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Resilience in Adversity: COVID-19 Pandemic Challenges in Diminishing Entrepreneurial Intentions and Business Startups

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Abstract

In this study, the researchers explore the effects of COVID-19-related challenges, such as fear and anxiety about COVID-19, the uncertainty of COVID-19, and the recognition of business opportunities for entrepreneurial intentions and business startups. This study used quantitative methods and based their findings on 278 usable samples collected from Egyptian entrepreneurs. Employing the Structural Equation Model (SEM) through SmartPLS4 shows that fear and anxiety arising from the COVID-19 pandemic harm entrepreneurial intentions and business startups. Moreover, the uncertainty of the COVID-19 pandemic and the recognition of business opportunities positively and significantly impact entrepreneurial intentions and business startups. In the context of the COVID-19 pandemic, this study's findings support psychological well-being, reduce uncertainty, foster the recognition of business opportunities, and implement supportive policies to promote entrepreneurial intentions and successful business startups.

Keywords
COVID-19 pandemic complications; entrepreneurial intentions; business startups; fear and anxiety of the COVID-19 pandemic; uncertainty of COVID-19; business opportunity recognition; entrepreneurs

1. Introduction

The COVID-19 pandemic has posed unprecedented health challenges and reverberated across various facets of society, fundamentally altered economic landscapes, and disrupted established norms [1]. Entrepreneurship is one of the sectors that has been significantly affected and has resulted in the usual dynamics of entrepreneurial intentions and business startups encountering formidable barriers [2-5]. An understanding of the nuanced impact of the COVID-19 pandemic on entrepreneurial endeavors becomes imperative as the virus continues to reshape societal structures and economic paradigms. Through a comprehensive exploration of the challenges faced by entrepreneurs during this pandemic, this study sought to unravel the factors contributing to the diminishing entrepreneurial intentions and the decline in new business startups [6, 7].

In several contexts and by numerous researchers, the previous literature highlights the impact of factors such as fear and anxiety of the COVID-19 pandemic, the uncertainty of COVID-19, and the recognition of business opportunities on entrepreneurial intentions and business startups. However, these connections require further investigation among Egyptian entrepreneurs since there have been few previous studies, particularly during the COVID-19 pandemic. Having identified these gaps. The researchers aim in this study to answer the following research questions:

RQ1: What are the effects of COVID-19-related factors on Egyptian entrepreneurs' entrepreneurial intentions?

RQ1: What are the effects of COVID-19-related factors on Egyptian entrepreneurs' business startups?

Against this background, the researcher investigates the COVID-19 factors associated with Egyptian entrepreneurs' entrepreneurial intentions and business startups in this study. While entrepreneurs' inherent agility and adaptability are often considered the backbone of economic dynamism, these have been severely tested in the wake of the COVID-19 pandemic. With lockdowns, supply chain disruptions, and economic uncertainties becoming the new normal, the landscape for entrepreneurial activities has undergone a paradigm shift. Therefore, in this study, the researchers investigate the challenges posed by the COVID-19 pandemic and how these have influenced Egyptian entrepreneurs' entrepreneurial intentions and business startups. In doing so, we aim to pave the way for a more resilient and adaptive entrepreneurial ecosystem capable of withstanding and rebounding from unforeseen challenges such as those presented by the ongoing global health crisis. Within the context of neurobiologists, this study's findings aim to help balance the processes that influence an individual's entrepreneurial intentions and the likelihood of starting a business during challenging times like the COVID-19 pandemic.

2. Literature Review and Conceptualization

2.1 Fear and Anxiety Caused by the COVID-19 Pandemic

The fear and anxiety of COVID-19 point to emotional distress leading to disrupted sleep patterns due to persistent thoughts about the coronavirus. It is about feeling either paralyzed or frozen when exposed to information about the coronavirus [8]. The examination of fear and anxiety of COVID-19 has yielded diverse insights across various dimensions. Shafran et al.'s findings [9] emphasize that individuals with preexisting anxiety disorders may experience heightened levels of fear and anxiety of COVID-19. This underscores the importance of targeted interventions for this vulnerable population. Lee et al.'s findings [8] contribute to the field by establishing the reliability of the Coronavirus Anxiety Scal, which provides a valuable tool for assessing clinically significant fear and anxiety of COVID-19. Moreover, these findings highlight the dangers for several segments of life and business. During the challenging time of the pandemic, fear and anxiety of COVID-19 have affected pregnant women's pregnancy experiences and the mental health of pregnant women. Researchers, such as [10, 11], who have studied the effects of fear and anxiety of COVID-19 on nutrition, have shown links between dietary practices and emotional states during the COVID-19 pandemic in Turkey. Alnazly et al.'s findings [12], which revealed heightened levels of anxiety, despair, tension, and dread among Jordanian healthcare professionals during the pandemic, have brought greater attention to the mental health of healthcare workers. The findings of Gómez-Salgado et al. [13] empirical analysis present a helpful evaluation and confirm its efficacy in evaluating the Spanish adult population's fear and anxiety of COVID-19 during the pandemic. The investigation of psychological fear and anxiety of COVID-19 common in tweets by [14] reflects the more comprehensive social responses. It has led to Twitter analytics becoming a prism used to evaluate public attitudes. The psychological effects of COVID-19 screening clinics were finally discussed by [15]. This study's findings show that beneficiaries in an Eastern Indian tertiary care hospital had higher fear and anxiety about COVID-19. Together, these studies contribute to a nuanced understanding of the multifaceted nature of fear and anxiety of COVID-19 during the COVID-19 pandemic.

2.2 Uncertainty of COVID-19

The perception of uncertainty of COVID-19 is characterized by complexity, unpredictability, and rapid changes. These contribute to a state of ambiguity and unclear expectations about the course and outcomes of the pandemic [16]. The previous literature has explored the complex interrelationship between entrepreneurial intentions and the uncertainty of COVID-19. By examining the broader effect of the uncertainty of COVID-19 on entrepreneurial endeavors, Yunita et al.'s findings [17] highlight the ubiquitous impact of uncertainty resulting from pandemics. From exploring the pandemic's influence on social entrepreneurial intentions, Ruiz-Rosa et al.'s findings [18] show that there is significant damage to entrepreneurial intentions. According to Gomes et al. [19], university students have successfully deciphered the "black box" and discovered that uncertainty about COVID-19 significantly affects emotional intelligence. Arnaut et al.'s findings [4] show positive results when examining entrepreneurial alertness and intentions during the pandemic. However, [20] report contrary findings, demonstrating the link's nuanced nature. An empirical analysis shows that work instability during the COVID-19 pandemic negatively predicts

green entrepreneurial intentions [21]. According to Cater et al.'s findings [22], the uncertainty of COVID-19 significantly impacts the drivers of entrepreneurial intentions. This highlights the general effect of uncertainty during the COVID-19 pandemic. The tremendous impact of external uncertainty is depicted in the findings of [5], which describe the lockdown's disastrous impacts on entrepreneurial intentions and resilience. Similarly, uncertainty about COVID-19 is a barrier to entrepreneurial intentions, impeding the decision-making process [23]. The combined results highlight in various settings the complex and varied relationship between the uncertainty of COVID-19 and entrepreneurial intentions. The uncertainty of COVID-19 has shown to be a challenging obstacle for business startups and has brought about significant changes that have impacted prospective entrepreneurs' abilities to begin their businesses [6]. In their investigation of the COVID-19 pandemic's impact on startup performance, [24]'s findings strongly emphasize resilience. It remains imperative to examine if the uncertainty of COVID-19 is mentioned explicitly as a factor affecting performance and startups' capacity to overcome obstacles [24]. Furthermore, [25]'s findings highlight the dynamic interaction between opportunities and the uncertainties offered by COVID-19. They also shed light on how startups perceive and seize opportunities arising from uncertainty throughout the pandemic. [7]'s findings contribute by simulating business startups' resilience to the COVID-19 pandemic. This raises the question of whether the study addresses the uncertainty of COVID-19's influence on the tactics used to address business startups resilience tactics. Silva et al. [26] 's insightful analysis of the ramifications and difficulties of managing uncertainty for business sustainability sheds light on how startups and entrepreneurs deal with the uncertainty of the COVID-19 pandemic.

2.3 Business Opportunity Recognition

Recognition of business opportunities signals the ability and inclination to identify numerous opportunities to initiate and expand businesses to find potential venture opportunities quickly to perceive a wealth of possibilities for new innovative products to possess a unique sense for new venture ideas, and to consistently recognize possible new ventures during routine day-to-day activities. According to [27], from their investigation of entrepreneurial intention among university students, there is a favorable correlation between the tendency towards entrepreneurship and recognition of business opportunities. According to [28]'s paradigm for analyzing entrepreneurial intentions, competence and business opportunity recognition are the main factors. According to [29], the predictors of entrepreneurial intentions emphasize the importance of recognizing business opportunities, previous business experience, and entrepreneurial education. The fear and anxiety about the COVID-19 pandemic causes adverse consequences regarding entrepreneurial intentions and, more specifically, the recognition of business opportunities [2, 30]. Ledi et al.'s [31] findings demonstrate that recognizing business opportunities influences university students' entrepreneurial intentions and having an entrepreneurial mindset. When comparing the recognition of business opportunities based on gender and family business background, [32]'s findings offer insights to the demographic influences on identifying and seizing entrepreneurial possibilities.

The previous literature provides the association between the recognition of business opportunities and business startups, especially when considering the difficulties caused by the COVID-19 pandemic. Doanh et al. [2]'s findings show that the resultant fear and anxiety has on

entrepreneurial behaviors and that recognition of business opportunities interacts with uncertainty to influence business actions. More especially during the COVID-19 pandemic fewer business opportunities led to a reduction in the number of business startups [6]. From studying new businesses chances of survival, De Esteban et al. [33]'s findings shed light on the importance of recognizing business opportunities to these businesses' resilience. The recognition of business opportunities greatly influences entrepreneurs' decisions to take advantage of presented opportunities under challenging situations [34]. From investigating the recognition of business opportunities in terms of people's willingness to launch new businesses in uncertain times, [30]'s findings show that fear and anxiety profoundly affect entrepreneurial intentions. The findings of [35]'s investigation into small businesses' use of dynamic skills to survive during the COVID-19 pandemic revealed how dynamic capabilities—such as business opportunity recognition—help startups become more flexible.

2.4 Entrepreneurial Intentions

Entrepreneurial intentions are the strong and determined inclination to pursue entrepreneurship. Such intentions are demonstrated by a readiness to take any necessary action; a professional goal centered on becoming an entrepreneur; a commitment to invest effort into starting and running a personal business; a relentless determination to establish a new business; serious contemplation of starting up a business; and clear intentions to embark on entrepreneurial endeavors. Liñán et al. [36]'s findings contribute to the field by highlighting education's significant role in shaping entrepreneurial intentions by emphasizing that educational experiences are crucial in influencing individuals' intentions to engage in entrepreneurial activities. Pakistan's commerce students establish connections between entrepreneurship education, entrepreneurial self-efficacy, the need for achievement, and entrepreneurial intentions [16]. According to Ismail et al. [37]'s findings, Malaysian undergraduates' cultural and contextual determinants affect their entrepreneurial intentions. In a similar dimension, by applying the entrepreneurial event model to predict entrepreneurial intentions among business students in Pakistan's public sector universities, [38]'s empirical findings provide valuable insights into the factors contributing to entrepreneurial intentions' formation. By combining psychological and behavioral approaches, this model offers a comprehensive understanding of the multifaceted factors influencing individuals' intentions to become entrepreneurs [39]. In Pakistan's public sector universities, except for controlling perceived behaviors, entrepreneurial intentions are affected by attitudes and subjective norms except [40]. The development of entrepreneurial intentions is affected by the ability to adapt to outside obstacles and, more particularly, the complications to entrepreneurial intentions during the COVID-19 pandemic [41].

2.5 Business Startups

The effects of the COVID-19 pandemic present business startups with a range of strategic adjustments. These include the cancellation of planned decisions to hire more employees, a scaling back of expansion plans into new markets or products, layoffs of existing employees, formulation of pay cuts, and decisions not to seek more funding for the current year due to the impact of the COVID-19 pandemic. The existing literature provides insights into understanding business startups. For instance, Von Gelderen et al. [42]'s findings reveal the intricate relationship between a small

business startup's strategies and the uncertainty about performance caused by the COVID-19 pandemic. The complex landscape of financing business startups affects entrepreneurs' various financial strategies and sources [43]. According to Sedláček and Sterk [44]'s findings, an investigation of the growth potential of startups over the business cycle offers valuable insights into the cyclical nature of the development of business startups. [45]'s findings show that the role of design and technological innovation helps to understand the growth of startups in competitive business environments and may reveal critical determinants of success. A business resilience framework for startups offers guidance on overcoming the challenges to achieve sustained viability [46]. The amount of wealth affects the new business startups in a developing economy and provides insights to the economic factors that influence entrepreneurship [47]. Scholars, such as [48, 49], have suggested that the uncertainty brings poverty, creating problems for consumers and reducing access to their markets. Consumers ' lower purchasing power negatively affects the microenterprises and entrepreneurship development due to their poverty and uncertainty [50]. Microenterprises are valuable sources of survival for entrepreneurs in meeting their basic consumption needs. Figures indicate that more than a billion entrepreneurs and microenterprises worldwide are living at subsistence levels of living standards. Moreover, by enhancing entrepreneurial self-efficacy, the effectiveness of marketplace and literacy education alleviates the adverse impact of periodic constraints on living standards [51]. Compared to people with few constraints on their living standards, those who experience chronically high constraints have more entrepreneurial intentions [52].

The existing literature has empirically assessed in various contexts and with different respondents the impact of factors, such as fear and anxiety of COVID-19, uncertainty of COVID-19, and the recognition of business opportunities on entrepreneurial intentions and business startups. However, these relationships have been examined primarily in isolation. Therefore, there is a need for an integrated model to comprehensively understand how collectively, fear and anxiety of COVID-19, uncertainty of COVID-19, and recognition of business opportunities recognition influence entrepreneurial intentions and business startups. Moreover, within the context of the COVID-19 pandemic, investigations into these relationships are still in their infancy, particularly concerning Egyptian entrepreneurs. In recognition of these gaps in the existing literature, we developed Figure 1 below as a conceptual framework to examine the position among Egyptian entrepreneurs. By bring together the fear and anxiety of COVID-19, the uncertainty of COVID-19, and the recognition of business opportunities and by taking into account the unique challenges posed by the COVID-19 pandemic in the Egyptian entrepreneurial landscape, this framework aims to provide a holistic view of their combined effects on entrepreneurial intentions and business startups.

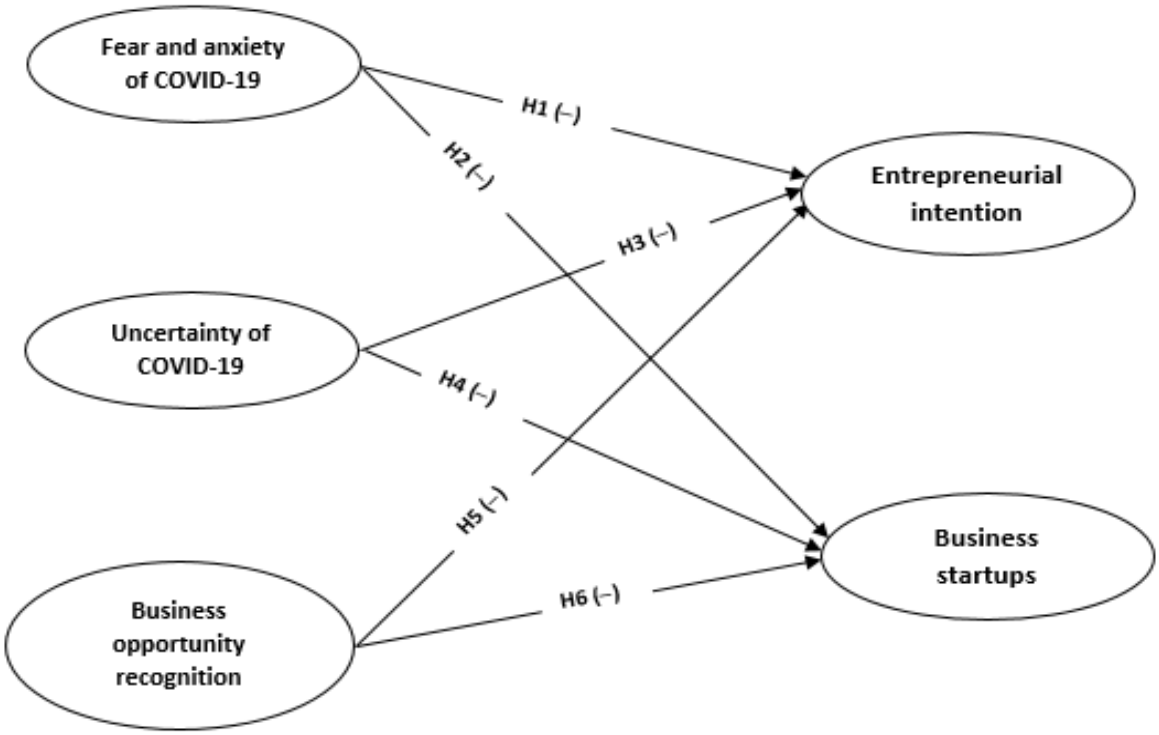

Figure 1 Model of the study. Source: Developed by the researchers.

3. Development of This Study's Hypotheses

3.1 Fear and Anxiety of COVID-19, Entrepreneurial Intention and Business Startups

An extensive review of multiple previous studies demonstrates that among potential entrepreneurs there is a consistent and significant relationship between the fear and anxiety of COVID-19 and entrepreneurial intentions [2, 30]. Across diverse cultural and economic contexts, the exploration of this relationship has provided nuanced insights. The fear and anxiety posed by the COVID-19 pandemic have considerably impacted entrepreneurial intentions [2, 30]. By investigating the implications of the COVID-19 pandemic on Pakistan's business start-ups, Soomro et al. [3]'s findings provide evidence that such fear and anxiety about COVID-19 plays a negative role and hinders entrepreneurial initiatives. Building on this foundation and drawing evidence from the second wave of the pandemic, [41]'s and [53]'s findings offer valuable insights into the nuanced effects of COVID-19 complications on entrepreneurial intentions. This is similar to the impact of fear and anxiety of COVID-19 in shaping college students' entrepreneurial intentions [54]. Further enriching the discourse, [55]'s findings show the moderating effects of COVID-19-related psychological distress on the cognitive process of entrepreneurship among Vietnam's higher education students. Scholars, such as [1, 56], broadened the perspective by considering psychological factors and the overall milieu created by the COVID-19 pandemic. Their work showcases how these elements influence self-employment intentions and environmental performance.

Likewise, as shown in the findings of several studies, there is an interplay between the fear and anxiety of COVID-19 and business startups. For instance, Games et al. [57]'s findings demonstrate that entrepreneurial fear of failure during crises and the well-being of incubated and non-incubated

startups offer a nuanced perspective on how COVID-19-induced uncertainties impact entrepreneurs' decision-making and resilience. The influence of fear and anxiety of COVID-19 negatively impacts entrepreneurial intentions, business startups, and their recognition of business opportunities. This sheds light on the motivations or psychological barriers that the pandemic presents for individuals contemplating business startups [30]. Similarly, by investigating the psychological distress experienced by Ghana's owners of SMEs due to the impact of COVID-19, [58]'s findings provide insights into the entrepreneurs' emotional toll and overall resilience.

Consequently, across different contexts, the existing literature, excluding Egypt's potential entrepreneurs, underscores the negative impact of COVID-19-induced fear and anxiety on entrepreneurial intentions and startups. Bearing in mind these gaps, we formulated the following hypotheses to investigate how fear and stress related to the COVID-19 pandemic affect Egypt's entrepreneurial dynamics:

H1. In the Egyptian context, fear and anxiety of COVID-19 are expected to exert a detrimental influence that leads to a reduction in entrepreneurial intentions among potential entrepreneurs.

H2. In the Egyptian context, Fear and anxiety of COVID-19 is expected to exert a detrimental influence that leads to a reduction in business startups among potential entrepreneurs.

3.2 Uncertainty of COVID-19, Entrepreneurial Intention and Business Startups

The existing literature reveals the intricate relationship between uncertainty of COVID-19 and entrepreneurial intentions. By investigating the broader impact of uncertainty of COVID-19 on entrepreneurial initiatives Yunita et al. [17]'s findings, shed light on the pervasive influence of pandemic-induced uncertainty. More specifically, the findings reveal the adverse and significant impact of the COVID-19 pandemic on social entrepreneurial intentions [18]. The university students, who have skillfully attempted to unravel the "black box", have discovered that the uncertainty of COVID-19 has had a notably negative impact on entrepreneurial intentions [19]. Having explored entrepreneurial alertness and intentions during the COVID-19 pandemic, [4]'s findings show a positive connection, whereas [20] findings show the opposite effect. These contrasting findings illustrate the complexity of the relationship. [21]'s empirical assessment demonstrates that job insecurity during the COVID-19 pandemic negatively predicts green entrepreneurial intentions. As shown by [22]'s findings, the uncertainty of COVID-19 has a significant effect on the drivers of entrepreneurial intentions, this emphasizes the overarching influence of uncertainties during the COVID-19 pandemic. Arve et al. [5]'s findings underline the profound effect of external uncertainties by depicting the lockdown's catastrophic impact on entrepreneurial intentions and resilience. Similarly, as observed by [23], the uncertainty of COVID-19 acts as a resistant force against entrepreneurial intentions and hinders the entrepreneurial decision-making process. The collective findings underscore across diverse contexts the nuanced and multifaceted nature of the relationship between the uncertainty of COVID-19 and entrepreneurial intentions.

The uncertainty of COVID-19 has proven to be a formidable challenge for business startups. Moreover, it has ushered in robust changes that significantly impact potential entrepreneurs' abilities to launch their ventures [6]. Mota et al. [24]'s findings demonstrate the effects of the COVID-19 pandemic on startup performance and, more specifically, emphasize resilience. Therefore, there remains a crucial need to investigate explicitly if the uncertainty of COVID-19 is a

factor that influences both performance and the ability of startups to bounce back from challenges [24]. Moreover, [25]'s findings shed light on how startups perceive and capitalize on opportunities emerging from uncertainty during the COVID-19 pandemic. This highlights the dynamic relationship between the opportunities and the uncertainties posed by COVID-19. By modeling the resilience of business startups during the pandemic, Sreenivasan et al. [7]'s findings prompt further exploration into the role played the uncertainty of COVID-19 in shaping strategies for business startups resilience. By unraveling the implications and challenges of managing uncertainty for business startups' survival, Silva et al. [26]'s findings provide valuable insights to how startups and entrepreneurs overcome challenges in the face of the uncertainty of COVID-19. The impact of business incubators on the survival of business startups during the COVID-19 pandemic offers potential insights into how the uncertainty of COVID-19 has shaped the dynamics between incubators and business startups [33]. Aldianto et al. [46]'s work towards a business resilience framework for startups demonstrates that uncertainty of COVID-19 hinders the positive development of such resilience strategies. Finally, the impact of the COVID-19 pandemic on startups in the Lublin region prompted an investigation into whether uncertainty of COVID-19 was a significant factor that influenced startups' operations and outcomes [59].

Consequently, from the literature, it is crystal clear that the uncertainty of COVID-19 has a negative effect on entrepreneurial intentions and business startups across various regions. However, along with factors such as fear and anxiety about COVID-19 and recognition of business opportunities, there is still a lack of evidence about the uncertainty of COVID-19, particularly among Egyptian entrepreneurs. To address this gap, we formulated the following hypotheses:

H3. In the Egyptian context, the uncertainty of COVID-19 is expected to exert a detrimental influence that leads to a reduction in entrepreneurial intentions among potential entrepreneurs.

H4. In the Egyptian context, the uncertainty of COVID-19 is expected to exert a detrimental influence that leads to a reduction in business startups among potential entrepreneurs.

3.3 Business Opportunity Recognition, Entrepreneurial Intentions and Business Startups

The recognition of business opportunities plays a significant role in developing entrepreneurial intentions in several aspects. From investigating university students' entrepreneurial intentions, Hassan et al. [27]'s findings demonstrate the positive association between the recognition of business opportunities and inclinations toward entrepreneurship. According to [28]'s entrepreneurial intention analysis framework, entrepreneurial intentions are positively affected by competency and the recognition of business opportunities their positively affect. According to Tian et al. [29], the entrepreneurial intentions predictors highlight the significance of recognizing business opportunities, previous business experience, and entrepreneurial education. With a specific focus on recognizing business opportunities, the fear and anxiety due to the COVID-19 pandemic has adversely affected entrepreneurial intentions [2, 30]. According to [31], entrepreneurial attitudes and the recognition of business opportunities shape university students' entrepreneurial intentions. Likewise, when comparing the recognition of business opportunities regarding gender and family business background, [32]'s findings provide insights into the demographic influences in recognizing and acting upon entrepreneurial opportunities.

The existing literature regularly details the relationship between the recognition of business

opportunities and business startups, particularly in the context of the challenges before the COVID-19 pandemic. However, during the COVID-19 pandemic, findings show that recognizing business opportunities negatively predicted the massive decrease in business startups and entrepreneurial intentions [2, 6, 33]. Also, the COVID-19 pandemic significantly reduced entrepreneurs' decision-making abilities to seize opportunities in challenging circumstances [30, 34]. Entrepreneurial ecosystems disappeared during the COVID-19 pandemic, making it difficult for small businesses to survive [35]. Based on this specific situation of the COVID-19 pandemic, we formulated the following hypotheses:

H5. In the Egyptian context, business opportunity recognition is expected to exert a detrimental influence that reduces potential entrepreneurs' entrepreneurial intentions.

H6. In the Egyptian context, recognizing business opportunities is expected to exert a detrimental influence that leads to a reduction in business startups among potential entrepreneurs.

4. Methods

4.1 Survey Strategy, Respondents

By using quantitative methodology, the researchers gathered cross-sectional data. According to Xu et al. [60], this approach is well-known in research and data collection and has great significance. Driven by numerical data, a quantitative study provides impartiality and reproducibility; this makes it a fundamental component of rigorous scientific investigation. Because of its dependence on statistical analysis, a quantitative study helps researchers to make sense of complicated occurrences by allowing them to find patterns, correlations, and trends within data. A quantitative study's ability to measure cause-and-effect correlations is crucial for precisely comprehending numerous phenomena. Also, its high sample sizes allow for generalizability and, consequently, aid broader use of the study's findings [61]. In a similar field, scholars such as [2, 4, 6, 23, 24, 30, 32, 41, 45, 46, 52] applied the same technique to investigate entrepreneurial intentions and business startups in diverse situations.

We targeted Egypt's entrepreneurs since they are pivotal in examining entrepreneurial intentions within business startups due to their central role as leaders and decision-makers. Critical determinants of entrepreneurial behavior are entrepreneurs' intentions, conscious decisions, and motivations to start a business [62]. Understanding the COVID-19 complications and psychological factors that drive entrepreneurial intentions is vital in predicting and influencing the startup process [63]. Entrepreneurs with high levels of entrepreneurial intentions are better equipped to manage the emotional aspects of entrepreneurship, such as dealing with uncertainties, setbacks, and interpersonal relationships [24, 41]. Their abilities to overcome these challenges positively influence their entrepreneurial intentions and foster a resilient mindset and determination to overcome the obstacles. Moreover, entrepreneurial intentions contribute to effective communication, team collaboration, and relationship building. These are all essential components of successfully launching and sustaining a business startup [23, 46].

Egypt's entrepreneurs are vital in driving economic growth, job creation, and innovation [64]. Through establishing and expanding businesses, they contribute to reducing unemployment, stimulate economic dynamism, and foster the adoption of new technologies. Also, entrepreneurs

promote diversity; engage in community development initiatives; and, through export-oriented ventures, enhance Egypt's presence in international markets [62]. Their abilities to adapt to global trends and collaboration with government agencies further position them as instrumental contributors to the country's economic development and prosperity.

4.2 Instrumental Assessment

We used a questionnaire as the primary instrument in this study to collect data. This emphasizes the crucial need to guarantee the preserved data's integrity, validity and reliability. We dealt comprehensively with these crucial issues. To ensure the questionnaire's legitimacy, we conducted a pilot with fifteen samples as an essential initial step. We strengthened this strategy by using Cronbach's alpha to gauge the internal consistency of the questionnaire's items.

Pursuing dependability was essential because it guaranteed precise measurements over time and amongst the respondents. The findings were encouraging since every item had respectable consistency levels (>0.7) and overall dependability that met the target criterion (>0.7) [65]. We also gave the questionnaire to university professors and subject-matter experts to increase its validity. These individuals offered insightful feedback on the questionnaire's format, design, and content. Their suggestions led to a few changes that were quickly implemented, this meant that we used a strong, dependable, and legitimate tool to gather copious amounts of data.

4.3 Data Collection Procedure

We employed an online questionnaire to gather the Egyptian entrepreneurs' insights conveniently. We identified potential participants through targeted outreach on social media platforms and WhatsApp groups created by entrepreneurs to share business-related information. We ensured that ethical considerations were paramount throughout the research process. Before their involvement, we provided the participants with comprehensive information about the study's objectives, eligibility criteria, potential benefits and risks, and the voluntary nature of their participation. We obtained each participant's explicit consent and assured them about the transparency and respect for their autonomy. We implemented stringent measures to safeguard the participants' privacy and anonymity. As the researchers, we maintained a confidential and secure environment for the collected data. We kept the cultural and ethical norms specific to Egypt's entrepreneurial community. Furthermore, we provided clear and informative responses to those participants who expressed an interest in receiving feedback on the study's outcomes. By adopting this approach, we adhered to ethical guidelines and fostered a sense of collaboration and transparency with the participants. We collected 278 valid responses and utilized them for the final analysis. Our adherence to these ethical principles upheld not only the participants' rights and well-being but also preserved the integrity of the research process.

4.4 Measures

As researchers, we adopted all the items from the existing literature. More specifically, we adopted the fear and anxiety of COVID-19 factor from [8]'s study and used four items to measure it. The sample item on the scale is "I had trouble falling or staying asleep because I was thinking about the coronavirus." Likewise, we adopted the uncertainty of COVID-19 from [16]'s study and

used three items to measure it. The sample content of the scale is "I perceive the context of COVID-19 as very complex." We adopted the business opportunity recognition from [66]'s study and used five items to measure it. The sample item is "I see many opportunities to start and grow a business." Moreover, as adopted from [67]'s study, we used 6 items to measure entrepreneurial intentions. The sample content of the entrepreneurial intention is "I am ready to do anything to be an entrepreneur." Finally, adopted from [68]'s study, we used seven items to measure business startups on seven items. The sample item of the scale is "Our business has canceled all planned hiring decisions". We used a five-point Likert scale where 1 = strongly agree and 5 = strongly disagree to measure all the items.

5. Results

5.1 Measurement Model

As advocated by [65], we ensured the robustness of our measurement model was pivotal in establishing the validity and reliability of this study's constructs. By using the Variance Inflation Factor (VIF), the initial scrutiny yielded satisfactory values (below 5.0) for each item and, thereby effectively addressing concerns of multicollinearity in the model [69]. Indicative of convergent solid validity, the loading scores demonstrate that the observable variables adeptly capture the latent features. These ranged from 0.708 (FAC2) to 0.962 (BOR5) [65]. However, we deleted items, such as BOR4, BS4, EI3, and EI6, due to the appearance of scores less than 0.707 [65]. Furthermore, the Average Variance Extracted (AVE) values, which spanned from 0.651 (entrepreneurial intention) to 0.792 (business opportunity recognition), assured us that by surpassing the recommended threshold of 0.5t the observed variables sufficiently measured the latent constructs. To assess internal consistency and dependability, we employed Composite Reliability (CR), this revealed acceptable values ranging from 0.882 (entrepreneurial intention) to 0.938 (business opportunity recognition). All surpassed the 0.70 benchmark set by [65]. Moreover, the application of Cronbach's alpha underscored the internal consistency among the items, with a commendable range of 0.824 (entrepreneurial intention) to 0.925 (business startups). As per Hair et al. [65], this range is considered outstanding since it consistently exceeds the 0.70 threshold (see Table 1 and Figure 2).

Table 1 Measurement model.

Items	BOR	BS	EI	FAC	UoC	VIF	CR	AVE	α
BOR1	0.832	0.030	-0.035	0.683	0.578	2.991	0.938	0.792	0.915
BOR2	0.936	-0.032	-0.087	0.789	0.623	4.39			
BOR3	0.822	-0.001	-0.064	0.765	0.799	2.151			
BOR5	0.962	0.009	-0.051	0.818	0.716	4.141			
BS1	-0.010	0.813	0.659	-0.015	0.008	4.300	0.933	0.701	0.925
BS2	0.108	0.778	0.722	0.087	0.117	4.725			
BS3	-0.028	0.913	0.602	-0.070	-0.038	4.114			
BS5	-0.089	0.837	0.650	-0.097	-0.088	4.701			
BS6	-0.026	0.905	0.578	-0.086	-0.030	4.201			
BS7	0.012	0.767	0.720	-0.050	0.028	1.945			
EI1	-0.058	0.805	0.771	-0.088	-0.064	1.831	0.882	0.651	0.824

EI2	-0.023	0.678	0.846	-0.092	-0.017	1.898			
EI4	-0.027	0.525	0.805	-0.097	-0.019	1.638			
EI5	-0.134	0.574	0.802	-0.175	-0.133	1.719			
FAC1	0.904	-0.041	-0.104	0.898	0.642	3.165			
FAC2	0.741	0.020	-0.018	0.708	0.801	2.673	0.921	0.747	0.899
FAC3	0.642	-0.067	-0.147	0.903	0.795	2.334			
FAC4	0.848	-0.063	-0.136	0.931	0.769	3.613			
UoC1	0.759	0.035	-0.034	0.678	0.834	4.533			
UoC2	0.609	-0.027	-0.084	0.758	0.917	1.429	0.897	0.744	0.872
UoC3	0.764	0.030	-0.030	0.684	0.834	4.507			

Source: Estimated by the researchers

Deleted items: BOR4; BS4; EI3; EI6

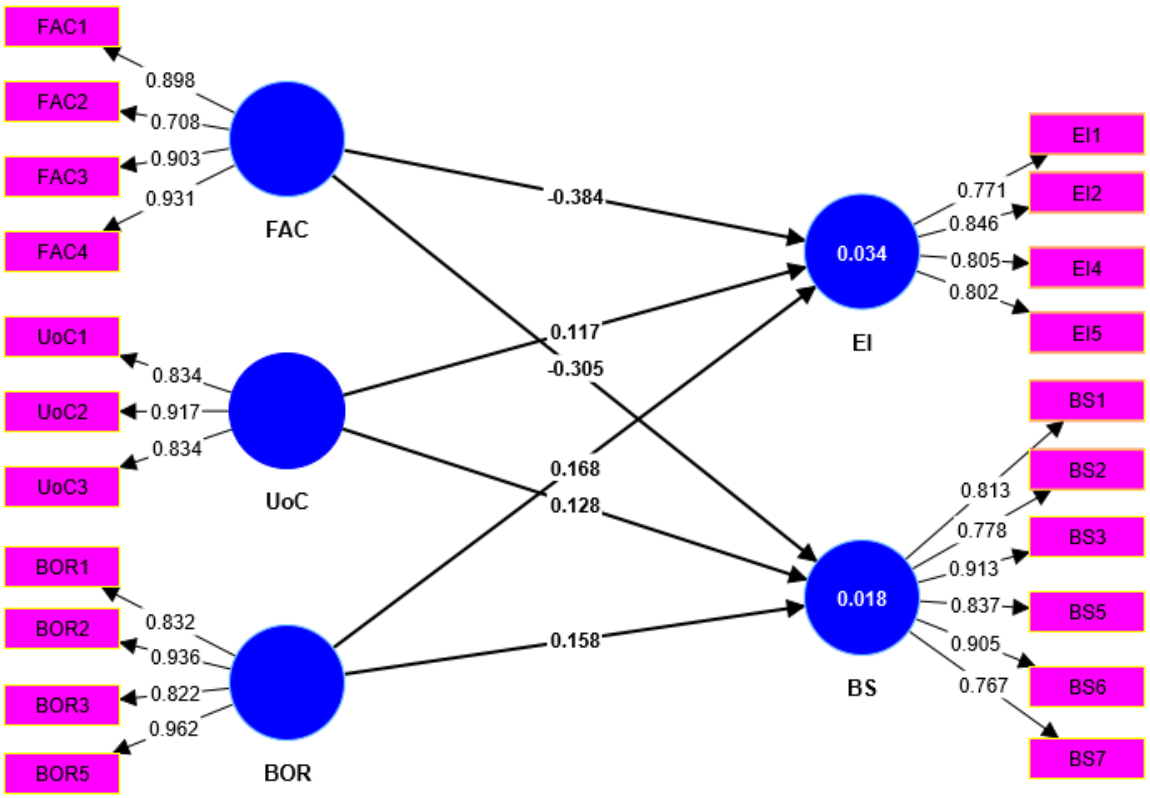

Figure 2 Measurement model. Source: Estimated by the researchers. Note(s): FAC = Fear and anxiety of COVID-19; UoC = Uncertainty of COVID-19; BOR = Business opportunity recognition; EI = Entrepreneurial intention; BS = Business startups.

In addition, we used the Heterotrait-Monotrait (HTMT) ratio, which is a valuable method of assessing discriminant validity in Structural Equation Modeling (SEM). According to Afthanorhan et al. [70], this measure helps researchers determine the uniqueness of their latent constructs' by considering the correlations between the AVEs recovered by these constructs and construct correlations. The discriminant validity of this study's constructs is validated by confirming that the HTMT values are within acceptable limits (see Table 2).

Table 2 HTMT ratio.

constructs	BOR	BS	EI	FAC	UoC
BOR					
BS	0.062				
EI	0.079	0.708			
FAC	0.782	0.082	0.14		
UoC	0.827	0.075	0.080	0.716	

Source: Researcher own estimation

Note(s): FAC = Fear and anxiety of COVID-19; UoC = Uncertainty of COVID-19; BOR = Business opportunity recognition; EI = Entrepreneurial intention; BS = Business startups

5.2 Structural Model

As researchers, we employed Structural Equation Modeling (SEM) since it was a comprehensive analytical approach that brought together aspects of regression, factor, and path analysis. This methodology offers a holistic grasp of the intricate relationships between variables within a research framework [71]. The R^2 values are 0.034 for entrepreneurial intentions and 0.018 for business startups. The path analysis shows that fear and anxiety about COVID-19 hurts entrepreneurial intentions and business startups (H1 = β = -0.384; p > 0.01; H2 = β = -0.305; p > 0.01). Therefore, hypotheses H1 and H2 are accepted. Moreover, the uncertainty of COVID-19 has a positive effect on entrepreneurial intentions and business startups. Therefore, hypotheses H3 and H4 (H3 = β = 0.117; p > 0.01; H4 = β = 0.128; p > 0.01) are rejected. Likewise, the path coefficients show that business opportunity recognition positively affects entrepreneurial intentions and business startups (H5 = β = 0.168; p > 0.01; H6 = β = 0.158; p > 0.01). Therefore, hypotheses H5 and H6 are rejected (see Table 3 and Figure 3 below).

Table 3 SEM estimations.

H.No.	Effects	Std. (β)	Mean	Std. Dev	t-value	p-value	Decision
H1	FAC → EI	-0.384	-0.324	0.206	1.867	0.062	Accepted
H2	FAC → BS	-0.305	-0.234	0.203	1.502	0.133	Accepted
H3	UoC → EI	0.117	0.091	0.155	0.755	0.450	Not accepted
H4	UoC → BS	0.128	0.104	0.149	0.857	0.391	Not accepted
H5	BOR → EI	0.168	0.126	0.152	1.107	0.268	Not Accepted
H6	BOR → BS	0.158	0.111	0.154	1.028	0.304	Not Accepted

Source: Estimated by the researchers

Note(s): FAC = fear and anxiety of COVID-19; UoC = uncertainty of COVID-19; BOR = business opportunity recognition; EI = entrepreneurial intention; BS = business startups

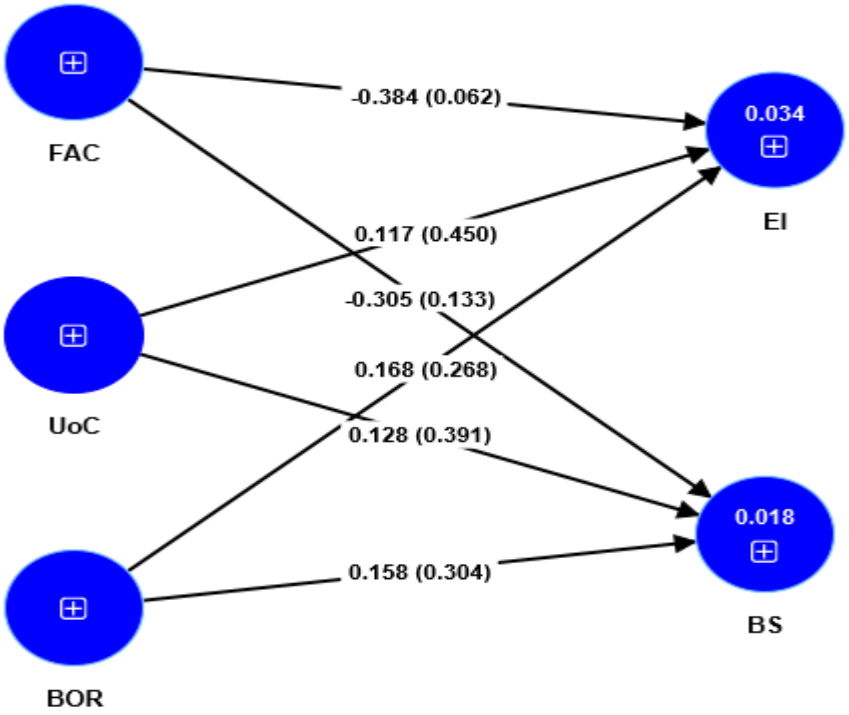

Figure 3 Structure equation model. Source: Estimated by the researchers.

6. Discussion and Conclusion

In this study, we aimed to investigate Egyptian entrepreneurs' entrepreneurial intentions and their business startups during the complications caused by the COVID-19 pandemic. In term of assessing this study's hypotheses, the path analysis findings show that fear and anxiety of COVID-19 has had a negative and significant effect on Egyptian entrepreneurs' entrepreneurial intentions and their business startups. These findings are consistent with those of previous studies by, such as [1-3, 30, 49, 52, 53]. These findings highlight that the pervasive aversion to risk stemming from heightened fear and anxiety can influence decision-making processes, lead entrepreneurs to adopt more conservative strategies; and refrain from pursuing entrepreneurial ventures. Moreover, the lack of resources and financial concerns, exacerbated by the economic repercussions of the COVID-19 pandemic, have acted as formidable barriers that have prevented Egyptian entrepreneurs ability to secure funding and invest in new business initiatives. The volatile and uncertain market conditions induced by the COVID-19 pandemic and the disruptions to the traditional business ecosystem have further damaged entrepreneurial activities. The psychological impact of fear and anxiety of COVID-19 on creativity and innovation has limited Egyptian entrepreneurs' abilities to identify and capitalize on new business opportunities. Moreover, regulatory uncertainties and the evolving policies in response to the COVID-19 pandemic have created additional barriers. Social and cultural factors, reflective of a risk-averse sentiment in broader society, may have also contributed to the observed adverse effects. Collectively, these dynamics highlight the multifaceted challenges that Egyptian entrepreneurs faced during the COVID-19 crisis. Moreover, they underscore the need for targeted interventions and support mechanisms that foster resilience and encourage entrepreneurial initiatives in the face of adversity.

Furthermore, consistent with the findings of previous studies by, such as [4, 5, 19-23], this study's findings confirm the positive effect of uncertainty of COVID-19 on both entrepreneurial intentions

and business startups. These findings highlight that entrepreneurs have demonstrated remarkable abilities to navigate uncertain terrains and, as an inherent part of the entrepreneurial journey, have strategically adjusted their business approaches to embrace rather than resist uncertainty. In addition, this study's findings show that previous experience and expertise, coupled with industry-specific resilience, have equipped Egyptian entrepreneurs to withstand and even capitalize on the challenges posed by the uncertain conditions of the COVID-19 pandemic. Government support and stability measures and the technological advancements embraced by businesses have played pivotal roles in providing Egyptian entrepreneurs with a more secure foundation and reducing the perceived impact of uncertainty. Furthermore, an optimistic outlook, fostered by collaborative networking and a sense of opportunity within entrepreneurial communities, collectively contributed to the observed insignificance of uncertainty on Egyptian entrepreneurs' entrepreneurial intentions and the creation of new business startups. These findings underscore the Egyptian entrepreneurs' abilities to adapt to challenging circumstances and highlight the importance of resilience in uncertain and disruptive environments.

Finally, consistent with previous studies such as [3, 28, 29, 31, 34], this study's findings show that recognizing business opportunities positively affects entrepreneurial intentions and business startups. As highlighted by this study's findings, while Egyptian entrepreneurs have identified a need for more viable opportunities, the economic challenges and disruptions caused by the COVID-19 pandemic meant that they were hesitant to do so. This was because, due to the COVID-19 pandemic, Egyptian entrepreneurs have focused primarily on survival and have mitigated the risks associated with pursuing new business ventures. The constraints on resources, both financial and human, have further hindered Egyptian entrepreneurs from turning the recognition of business opportunities into their entrepreneurial intentions and, ultimately, starting new businesses. Collectively, heightened risk aversion in times of uncertainty, industry-specific dynamics, and market saturation or decline contribute to an insignificant relationship between the recognition of business opportunities and entrepreneurial activities. Moreover, this study's findings show that in an uncertain environment, Egyptian entrepreneurs are deterred from taking specific actions towards starting new businesses and focus strategically on their existing ventures. These findings highlight the complex interplay of environmental, individual, and strategic factors influencing Egyptian entrepreneurial responses to identified opportunities amid challenging circumstances.

In conclusion, on the one hand, this study's findings reveal that Egyptian entrepreneurs' fear and anxiety of COVID-19 had an adverse and substantial impact on their entrepreneurial intentions and starting new businesses. On the other hand, this study's findings demonstrate that the uncertainty of COVID-19 positively influenced Egyptian entrepreneurs' entrepreneurial intentions and business startups. In addition, this study's findings show that the recognition of business opportunities positively affected both entrepreneurial intention and business startups. These findings underscore, on the one hand, the distinctive role played by fear and anxiety of COVID-19 in hindering Egyptian entrepreneurs' entrepreneurial activities. On the other hand, these findings highlight the resilience of Egyptian entrepreneurs and the adaptive strategies they employed to overcome the uncertainties brought about by the COVID-19 pandemic. In the specific context of Egypt during the COVID-19 pandemic, the positive impact of uncertainty and recognition of business opportunities demonstrates a nuanced relationship between contextual factors and entrepreneurial responses.

Finally, in a neurobiological perspective, this study's findings may be explained by the interplay of emotional processing (fear and anxiety) and cognitive functions (uncertainty processing and

opportunity recognition) within the brain. The balance between these processes may influence an individual's entrepreneurial intentions and the likelihood of starting a business during challenging times like the COVID-19 pandemic. Further research incorporating neurobiological measures (such as entrepreneurial intentions) may provide more direct insights into the neural correlations between entrepreneurial decision-making in fear, uncertainty, and recognition of business opportunities.

7. Implications of This Study

This study's findings provide far-reaching implications for Egypt's entrepreneurial landscape during the COVID-19 pandemic. Accordingly, we recommend that organizations and policymakers prioritize mental health support initiatives to help Egyptian entrepreneurs navigate the substantial negative impact of fear and anxiety on both entrepreneurial intentions and business startups. The tailoring entrepreneurial training programs to address the unique challenges posed by the uncertainty of COVID-19 can equip Egyptian entrepreneurs with the skills needed to adapt to unpredictable business environments. Moreover, in acknowledging the insignificant effect of the recognition of business opportunities, we recommend that efforts be directed towards addressing the constraints on resources and that there is a greater focus on providing financial support and creating networks that facilitate innovation and resource-sharing among Egyptian entrepreneurs. Policymakers are pivotal in creating a policy environment that encourages risk-taking, innovation, and collaboration. Collectively, industry-specific interventions, clear communications, and a focus on long-term planning and adaptability can contribute to Egypt fostering a resilient entrepreneurial ecosystem that ensures entrepreneurs can thrive in adversity.

Turning to theatrical implications, the observed negative impact of fear and anxiety of COVID-19 on entrepreneurial intentions and business startups emphasizes the need for a deeper exploration of psychological resilience within entrepreneurship theory with integral components being coping mechanisms and mental health support. In addition, the positive effect of the uncertainty of COVID-19 on entrepreneurial intentions and business startups signals the need to reconsider the adaptive strategies employed by Egyptian entrepreneurs in the face of environmental uncertainty. By highlighting the pivotal need to address the lack of resources, this study's findings challenge the traditional assumptions about the direct link between the recognition of business opportunities and entrepreneurial outcomes. Furthermore, the industry-specific dynamics, which influence the relationship between the recognition of business opportunities and entrepreneurial developments, highlight the importance of sector-specific factors in theoretical frameworks. The emphasis on long-term planning and adaptability introduces temporal dimensions into entrepreneurial decision-making models. These offer a more comprehensive understanding of the methods used by Egyptian entrepreneurs over time to deal with uncertainty. By contributing to the refinement and expansion of existing entrepreneurship theories, these theoretical implications offer a nuanced perspective on entrepreneurial behaviors during crises and enrich this field's academic landscape. Moreover, our analysis observed cross-loading in a few items, a phenomenon recognized for its potential impact on AVE, CR, and discriminant validity. However, it's crucial to highlight that, in our study, these cross-loaded values maintain the reliability and validity metrics. The robustness of our measurement model is maintained, and appreciation of meticulous item selection and conceptual alignment, which successfully mitigated potential adverse effects of cross-loading. This implies that while some

shared variance exists, the primary dimensions of our constructs remain distinct and interpretable. These insights significantly bolster our theoretical and methodological positions.

8. Limitations and Future Research

While this study's findings contribute valuable insights, it is essential to acknowledge that its limitations impact the generalizability and comprehensiveness of these findings. Firstly, we employed a quantitative approach; therefore, it has the potential to limit the depth of understanding that may be provided by using qualitative methodologies. Such an approach may reveal nuanced factors influencing entrepreneurial behaviors during the COVID-19 pandemic. By focusing on a selected set of factors, namely, fear and anxiety of COVID-19, uncertainty of COVID-19, recognition of business opportunities, entrepreneurial intentions, and business startups, this study may have overlooked other relevant variables that influence Egyptian entrepreneurs' entrepreneurial outcomes. By entering this study only on Egyptian entrepreneurs, we narrowed the generalizability of this study's findings and, potentially, limited their applicability to entrepreneurs in different cultural, economic, and regulatory contexts. Furthermore, by not applying either a specific theory or a domain to this study's findings, we accept that there may be challenges to interpreting and contextualizing the observed relationships between the variables. We acknowledge that a theoretical framework may have provided a more robust foundation for understanding the underlying mechanisms driving the observed phenomena. These limitations underscore the need for caution when either extrapolating the findings to diverse populations or seeking a more nuanced understanding of the complex interplay of factors influencing entrepreneurial activities during times of crisis.

In this study, we explored broader factors such as social networks, institutional support, and individual characteristics to reveal additional drivers of entrepreneurial activities. However, we recommend that cross-cultural comparative studies be conducted in the future to contribute to generalizability and to offer insights into the contextual nuances that shape entrepreneurial responses in different regions. In this regard, we recommend that longitudinal analyses be conducted to capture the temporal dimensions of entrepreneurial behaviors and to trace the evolution of businesses from recognizing business opportunities to starting new ventures. We also recommend the integration of established theories and models from relevant disciplines to form global comparative analyses that could provide a more robust theoretical foundation for understanding entrepreneurial dynamics during future crises. Finally, we consider that interdisciplinary collaborations can bring diverse perspectives to the study of entrepreneurship during pandemics and, thereby, foster a better understanding of the challenges and opportunities entrepreneurs face and pave the way for evidence-based strategies to support them more effectively in the future.

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Author Contributions

Abdelwahed NAA developed the conceptualization framework and hypotheses of the study. Al Doghan MA developed the methods and write-up of the manuscript. Ali Soomro B analyzed the data and discussed the results in the light of literature. All authors accepted the final version after revisions.

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Competing Interests

The authors have declared that no competing interests exist.

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