due to sudden fears of a forthcoming shortage or price increase". Panic buying has always been a common consumer reaction to anticipated disasters. On March 11, 2020, the world health organization declared Covid-19 as a global pandemic (WHO), at that time the pandemic was an unprecedented disaster that the world has never seen anything like before. As governments impose quarantine and lockdowns to prevent the spread of the virus, anxiety levels elevated, and panic buying became not only a necessity act but also rather a psychological coping mechanism. Although panic buying is not a new phenomenon, the scale of which it has been witnessed during the global pandemic is unprecedented. During the Covid-19 pandemic, panic buying has been observed in more than 90 countries (Li et al., 2021). Widespread increase in demand for masks, toilet paper, sanitizers, food, and medicine left many supermarket shelves emptied. Post-pandemic research revealed that panic buying is mainly triggered by phycological factors such as anxiety and depression (Yuen et al., 2020; Lopes et al., 2020; Kaur & Malik, 2020; Lins et al., 2021), social factors such as social media (Naeem & Ozuem, 2022; Naeem, 2021a), and situational factors such as supply scarcity (Omar et al., 2021; Yuen et al., 2022). Given the novelty of the corona virus, leading journals and publishers have expressed an urgent need for more research into the economic, social, and behavioral effects of the COVID-19 pandemic on communities, societies, and countries (WHO). The purpose of this study is to systematically analyze recent scholarly articles and conduct a systemic analysis on the determinates of panic buying during the COVID-19 crises based on the articles' participating countries, research methods, and theories. Despite the growing literature on the causes of panic buying, the COVID-19 pandemic has provided researchers with strong motivation to re-examine customer panic behavior in the context of virus outbreak.

1.1. Research questions.
With little academic literature that studies the determinants of panic buying behavior during the COVID-19 period, our research attempts to address this research gap by answering the following research questions:

RQ1: What is the impact of government interventions on consumer buying behavior during Covid-19?
RQ2: How have consumers perceived scarcity due to COVID-19 crises impacted consumer's panic buying?
RQ3: How did social media influence customer's response to COVID-19 pandemic in terms of stockpiling and panic behavior?

RQ4: What research methods and theories were applied in the examined articles?

RQ5: What findings and recommendations about strategies that can be adopted to mitigate the effects of panic buying during COVID-19 did the studied articles produce?

1.2. Research objectives.

In light of these research questions, the research objectives of this study are as follows:

1. To study the impact of government interventions on panic buying during the COVID-19 pandemic.
2. To study the impact of perceived scarcity on panic buying during the COVID-19 pandemic.
3. To study the impact of social media on panic buying during the COVID-19 pandemic.
4. To identify the theories that explains the panic buying behavior during the crises.
5. To provide insights to policy makers and marketers about the relationship between COVID-19 and panic buying.

2.   LITERATURE REVIEW

2.1. Panic buying.

Panic buying is defined as "the act of purchasing usually large amounts of production due to a prediction of supply disruption caused by a severe disaster or crisis" (Prentice et al. 2020). Also, Yuen et al. (2020) defined panic buying as a "specific herd behavior that is mainly triggered by a disaster or health crisis". As can be seen, both definition ties the emergence of panic buying behavior with a disaster or crisis. In addition, Sim et al. (2020) defined panic buying as "act of self-preservation in the face of a traumatic circumstance whereby the survival of an individual and community is at risk especially when under quarantine situation". Most probably, individuals adopt panic buying behavior as a strategy to "manage their feelings of insecurity and regain control over the situation" (Yuen et al., 2021). However, panic buying is not always irrational; stockpiling essential products that are in limited supply is a wise decision (Martin-Neuninger & Ruby, 2020). Apart from quantity, panic buying can lead the shopping experience to rely more on heuristics such as the brand name and visual features due to time constraints (Maharana, 2025) and Disgust proneness (Tang & Zhang, 2026). For instance, buyers are predicted to prefer high price and high-quality products over low price and low-quality products (Li et al., 2025; Zhang et al., 2025).

One study categorizes the causes of panic buying into three groups: psychological factors (anxiety and depression), social factors (social media), and contextual factors (scarcity and supply chain interruptions) (Singh et al., 2023). Similarly, Sharma et al. (2020) suggested panic buying to be triggered mainly by fear of scarcity, lack of control over the environment, vulnerability due to fear, anxiety exacerbation and simple primitive human reaction. The same study highlights the importance of differentiating panic buying from other normal behaviors of buying in excess or compulsive buying behavior. In addition, influence from close relations and social proof are proposed to be the determinants of panic buying by (Chua et al., 2021). Prentice et al. (2021b) identified three essential parties engaged in as motivators for panic buying behavior and sometimes as interveners namely, government, media (news, social media, and advertisements), and peers (family, friends, and other shoppers). Firstly, Governments in response to the outbreak of COVID- 19 pandemic imposed several measures. Those measures were of two goals; to contain the spread of the disease while minimizing the adverse economic impact (Ashraf, 2020). Lockdowns and social distancing measures imposed by governments are found to be perceived by individuals as indicators for resources availability.Prentice et al. (2021b) proved a significant relationship between those mitigating measures and stockpiling or panic buying behavior. Secondly, individuals are excessively exposed to formal and informal media messages and news that rouse their desire to "go with the flow" and imitate others' consumption behavior (Bavel et al., 2020). Thirdly, buyers are likely to mimic the purchase behaviors and decisions of their peers. Existing literature claims that during crisis times, individuals become sensitive to others' emotions and feelings, fears, and anxieties, particularly persons whom they have direct contact with (Masa'deh et al., 2023; Oliinyk et al., 2025).

Panic buying effects and consequences can be measured from different dimensions: demographically, psychologically, environmentally, socially, economically, and environmentally. Demographically, the negative effects of panic buying are more likely to be focused on elderly, homeless, and people who are discriminated against as well as women who take care of their families. Psychologically, panic buying behavior is exhibited mostly by people who lack appropriate communication skills and those who suffer from mental health problems. Socially, buying household essentials in excessive amounts leave other consumers deprived from the same essentials. This situation exacerbates particularly in lower-income countries that lack social safety needs. Economically, panic buying disrupts supply chains and causes the prices to increase in the face of excessive demand. Nevertheless, due to legal and reputational concerns, well-known stores and brands are not likely to increase prices. This may cause black markets to emerge and speculative buying to flourish (Keane & Neal, 2021). Environmentally, panic buying is expected to lead to excessive greenhouse emissions. In more details, the extra panic bought items will eventually be left to waste, which means that the energy and inputs utilized to produce them will be also left to waste. Globally, it has been proven that countries whose citizens are risk averse are more likely to suffer from the panic buying phenomenon (Chua et al., 2021).

2.2. Intention and behavior: The aspects of panic buying phenomenon.

Intention and behavior are the major aspects of panic buying (Sharma et al., 2020). The intentions of individuals surrounding panic buying dictate their purchasing behavior during crisis times. Individuals' behaviors are most likely to be in accordance with their intentions. Panic buying behavior or decision is an output on two concurrent processes: the production of a subjective purchase intention

based on the individual's own subjective emotion and the generation of internal positive/ negative panic buying motivation. Based on this internal driving force, the individual makes the decision to engage in panic buying (Chen et al., 2022). Many scholars employ the "Theory of Planned Behavior" to shape their investigations of intentions to embrace pandemic prevention strategies (Sherman et al., 2021). The theory of planned behavior is adopted widely in consumer behavior research area to interpret the human behavior and identify the factors that drive human behavior. Three variables are measured in this theory: attitude, subjective norm, and perceived behavior control (Ding et al., 2022). In Covid-19 context, the excessive exposure to media messages and news prompts the intention to prepare as a form of problem-focused coping response. Covid-19 related news is overwhelmingly negative as it focuses on risk of death, economic downturn, loss of jobs and social isolation. Thus, the generated intention to purchase (prepare) is based on the subjective emotion of anxiety. At the same time, adaptive and maladaptive behaviors are produced to cope with this negative state of being. In other words, individuals make a decision to participate in panic buying driven by an internal force to eliminate or mitigate the anxiety and tension levels (Sherman et al., 2021).

2.3. Social proof and influence from close relations.
Existing literature suggests social proof and influence from close relations to have robust impact on the decision to participate in panic buying. Social proof serves as a psychological and social indicator that directs people to choose the options selected by the majority. Similarly, Influence from close relations guides to some extent the individual's behaviors, actions, and decisions (Prentice et al., 2021b). "People are influenced by the behavior of their peers at time of uncertainty" (Martin-Neuninger & Ruby, 2020), and particularly those who are risk averse. Risk- averse individuals are characterized by their tendency to imitate or copy the decisions of other people whom they perceive close or similar to themselves (Chua et al., 2021). Peer influence can be explained by the contagion theory. Contagion theory states that "individuals engage in a process of social learning by examining and imitating the actions of peers under conditions of uncertainty" (Prentice et al., 2021b). Scholars found that negative feelings and emotions such as anxiety, and fear of missing out to be contagious and to spread via means of observational and social learning. When shoppers observe their fellow shoppers stockpiling they tend to rush and imitate their buying behavior out of thinking that those fellow shoppers have specific knowledge or foresight leading them to panic buying (Zheng et al., 2021). Contagion can be either conscious or unconscious cognitive process. It is predicted to be conscious when individuals become more sensitive to others' fears, emotions, and feelings (Gao et al., 2025).

2.4. Perceived scarcity and panic buying during the COVID-19 era.
As the threat of pandemic risk becomes more evident, consumers fear product supply shortages and as a result they employ different coping/survival mechanisms to maintain physiological and safety needs (Prentice et al., 2021a). During the Covid-19 pandemic, demand for basic consumer necessities has surged exponentially, making businesses incapable of satisfying the abnormal soar in market demand (Gupta et al., 2021). Several post-pandemic research discussed perceived scarcity as a factor that leads to panic buying. Chua et al. (2021) and Omar et al. (2021) defined perceived scarcity as "consumers' conception of the degree of resource abundance or availability in this COVID-19 pandemic" and "an individual's expectation that a product might not be accessible after incidents such as health crises" respectively. Several studies analyzed the determinants of consumer's perceived scarcity leading to panic buying. Chua et al. (2021) proposed that three interconnected elements influence perceived scarcity: a lack of control over the surrounding environment, a sense of insecurity and instability, and supply chain interruptions. Furthermore, perceived scarcity is influenced by customers' feelings of vulnerability and lack of trust in the government, which drives consumers to overestimate the chances of danger while underestimating the likelihood of receiving assistance from the government (Yuen et al., 2021).

To add more, in the context of the pandemic, research suggests that perceived scarcity has both a direct and indirect effect on panic buying. In terms of direct impact, Singh et al. (2023) argued that there is a significant positive relationship between scarcity and panic buying. In the time of COVID-19, perceived scarcity of basic consumer goods implies a threat of personal freedom (limited access to products) which triggers a psychological reaction that leads customers to panic buying to obtain limited goods and services before they become unavailable. To support this argument, Omar et al. (2021) referred to reactance theory, which states that when individuals perceive a threat to their freedom, they initiate a psychological reaction to re-establish their perception of freedom. Whereas indirectly, scarcity has an indirect influence on panic buying through perceived competition (Singh et al., 2023), anticipated regret (Yuen et al., 2022), and anxiety (Omar et al., 2021). Perceived scarcity indirectly affects panic buying by stimulating perceived competition among consumers as they feel that they are competing with other customers to buy more products before others do.

In terms of anticipated regret, Yuen et al. (2022) studied the indirect influence of perceived scarcity on panic buying behavior by referring to the regret theory. Regret theory is a prominent economic decision theory formalized by (Loomes and Sugden, 1982). The regret theory assumes that people anticipate regret if they make the wrong decision, this anticipation is taken into account when making decisions under uncertainty. In the context of Covid-19 pandemic, perceived scarcity stimulated feelings of anticipated regret in terms of product availability and price which led to increase efforts in consumer purchase decisions. As consumers are regret averse, consumers felt the urge to stockpile to avoid the feeling of regret in case they do not by limited supply products before they stockout of before the prices increase. Furthermore, Omar et al. (2021) suggested that anxiety mediates the relationship between perceived scarcity and panic buying. Their findings show that the relationship between perceived scarcity and panic purchase is not direct. In other words, the perception of scarcity during the covid-19 era did not affect panic buying directly, but rather it had an indirect impact as anxiety played an important role in mediating the relationship among these variables. They argue that panic buying can provide consumers with a sense of relief from the anxiety and negative feelings that emerged from perceived risk and scarcity during the covid-19 outbreak. Summarizing the above, when consumers sense a fear of lack of resources to attend to their individual needs and wants (FOMO), they feel the urgency to procure

more products immediately. This feeling of scarcity and competition led to customers stockpiling impulsively and obsessively in the Covid-19 era.

2.5. Social media and panic buying during the COVID-19 era.
Currently, there are over 2.65 billion users of social media, and with social networking usage increases daily, social media have evolved from connecting and engaging people with each other into an important platform for information sharing. However, this increase in information sharing allowed the spread of sensationalism and misinformation regarding many events. This is especially witnessed during the COVID-19 pandemic, where social media facilitated the spread of many hashtags that were intended to arouse consumers. Addetionally, previous studies highlighted that in times of uncertainty, social media have influenced consumers buying behavior. Naeem (2020b) referred to "social proof" theory to highlight how important is the impact of social media on human behavior during the coronavirus pandemic. According to this theory, an individual who is unsure of how to act in a given situation will most likely seek guidance from other actions for optimal decision making (Cialdini, 2006). The findings suggested that high exchange of rumors, sensationalism, and other forms of disinformation on social media during the pandemic have developed a social proof for stockpiling behavior. Additionally, Naeem (2021) findings suggested that emotionally charged content gets people attention and increases insecurity among consumers as they become more uncertain regarding which information is correct and which is incorrect. Another article by Naeem & Ozuem (2022) extended the previous research to study the impact of social influence theory on consumer's reaction to the COVID-19 crises. Kelman (1958) mentioned that social influence theory proposed that an individual attitude, beliefs, and subsequent actions or behaviors are influenced by referent other people. Naeem (2020a) suggested that information overload from scientists, government authorities, community leaders and medical experts who turned to social media to express their opinions and describe the unprecedented threat of what has become the largest health crisis in modern history have affected how the global society thought and reacted to the crisis. Stressing the role of social influence in the context of social media which led to developing a global digital society whose interpretation of the overwhelming information have caused consumers to convert to panic buying with purpose to avoid risk in the future. Aljanabi (2023) inferred that the media portrayal and framing of the pandemic has played a pivotal role in the dissemination of misinformation and fake news during the COVID-19 crisis which affected consumer purchasing decisions and caused a shift towards panic buying.

3.   RESEARCH METHODOLOGY

This study aims to conduct a systematic literature review to achieve its research objectives and to contribute to the limited literature by closing the research gap. A systematic literature review was deemed most appropriate to analyze the differences in perspectives and approaches in studying the relationship between panic buying and COVID-19. The study went through different stages: Inclusion and exclusion criteria, data sources and search strategies, and data analysis.

3.1. Inclusion/exclusion criteria.
As the number of information sources has been radically increasing recently, it is necessary to filter the search results in order to get the relevant articles to conduct research. Inclusion and exclusion criteria help in ensuring that all articles included in the systematic review are of high quality and relevant to the research topic to deliver reliable findings. Table 1 describes the inclusion and exclusion criteria that were applied in our review.

Table 1. The systematic literature review's inclusion and exclusion criteria.

No.	Criteria	Inclusion criteria	Exclusion criteria
1.	Publishing year	2020-2022	Earlier than 2020
2.	Type of a source	Peer-reviewed articles Scholarly journals Academic journals	Non- peer-reviewed articles Newspapers Book reviews Other types of publications
3.	Language	English	All the other languages
4.	Study focus	Should focus on panic buying and COVID- 19 Should involve one or all terms of impulse buying, covid-19 pandemic, and could be in Tittle, abstract or anywhere in the document	Any study that does not discuss mainly panic buying and COVID-19

3.2. Data sources and search strategies.
Different databases and search engines have been used to conduct the systematic review. Articles were collected from four databases ProQuest, Science Direct, Google Scholar, and Emerald. Key research terminology used to filter results were ("Panic buying" AND "COVID-19"),("Panic buying" AND "COVID-19" AND "Pandemic"), ("Panic buying" AND "pandemic"), ("impulse buying" AND "COVID-19"), ("stockpiling" AND "COVID-19"). In the first stage of search (IDENTIFICATION STAGE). The search result from the four databases yielded 140 studies that included the keywords. These articles were then downloaded for further screening to remove the duplicate studies, which were 28 articles, making the available studies 112. Then, for the third stage, we applied the inclusion and

exclusion in which 74 articles were excluded after applying the criteria above, making the number of used studies in this review 38. Table 2 presents final selected studies from the databases with number of included articles. It is worth to mention that the number of articles is relatively small due to the novelty of the COVID-19 pandemic. Figure 1 describes all the steps of the systematic literature review.

Table 2. The total number of articles.

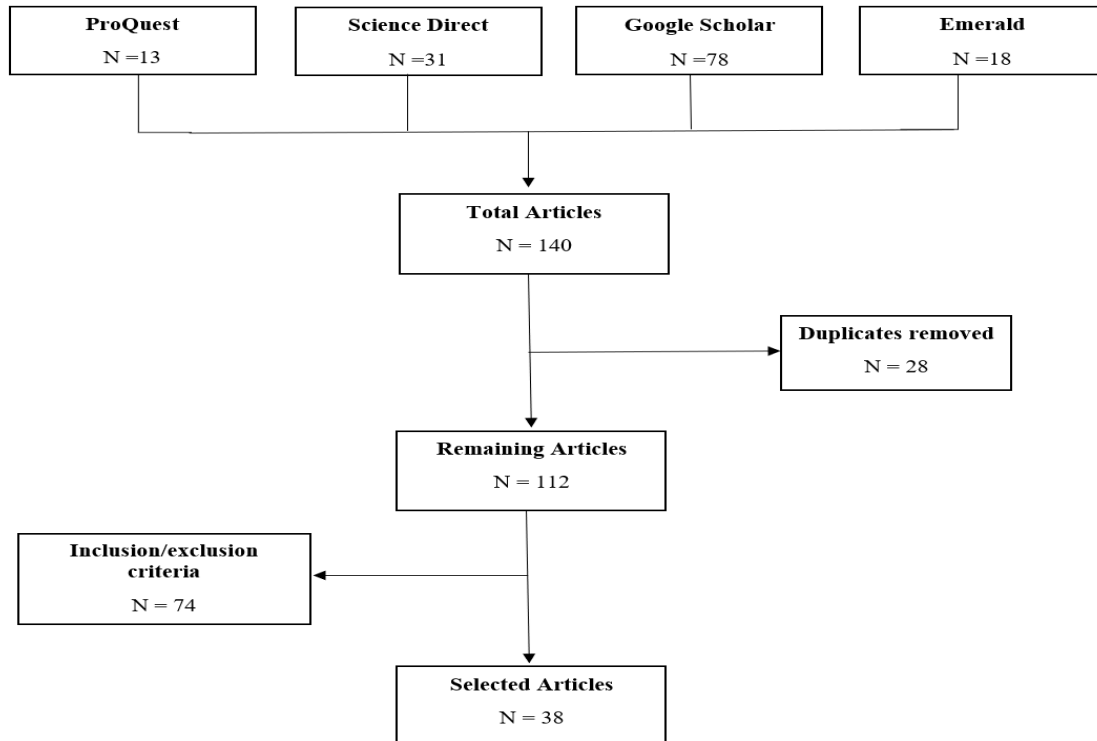| Journal databases	Frequency	Final result
ProQuest	13	3
Science Direct	31	10
Google Scholar	78	17
Emerald	18	8
Total	140	38

Figure 1. PRISMA flowchart for the selected studies.

3.3. Data coding and analysis.

For data coding, the articles were coded based on the articles' articles' participating countries, research methods, and theories used in the research. During the coding process, any article that didn't clearly focus on panic buying and the COVID-19 pandemic were excluded from the analysis.

Table 3. Articles' Participating Countries, Research Methods, and Theories.

Authors	Article title	Country	Research Method	Theory
(Arafat et al., 2020)	Panic buying: An insight from the content analysis of media reports during coivd 19 pandemic	Multi-country	Cross sectional study	Social learning theory
(Prentice et al., 2021b)	Antecedents and consequences of panic buying: The case of COVID-19	United States & Australia	Structural equation modelling	Theory of resource scarcity Crowd psychology Theory of contagion
(Leung et al., 2021)	Anxiety and Panic Buying Behaviour during COVID-19 Pandemic—A Qualitative Analysis of Toilet Paper Hoarding Contents on Twitter	Multi-country	Content analysis	Grounded theory approach
(Loxton et al., 2020)	Consumer Behaviour during Crises: Preliminary Research on How Coronavirus Has Manifested Consumer Panic Buying, Herd Mentality, Changing Discretionary	United States & Australia	Content analysis	Maslow's Hierarchical Theory

	Spending and the Role of the Media in Influencing Behaviour			
(Keane & Neal, 2020)	Consumer panic in the COVID-19 pandemic	Multi-country	Factor Analysis	No theory specified
(Lins & Aquino, 2020)	Development and initial psychometric properties of a panic buying scale during COVID-19 pandemic	Brazil	Factor Analysis	No theory specified
(Naeem, 2021)	Do social media platforms develop consumer panic buying during the fear of Covid-19 pandemic	UK	Telephonic interviews	Consumer panic buying theory Social influence theory Social proof theory
(Harahap et al., 2021)	Emerging Advances In E-Commerce: Panic And Impulse Buying During The Covid-19 Pandemic	Indonesia	Literature review	No theory specified
(Gazali, 2020)	THE COVID-19 PANDEMIC: FACTORS TRIGGERING PANIC BUYING BEHAVIOUR AMONG CONSUMERS IN MALAYSIA	Malaysia	Literature review	No theory specified
(Yuen et al., 2021)	Panic buying during COVID-19: Survival psychology and needs perspectives in deprived environments	Singapore	Structural equation modelling	Maslow's Hierarchical Theory
(Islam et al., 2021)	Panic buying in the COVID-19 pandemic: A multi-country examination	Multi-country	Factor Analysis	Cognitive load theory
(Lehberger et al., 2021)	Panic buying in times of coronavirus (COVID-19): Extending the theory of planned behavior to understand the stockpiling of nonperishable food in Germany	Germany	Online surveys	Theory of planned behavior
(Kostev & Lauterbach, 2020)	Panic buying or good adherence? Increased pharmacy purchases of drugs from wholesalers in the last week prior to Covid-19 lockdown	Germany	Cross sectional study	No theory specified
(Sherman et al., 2021)	Panic buying or preparedness? The effect of information, anxiety and resilience on stockpiling by Muslim consumers during the COVID-19 pandemic	UAE	Online surveys	Theory of planned behavior Conservation of resources theory
(O'Connell et al., 2020)	Preparing for a pandemic: spending dynamics and panic buying during the COVID-19 first wave	UK	Secondary data analysis	No theory specified
(Chua et al., 2021)	The Determinants of Panic Buying during COVID-19	Singapore	Structural equation modeling	Health belief model Theory of resource scarcity Anticipated regret theory
(Omar et al., 2021)	The panic buying behavior of consumers during the COVID-19 pandemic: Examining the influences of uncertainty, perceptions of severity, perceptions of scarcity, and anxiety	Malaysia	Structural equation modeling	Behavioral inhibition system theory Reactance theory Expectancy theory
(Yuen et al., 2020)	The Psychological Causes of Panic Buying Following a Health Crisis	Multi-country	Systematic review	No theory specified
(Phillips et al., 2021)	The victims, villains and heroes of 'panic buying': News media attribution of responsibility for COVID-19 stockpiling	Australia	Content analysis	No theory specified
(Prentice et al., 2020b)	Timed intervention in COVID-19 and panic buying	Australia	Semantic analysis	No theory specified
(Taylor, 2021)	Understanding and managing pandemic-related panic buying	multi-country	Literature review	Social learning theory

				Behavioral inhibition system theory Game theory
(Barnes et al., 2021)	Understanding panic buying during COVID-19: A text analytics approach	Italy	Text analytics	Compensatory control theory
(Naeem, 2020b)	Understanding the customer psychology of impulse buying during COVID-19 pandemic: implications for retailers	UK	Telephonic interview	Theory of fear and perceived risk
(Kassas & Nayga, 2021)	Understanding the importance and timing of panic buying among U.S. Households during the COVID-19 pandemic	United States	Regression analysis	No theory specified
(Lins et al., 2021)	Anxiety, depression, and stress: Can mental health variables predict panic buying?	Brazil	Online surveys	No theory specified
(Kaur & Malik, 2020)	Understanding the Psychology Behind Panic Buying: A Grounded Theory Approach	India	Focus group interview	Grounded theory approach
(Çelik & Köse, 2021)	Mediating effect of intolerance of uncertainty in the relationship between coping styles with stress during pandemic (COVID-19) process and compulsive buying behavior	Turkey	Online surveys	No theory specified
(Lopes et al., 2020)	Paranoia, hallucinations and compulsive buying during the early phase of the COVID-19 outbreak in the United Kingdom: A preliminary experimental study	UK	Online surveys	No theory specified
(Prentice et al., 2021a)	Relevant, or irrelevant, external factors in panic buying	Multi-country	Factor analysis	Self-protection theory Social influence theory
(Yuen et al., 2022)	Social determinants of panic buying behaviour amidst COVID-19 pandemic: The role of perceived scarcity and anticipated regret	Singapore	Structural equation modeling	Social learning theory
(Yang et al., 2022)	Spatial evolution patterns of public panic on Chinese social networks amidst the COVID-19 pandemic	China	Sentiment analysis	Grounded theory approach
(Satish et al., 2021)	Covid-19 is driving fear and greed in consumer behaviour and purchase pattern	India	online survey	Theory of planned behavior Reactance theory Stimulus-organism-response theory
(Gupta et al., 2021)	Impact of COVID-19 crisis on stocking and impulse buying behaviour of consumers	Multi-country	Factor analysis	Theory of reasoned action
(Aljanabi, 2023)	The impact of economic policy uncertainty, news framing and information overload on panic buying behavior in the time of COVID-19: a conceptual exploration	Multi-country	Semantic analysis	Protection motivation theory Information processing theory
(Tan et al., 2021)	To verify or not to verify: using partial least squares to predict effect of online news on panic buying during pandemic	Malaysia	Structural equation modeling	Theory of planned behavior
(Naeem & Ozuem, 2022)	Understanding misinformation and rumors that generated panic buying as a social practice during COVID-19 pandemic: evidence from Twitter, YouTube and focus group interviews	UK	Thematic analysis	Theory of rumor transmission Protection motivation theory

| (Naeem, 2020a) | The role of social media to generate social proof as engaged society for stockpiling behaviour of customers during Covid-19 pandemic | UK | Thematic analysis | Social proof theory |
| (Chen et al., 2022) | Identifying emergence process of group panic buying behavior under the COVID-19 pandemic | Multi-country | Simulation analysis | No theory specified |

4.   RESULTS

Based on the 38 selected studies published on panic buying and COVID-19 since 2020, the results of this systematic review are reported as follows:

4.1. Distribution of studies in terms of participating countries.

Most of the reviewed studied were carried out in a multi-country context with 10 studies. The country with the majority studies is United Kingdom, with 6 studies and the second most is Australia with 4 studies, followed by the United States, Singapore, and Malaysia each having 3 studies. Next is Brazil, Germany, and India with two studies for each. As for other countries, one article at least was analyzed in this study. Figure 2 shows the distribution of the reviewed studies in terms of the participating countries.
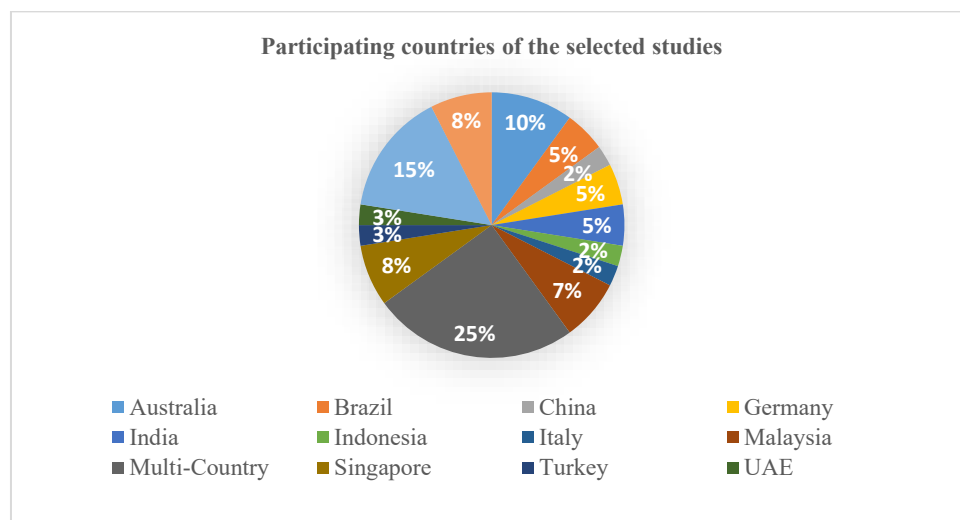

Figure 2. Distribution of studies in terms of participating countries.

4.2. Distribution of studies in terms of research methods.

The research method distribution showed that a variety of methodologies were applied to study the topic. The most used methods were structural equation modelling and online surveys with 6 studies each. Next is factor analysis which was used in 5 studies. Followed by literature review and content analysis were applied in 3 studies each. Other methods used are identified in figure 3 which shows the distribution of the studies in terms of the research methods.
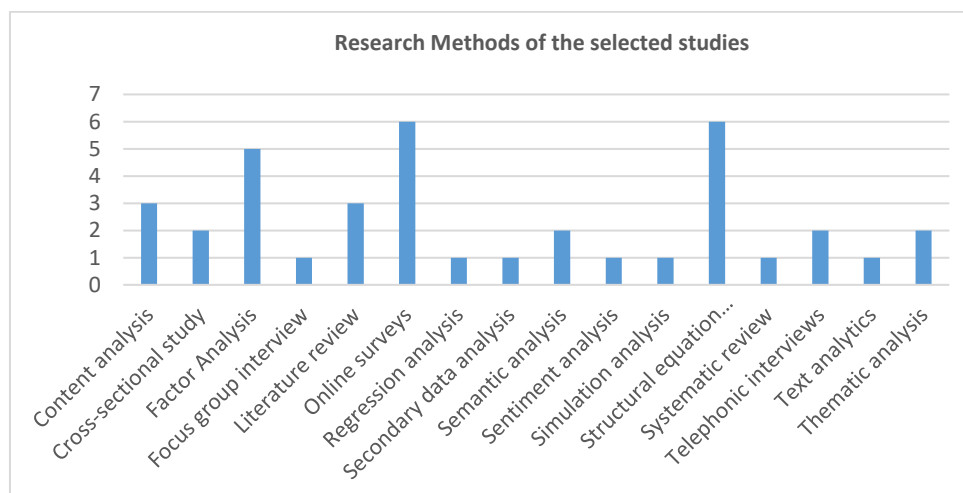

Figure 3. Distribution of studies in terms of research methods.

4.3. Distribution of studies in terms theories used.

In terms of the theories used in the reviewed studies, our systematic review showed that there were various theories applied in studying the topic, with each theory providing a different perspective. However, 13 of the reviewed articles did not specify a theory in studying the topic. The theory of planned behavior was the most used in studying the concept of panic buying with 4 articles using this theory in their studies. Next is the social learning theory, the theory of resource scarcity, and grounded theory approach were used in 3 articles each. Figure 4 displays the theories used in the reviewed articles.
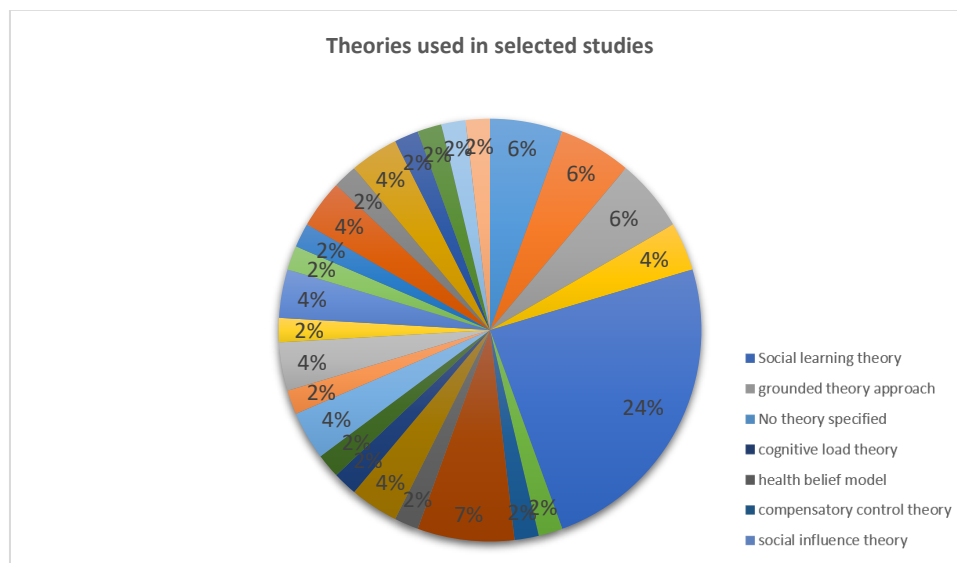

Figure 4. Distribution of studies in terms of theories used.

5. CONCLUSION

This review aims to comprehend previous literature on panic buying during Covid-19 crisis. Google Scholar and ScienceDirect were two dominant databases used to search research papers. Thirty-eight peer reviewed articles that follow the inclusion and exclusion criteria were selected. Five research questions were subject of investigation. RQ1 led us realize the adverse role of government as a motivator for panic buying. RQ2 helped us understand the direct and indirect relationships found between panic buying and perceived scarcity and the role of anxiety in mediating the indirect relationship. Similarly to RQ1, RQ3 points out the role of media in exacerbating the negative state of panic buying. RQ4 defines and clarifies the methodology adopted and theories discussed in conducting this review. Finally, the answer to RQ5 serves as a future roadmap, highlighting potential strategies that should be employed to mitigate the causes and consequences of panic buying.

5.1. Towards mitigating the causes and consequences of panic buying.

Starting from the buyer itself, public education and the well-framed government and media messages can ease the fear and anxiety contagion among people. "Don't panic" messages are suggested to be positively framed and displayed such as" Shop reasonably for groceries". Furthermore, educating people about the nature of panic buying phenomenon can contribute greatly to better consumer purchasing behavior. Consumers must be aware that panic buying phenomenon is non-threatening and of short-durability. Taylor (2021) proposed that the key to beat the crowd is not "to go with the flow" but to wait. In a similar manner media leaders whether social media influencers, Youtubers, journalists or TV-presenters are invited to draw the public attention toward the negative consequences of panic buying and to foster the importance of social responsibility during crisis times. In- order to address the supply chain disruptions initiated by panic, some strategies can be adopted. Existing literature suggests diversifying disruption risk by multi- sourcing strategy, enhancing supply chain reliability by process improvement, in addition to "holding inventory for disruption" strategy and facility location strategy (Zheng et al., 2021). Factors such as consumers' demand process, cost structure and severity of the disruption play an important role in choosing the appropriate strategy.

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