

Necessity Entrepreneurship and Innovation Adoption During a Crisis: The Moderating Role of Side-Hustling

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Abstract

We investigate the connection between entrepreneurial motivation and innovation adoption during COVID-19 crisis by informal firms in India. Using the theory of Conservation of Resources, this study examines the extent to which necessity entrepreneurs are more likely to adopt innovation than opportunity entrepreneurs and how the presence of side hustles moderates this relationship. Our findings suggest that necessity entrepreneurs are more likely than opportunity entrepreneurs to adopt innovation during COVID-19 uncertainty in order to preserve and acquire resources. In addition, the study demonstrates that the positive relationship between necessity entrepreneurship and innovation adoption is weakened in the presence of side jobs due to availability of buffer resources. These findings have implications for policymakers and practitioners who seek to foster innovation and entrepreneurship in uncertain environments, highlighting the importance of supporting necessity entrepreneurs and comprehending the potential costs and benefits of engaging in a side hustle. We use the World Bank Enterprise Surveys of Indian Informal firms 2011-2012 for analysis.

Keywords: Informal, Innovation, COVID-19, Side-Hustling

Introduction

Global businesses face challenges due to constant environmental changes, creating opportunities for growth and development. Firms often devise innovative strategies during economically uncertain times to ensure their survival and prosperity (Clauss, 2017). The

COVID-19 pandemic led to a public health crisis and triggered a global economic crisis, impacting various social strata and extending beyond the health sector (Ozili & Arun, 2020). The informal sector was no exception.

The Organization for Economic Co-operation and Development (OECD, 2002) defines the informal sector as legal production activities purposely hidden from public authorities to avoid taxes, social security contributions, and legal standards compliance. Informal entrepreneurs operate outside the law (ILO, 2013; Webb et al., 2009) but are often accepted due to their perceived benefits (Webb et al., 2020).

Research on entrepreneurship, particularly in the informal sector, reveals a dichotomy between necessity-driven and opportunity-driven entrepreneurs (Gurtoo & Williams, 2009). Opportunity entrepreneurs capitalize on business opportunities, while necessity entrepreneurs turn to entrepreneurship due to unemployment or limited job prospects (Minniti, Bygrave, & Autio, 2006). Some argue that necessity primarily drives entrepreneurship in the informal sector (Webb et al., 2013). In uncertain times, like the COVID-19 pandemic, the "Schumpeter effect" suggests entrepreneurship can help reduce unemployment (Sanchis Llopis et al., 2015).

Entrepreneurship fosters innovation and economic growth, particularly during uncertain times when conventional employment options may be limited. However, entrepreneurs' likelihood of adopting innovative practices in the face of uncertainty may vary. Our study aimed to explore the relationship between entrepreneurial motivation and innovation implementation during uncertain times, focusing on necessity entrepreneurship and side hustles.

We tested two hypotheses: 1) necessity entrepreneurs are more likely to adopt innovation during uncertain times than opportunity entrepreneurs, and 2) the positive relationship between

necessity entrepreneurship and innovation adoption weakens in the presence of side hustles. Our results supported both hypotheses.

Our research adds to the literature on entrepreneurial motivation and innovation adoption during uncertain times. Our findings highlight necessity entrepreneurs as crucial sources of innovation during uncertainty and show that side hustles can influence their resourceful behaviors. Policymakers and practitioners could assist necessity entrepreneurs by addressing their resource constraints. Furthermore, our study underscores the importance of evaluating the potential costs and benefits of engaging in side hustles within the entrepreneurial context.

Theory and Hypotheses

Drawing on Conservation of Resources (COR) theory (Hobfoll, 1989, 2001), this paper presents a novel perspective on the relationship between necessity entrepreneurship, innovation, and uncertainty. COR theory suggests that individuals are motivated to prevent the loss of valued resources and acquire new resources they do not possess (Hobfoll, 1989). Resources can be objects, personal characteristics, conditions, or energies valued by an individual or those serving as a means to attain them (Hobfoll, 1989, p. 516). The COVID-19 pandemic exemplifies a context fostering risk-taking among necessity entrepreneurs and innovation, given that both crisis and innovation share the common element of uncertainty.

During crises, individuals' livelihoods are at stake, with employment and income becoming essential resources for survival and sustenance. We argue that entrepreneurs, particularly in the informal sector, face increased challenges in sustaining their businesses during uncertain times. Their willingness to adopt innovative practices allows them to maintain operations as innovations serve as crucial resources. Survival during crisis periods depends on their ability to acquire these vital resources through innovation adoption.

Applying COR theory principles (Hobfoll et al., 2018), we posit that resource loss is more significant than resource gain. Accordingly, adopting innovation becomes a viable strategy for necessity entrepreneurs to counteract the loss of key resources, such as income and employment. The potential loss of critical resources can jeopardize an entrepreneur's business, leading to unemployment and, ultimately, insolvency. Nevertheless, the prospect of loss often drives entrepreneurs to persevere (Holland & Shepherd, 2011). From this perspective, embracing innovation is a fundamental resource required to ensure survival. Entrepreneurs who can effectively manage resource scarcity are more likely to succeed (Baron, Hmieleski, & Henry, 2012; Uy, Foo, & Song, 2012).

Uncertain times, besides threatening resources, also present opportunities for entrepreneurs to acquire additional resources by taking risks and adopting unconventional practices, such as innovation adoption. Such actions may provide future resource gains and serve as a buffer in the present.

According to COR theory, losing resources is more detrimental to an organization than regaining them after a loss. This results in two guiding principles: a) resource loss is disproportionately more salient than resource gain (Hobfoll, 1998, p. 62); and b) individuals must invest resources to protect against resource loss, recover from losses, and gain resources (Hobfoll, 1998, p. 73). In this context, we argue that income and employment are resources at risk for necessity entrepreneurs who seek conservation. Innovation adoption becomes a new resource these entrepreneurs invest in to protect and potentially increase their income and employment (Hobfoll et al., 2018). Conversely, opportunity entrepreneurs are less likely to innovate during increased uncertainty, such as the COVID-19 pandemic, as this raises the potential for resource loss. While willing to take risks, they are less inclined to do so than necessity entrepreneurs who face existential threats.

Prospect theory (Kahneman & Tversky, 1979) posits that individuals make decisions based on loss avoidance rather than gain achievement relative to a reference point, taking more risks to prevent potential losses than to achieve gains. Individuals process gains and losses differently, exhibiting risk-seeking behavior when anticipating losses and risk aversion when anticipating gains (Kahneman & Tversky, 1979). Prospect theory aids in understanding decision-making under risk or uncertainty (Kahneman & Tversky, 1979), which applies to our study of necessity entrepreneurs. These entrepreneurs engage in innovation out of necessity due to a lack of alternative opportunities, which pushes them toward risk-taking activities and endeavors in the form of innovation adoption, particularly in uncertain contexts like the COVID-19 pandemic. In contrast, opportunity entrepreneurs, who pursue opportunities as they arise, are not driven by unemployment or income needs. Especially during uncertain times like the COVID-19 pandemic, opportunity entrepreneurs may become risk-averse as they do not require resources for survival, unlike necessity entrepreneurs.

Drawing from prospect theory, necessity entrepreneurs are more inclined to take risks in situations of loss (unemployment and no income), while opportunity entrepreneurs may become more cautious. Thus, we propose the following hypothesis:

H1: Necessity entrepreneurs are more likely to adopt innovation during uncertain times than opportunity entrepreneurs.

Role of Side Hustles in Uncertain Times

Side hustles refer to the practice in which individuals pursue additional sources of income apart from their primary occupation, typically a full-time job (Ashford, Caza & Reid, 2018; Muthoni Mwaura, 2017). This practice, akin to moonlighting, involves operating outside the formalized systems and organizational boundaries of one's primary employment (Petriglieri et al., 2019).

Side hustles offer individuals the flexibility to choose their work method, location, and schedule (Ashford, Caza & Reid, 2018).

While side hustles are considered alternative work arrangements, they are essential income sources for individuals in precarious employment situations. Engaging in multiple side businesses can yield financial rewards (Glavin, 2020) and has become increasingly prevalent with the expansion of the gig economy (Kuhn & Maleki, 2017). Research indicates that freelancers or contract workers experience higher stress levels than those in conventional full-time jobs (Madden et al., 2017). Drawing from the Conservation of Resources (COR) theory, we argue that a side hustle, as an alternative income and employment source during uncertain times, serves as a buffer for necessity entrepreneurs, helping them prevent resource loss.

The COVID-19 pandemic introduced unprecedented unpredictability and career shocks (Akkermans et al., 2020), from diminished work availability to eliminating job opportunities. A side hustle provides an additional income and employment source, reducing the uncertainty in one's life. Previous studies have established connections between side hustles and financial gains, economic needs (Throsby & Zednik, 2011), and fluctuations in primary employment (Guariglia & Kim, 2004). In the context of COVID-19, side hustles can act as a safety net for necessity entrepreneurs' survival and livelihood. Consequently, the urgency to acquire new resources, such as adopting innovations, may be less pronounced for those with a secondary occupation. Applying the first corollary of COR theory, which posits that individuals with greater resources are less vulnerable to resource loss and more capable of resource gain, we argue that having a second job can be considered a resource, as it reduces the risk of losing one's primary income and employment source. Furthermore, a second job may decrease the

likelihood of necessity entrepreneurs acquiring additional resources through innovation adoption.

The COVID-19 pandemic created an atmosphere of uncertainty and posed challenges to business owners, including the risk of resource loss. In this context, gains from buffer resources become more salient. Adopting new products or adapting to novel approaches can act as resource gains to counter resource losses during crises. However, the propensity for innovation adoption diminishes when necessity entrepreneurs engage in side hustles, as these alternative occupations provide employment and serve as valuable resources.

Entrepreneurship and innovation are often characterized by risk-taking (Block, Sandner & Spiegel, 2015), where risks involve failure and resource loss. In our study, necessity entrepreneurs face uncertainty in both the present and future, exacerbated by the COVID-19 pandemic. This volatility and threat to resources are addressed by investing in innovation adoption during uncertain times. Nevertheless, the likelihood of innovation adoption is hindered when necessity entrepreneurs engage in side hustles, as these alternative pursuits provide employment and income. Thus, we propose:

H2: The positive relationship between necessity entrepreneurs and innovation adoption during uncertain times is weakened in the presence of side hustles.

Theoretical Model

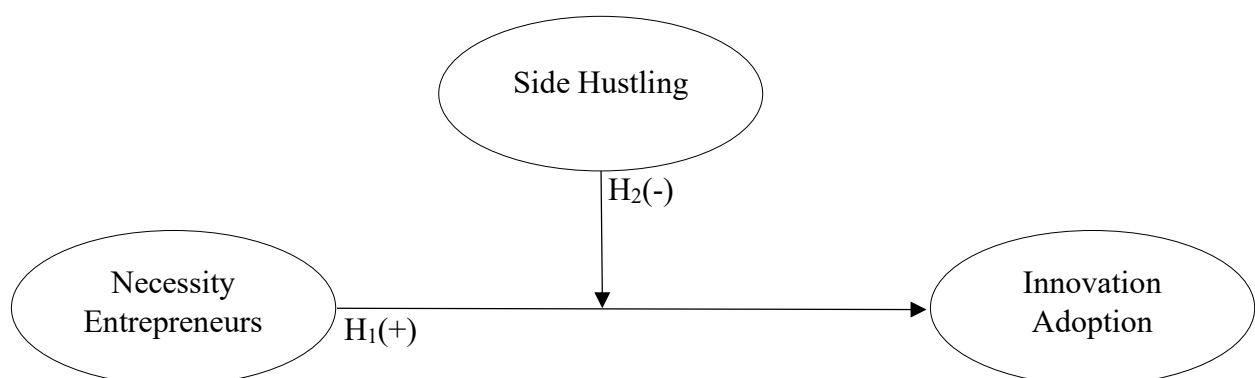


Figure 1. Theoretical Model

Data and Methods

Data

The study uses data from the World Bank Enterprise Survey (WBES) which conducted a cross-sectional survey of informal firms across multiple cities in India between 2021 and 2022. The survey collected information from a representative sample of informal businesses in India, which are businesses not registered with the government and do not pay taxes. The survey covers many topics pertaining to entrepreneurship, such as business practices, access to capital, innovation, and the impact of the COVID-19 pandemic. The WBES is intended to be representative of the informal sector in each country, so that generalizable conclusions can be drawn about the characteristics and practises of informal firms.

Our use of WBES data is significant for a number of reasons. First, the WBES is a well-established and widely utilised survey that has been conducted in numerous countries and regions worldwide (Barasa et al., 2017; Dwibedy, 2022). Second, the WBES data have a reputation for reliability and validity. The survey is meticulously designed to minimise common method variation, a potential source of bias when data are collected using a single method (McCann & Bahl, 2017; Mohammad & Husted, 2021)

Thirdly, the final sample for this study comprised 8146 businesses after “Don’t Know” responses and missing data were eliminated. This is a sufficiently large sample size to detect significant differences and relationships among the variables of interest. Moreover, the large sample size enhances the external validity of the study and the generalizability of the findings.

In conclusion, the use of WBES data in this study provides a trustworthy and reliable source of information regarding the characteristics and practises of informal firms in India. The

large sample size and meticulous data collection methods ensure that the data are reliable and applicable to a variety of analyses.

Variable description

To create our dependent variable, we used a question from our unstructured survey that asked, “In response to COVID-19, did the business change its products sold or services rendered?” We coded “yes” and “no” responses as “1” and “0”, respectively. To articulate this innovation metric, we referred to Gault's (2018, p. 619) definition of product innovation, which includes both goods and services. According to Gault, a product innovation is a product that is either new or significantly modified in terms of its characteristics or intended uses and made available to consumers. However, informal firms are not typically known for innovation and instead compete with formal sector firms on the basis of cost advantages (McCann & Bahl, 2017). Therefore, we modified Gault's definition to include product or service changes as a measure of innovation for informal firms. Given that the question was explicitly posed in the context of COVID-19, we interpret this metric as innovation in response to a crisis or in an uncertain environment.

To determine whether an entrepreneur is a necessity entrepreneur or an opportunity entrepreneur, we asked, “Whether the entrepreneur started the business due to the inability to find another source of income?” The responses to this question were “yes” or “no,” which we encoded as “1” and “0”, respectively. As previously mentioned, necessity entrepreneurship includes unemployed entrepreneurs at the outset of their venture (de Vries et al., 2020).

We used the question “Does the owner currently have a job with either a temporary or permanent contract?” to measure side hustles. We coded “yes” and “no” responses as “1” and “0”, respectively.

In addition to the variables listed above, we controlled for a number of other variables that may influence the adoption of innovation by informal businesses in response to COVID-19. We controlled for a variety of other factors because it is possible that they will have an effect on the adoption of innovation by informal firms as a response to COVID-19. The size of the informal firm is the first control variable that we consider (measured as the number of workers employed in the last month). Due to the fact that workers in informal firms do not have fixed contracts and can leave at any time, this measurement of size seemed appropriate for an informal firm. As a result, the most recent figures regarding employment at the firm can provide us with the most accurate measurement of the same. We also controlled for the age of the firm, the type of premises that they operate out of (Household, Non-Household, or Hawking), the sector of work that they belong to, the years of experience that the owner has in the industry, the temporary closure of the business during COVID-19, the city in which the informal firm is located, and whether or not the firm currently has a loan on the business. Table 1 describes the variables used.

Table 1.

Variable Description.

Variable	Code
Dependent Variable: Innovation Adoption	1 = Yes, 0 = No
Independent Variable: Necessity Entrepreneurship	1 = Yes, 0 = No
Independent Variable: Side-Hustling	1 = Yes, 0 = No
Control Variable: Firm Size	Number of workers employed last month
Control Variable: Age of Firm	Number of years since establishment started operations
Control Variable: Type of Premises	Household, Non-Household, or Hawking
Control Variable: Sector of Work	Industry dummies
Control Variable: Years of Experience	Number of years of owner's experience in the industry

Control Variable: Temporary Closure due to COVID-19	1 = Yes, 0 = No
Control Variable: Location	City where the informal firm is located
Control Variable: Loan on Business	1 = Yes, 0 = No

Method

We employ the logistic regression model to examine the binary dependent variable representing informal firms' adoption of innovation in India. Logistic regression is a commonly used statistical technique for examining the relationship between a binary outcome variable and one or more independent variables. The objective of logistic regression is to estimate the likelihood of the outcome variable given the values of the explanatory variables. The results of logistic regression are simple to interpret, which is an advantage of the method. We get the odds-ratios of the individual explanatory variables which make it simpler to interpret how they impact the likelihood of the dependent variable attaining value 1. The dependent variable K (representing adoption of innovation) can take on the values 0 or 1, with 0 representing non-adoption of innovation and 1 representing adoption of innovation as a response to COVID-19. The logistic regression equation is:

$$\text{logit}(P(K=1)) = \alpha + \beta_1 \text{ typeofentrepreneur} + \beta_2 \text{ sidehustling} + \beta_3 \text{ typeofentrepreneur*sidehustling} + \beta_n \text{ control variables} + \varepsilon$$

where $P(K=1)$ is the adoption probability, logit is the natural logarithm of the odds ratio, α is the intercept term, β_1 to β_3 are the coefficients of the primary explanatory variables, β_n represents the coefficients of the control variables, and ε is the error term.

In logistic regression, the odds ratio corresponds to the ratio of the probability of adoption to the probability of non-adoption, or the odds of adoption to the odds of non-adoption. The logit function converts the odds ratio to a linear form, making the relationship

between the explanatory variables and the dependent variable easy to interpret. We used robust standard errors to account for heteroskedasticity and potential clustering effects. This method helps account for any biases that may arise as a result of non-random sampling or measurement errors, ensuring that the results are accurate and consistent.

Results

Table 2 shows the descriptive statistics of our dataset. The dependent variable in our sample shows that 21.5% of informal firms adopted innovation as a response to COVID-19. Further in the sample, 47.4% of informal sector entrepreneurs are shown to be driven by necessity, suggesting that many start businesses out of need rather than opportunity. Additionally, we find that 9.8% of the entrepreneurs had a side hustle, indicating that a small number of informal sector entrepreneurs have multiple income streams. Table 3 presents the results of the logistic regression.

Table 2.

Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Adopt Innovation	8146	.215	.411	0	1
Necessity Entrepreneur	8146	.474	.499	0	1
Sidehustle	8146	.098	.298	0	1
Size	8146	1.637	2.46	0	200
Age	8146	11.124	7.102	2.5	64.5
Type of Premises	8146	2.34	.898	1	4
Business Temporarily Closed Due to COVID-19	8146	0.766	.423	0	1
Has a Loan for the Business	8146	0.124	.33	0	1

Table 3.

Results

Logit Regression	(1) Adopt innovation	(2) Adopt innovation	(3) Adopt innovation	(4) Adopt innovation
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Size	-0.0164 (0.0177)	-0.0149 (0.0163)	-0.0147 (0.0160)	-0.0140 (0.0153)
Age	0.0217** (0.00695)	0.0255** (0.00690)	0.0257** (0.00691)	0.0248** (0.00694)
Type of Structure				
Non-household with permanent structure	0.547** (0.113)	0.556** (0.116)	0.551** (0.116)	0.548** (0.116)
Non-household with temporary structure, including stall or stands	0.175 (0.132)	0.204 (0.134)	0.197 (0.135)	0.186 (0.134)
Non-fixed premises, including hawkers	0.444** (0.135)	0.468** (0.137)	0.464** (0.137)	0.450** (0.138)
Owner Years of Experience	-0.0235** (0.00654)	-0.0225** (0.00651)	-0.0224** (0.00652)	-0.0212** (0.00655)
Business Temporarily closed due to COVID-19	0.274** (0.0723)	0.268** (0.0729)	0.266** (0.0729)	0.265** (0.0730)
Has a loan for the business	0.888** (0.0792)	0.961** (0.0802)	0.971** (0.0805)	0.971** (0.0805)
Necessity Entrepreneur		0.601** (0.0650)	0.605** (0.0652)	0.679** (0.0690)
Side-Hustle			-0.109 (0.0964)	0.234 (0.132)
Side-Hustle X Necessity Entrepreneur				-0.656** (0.192)
Sector	Included	Included	Included	Included
City of operations	Included	Included	Included	Included
Constant	0.0195 (0.905)	-0.497 (0.901)	-0.495 (0.904)	-0.522 (0.899)
Observations	8146	8146	8146	8146
Log Likelihood	-3589.8	-3543.9	-3543.2	-3537.3
Chi-Square	1002.6	1012.8	1012.6	1014.0
VCE	robust	robust	robust	robust
AIC	7277.6	7187.8	7188.5	7178.5
BIC	7620.9	7538.0	7545.7	7542.8

Standard errors in parentheses

* p<0.05, ** p<0.01

Table 4.

Key information of the Full Model (Model 4)

Variable	Coefficient	SE	Odds Ratio	Marginal Effect	Significance
Size	-0.0140	0.0153	0.9861	-0.0002	
Age	0.0248	0.0069	1.0251	0.0029	**
Non-household with permanent structure	0.5484	0.1160	1.7312	0.0382	**
Non-household with temporary structure, including stall or stands	0.1863	0.1340	1.2049	0.0040	
Non-fixed premises, including hawkers	0.4500	0.1380	1.5686	0.0302	**

Variable	Coefficient	SE	Odds Ratio	Marginal Effect	Significance
Owner Years of Experience	-0.0212	0.0065	0.9789	-0.0022	**
Business Temporarily closed due to COVID-19	0.2651	0.0730	1.3037	0.0218	*
Has a loan for the business	0.9712	0.0805	2.4276	0.0706	**
Necessity Entrepreneur	0.6794	0.0690	1.9724	0.0514	**
Side-Hustle	0.2342	0.0964	1.2631	0.0075	
Necessity Entrepreneur X Side-Hustle Interaction	-0.6563	0.1920	0.5198	-0.0276	**

* $p < 0.05$, ** $p < 0.01$

The odds ratios were calculated as the exponential of the coefficients from the logistic regression model, and the marginal effects were calculated using the delta method at the mean values of the continuous variables. The standard errors were calculated using the robust variance-covariance matrix.

Model 1 describes the relationship between the control variables and the probability of adoption of innovation by informal firms. In Model 1, the control variable “Size” has a coefficient of -0.0164 that is significantly and negatively related to the adoption of innovation ($p > 0.10$). This indicates that larger companies are less likely to adopt innovation.

With a coefficient of 0.0217 ($p < 0.01$), the control variable “Age” is significantly and positively associated with innovation adoption. This suggests that older companies are more likely to adopt innovation. The coefficient of 0.547 ($p < 0.01$) indicates a positive and significant relationship between the control variable “Non-household with permanent structure” and innovation adoption. This indicates that businesses operating in non-residential permanent structures are more likely to adopt innovation than businesses operating in other types of structures. The coefficient of 0.175 ($p > 0.10$) indicates that the control variable “Non-household with temporary structure, including stalls and stands” is not significantly related to innovation adoption. The control variable “Non-fixed premises, including hawkers” has a positive and statistically significant relationship with innovation adoption ($p < 0.01$). This suggests that businesses operating in non-fixed locations are more likely to adopt innovation compared to those operating in other structures.

Model 2 describes the direct relationship between type of entrepreneurship (necessity vs opportunity) and the likelihood of adoption of innovation during COVID-19. The coefficient for necessity entrepreneurs in Model 2 is 0.601, indicating that they are more likely than opportunity entrepreneurs to adopt innovation during uncertain times. The odds ratio here is calculated to be 1.823, indicating that they are 82.3% more likely than opportunity entrepreneurs to adopt innovation in times of crisis like the COVID-19. Necessity Entrepreneur coefficient is 0.601 with standard error 0.065. Holding other variables constant, being a necessity entrepreneur increases the odds of adopting innovation by $\exp(0.601) = 1.82$. In Model 3, holding all other variables constant, necessity entrepreneurs have a 1.83-fold higher

chance of adopting innovation. This effect is similar to Model 2. However, we find that side-hustling by entrepreneurs in itself has no statistically significant impact on adoption of innovation. In Model 4, which is the full-model, the coefficient of necessity entrepreneur is 0.679 with standard error 0.069. Holding all other variables constant, necessity entrepreneurs are 1.97 times more likely to adopt innovation. In fact, when controlling for the interaction term in Model 4, the positive effect of being a necessity entrepreneur on innovation is stronger than in the previous two models. Model 4 also provides the role of the side-hustling by informal sector entrepreneurs on their adoption of innovation. Here we find that the interaction term coefficient is -0.656 with a standard error of 0.192. This suggests that side-hustle entrepreneurs reduce the impact of necessity entrepreneurs on innovation. Holding all other variables constant, a necessity and side-hustle entrepreneur's odds of adopting innovation decrease by $\exp(-0.656) = 0.52$. The graph below shows the marginal effects of the interaction terms.

Table 4 describes the odds-ratios and marginal effects of the independent variables. According to the table the likelihood of innovation adoption by necessity entrepreneurs is 1.82 times higher than that of opportunity entrepreneurs. As measured by the marginal effect of entrepreneurship, the likelihood of adopting innovation is higher among necessity entrepreneurs by 4.4%. A 1.26-fold increase in the odds of adopting innovation is associated with having a side hustle, but this effect is not significant at the 5% level of analysis. A 0.8% increase in the likelihood of adopting innovation has been ascribed to having a side hustle, according to the marginal effect of side hustle. The negative coefficient of the interaction term between necessity entrepreneurs and the side hustle indicates that the impact of the side hustle on innovation adoption is smaller for necessity entrepreneurs than it is for opportunity entrepreneurs. In particular, the likelihood of innovation adoption is 0.52 times lower for necessity entrepreneurs who also have a side hustle than for non-necessity entrepreneurs who also have a side hustle. The marginal effect of the interaction term suggests that the likelihood

of adopting innovation is reduced by 2.8% if one is both a necessity entrepreneur and a side hustler. The results support our hypotheses 1 and 2.

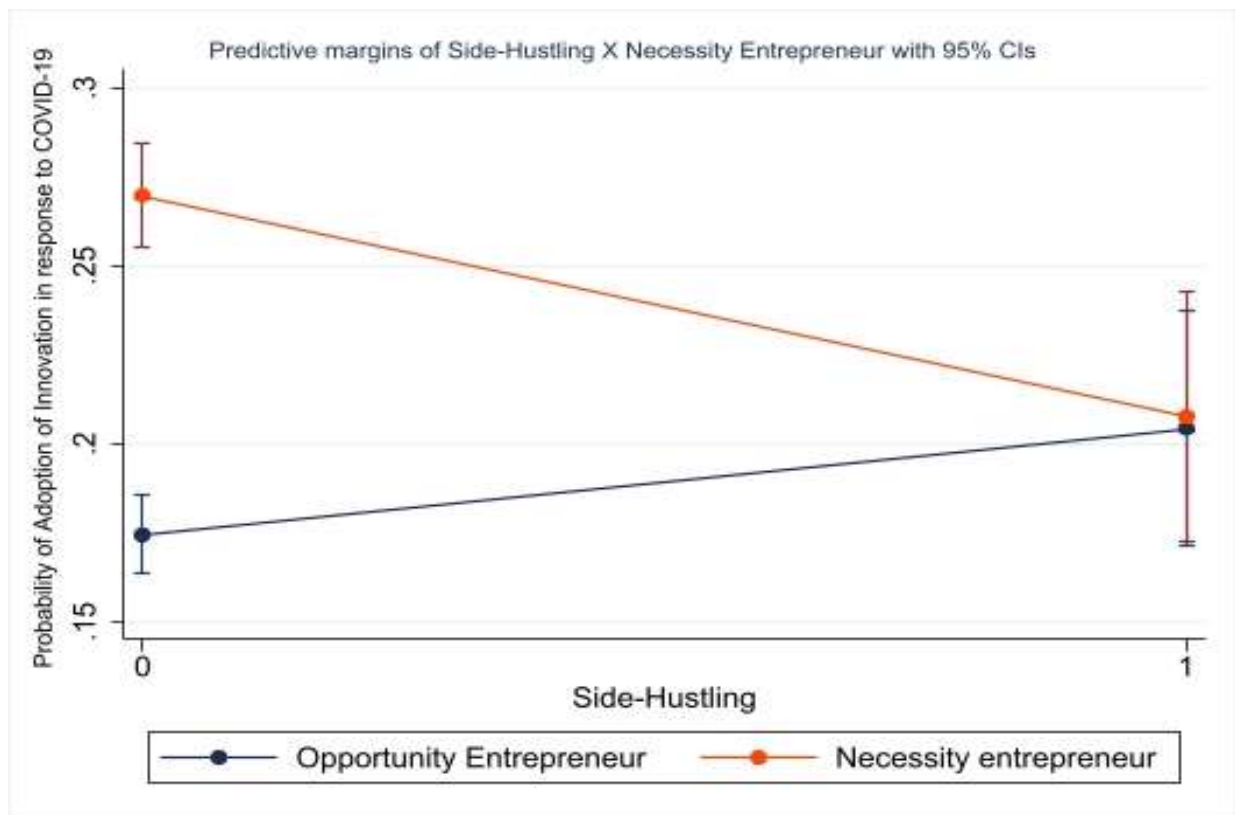


Figure 1. Marginal Effects of the Interaction between Side-Hustling and Necessity Entrepreneurship

The presented marginal effects display the graphical representation of the predicted probabilities of adopting the innovation for various combinations of the variables side hustle and necessity. The predicted probability of innovation adoption is 0.174 for necessity entrepreneurs who are not side hustlers (0 0), and 0.270 for necessity entrepreneurs who are side hustlers (0 1). The predicted probability of innovation adoption is 0.204 for opportunity entrepreneurs who are not side-hustling (1 0), which is lower than the probability for necessity entrepreneurs who are not side-hustling. However, the predicted probability of innovation adoption increases slightly for opportunity entrepreneurs (1 1), to 0.207.

Overall, the results indicate that necessity entrepreneurs are more likely to adopt innovation as a response to COVID-19 than opportunity entrepreneurs, and that side hustles have a positive impact on innovation adoption for both groups. However, side-hustling decreases the likelihood of innovation for necessity entrepreneurs compared to when they do not have a side-hustle.

Discussion

The objective of our study was to delve into the association between entrepreneurial motivation and the implementation of innovation during uncertain times. Specifically, we examined the hypotheses that necessity entrepreneurs are more inclined to embrace innovation amidst uncertainty compared to opportunity entrepreneurs, and that this positive relationship diminishes when side-hustles are present. Our findings corroborate both hypotheses.

In alignment with our initial hypothesis, the results demonstrate that necessity entrepreneurs are indeed more prone to adopt innovation during periods of uncertainty than their opportunity-driven counterparts. This inclination can be attributed to necessity entrepreneurs often launching their businesses due to limited alternative employment opportunities (Block et al, 2015). Furthermore, our findings lend support to the second hypothesis, which asserts that the positive relationship between necessity entrepreneurship and innovation adoption during uncertain times is attenuated when side-hustles are present. Specifically, we determined that the presence of side hustles negatively moderates the relationship between necessity entrepreneurship and innovation adoption. This insight suggests that the positive effect of necessity entrepreneurship on innovation adoption during uncertain times is weaker when entrepreneurs engage in side-hustles, due to the availability of resources from their secondary jobs. Our findings can be contextualized within the Conservation of Resources (COR) theory (Hobfoll, 1989), which posits that individuals and organizations strive to acquire, maintain,

and safeguard their resources, with resource loss or the threat thereof leading to stress and adverse outcomes. In the realm of informal entrepreneurship, entrepreneurs face resource limitations and unpredictability, compelling them to adopt resourceful behaviors such as innovation to adapt and sustain their businesses. Our study indicates that necessity entrepreneurs, who confront more pronounced resource constraints due to limited alternative employment options, are more likely to engage in innovation to protect existing resources and obtain new ones. Additionally, our findings imply that the positive impact of necessity entrepreneurship on innovation adoption may be mitigated by the presence of side-hustles, which can enhance buffer resources, thereby enabling necessity entrepreneurs to survive and earn a livelihood during uncertain periods like the COVID-19 pandemic.

Our study underscores the role of necessity entrepreneurs and the influence of side-hustling on innovation adoption. It contends that necessity entrepreneurs, who are at a disadvantage when entering the entrepreneurial domain, are more likely to adopt innovation despite the increased risks during uncertain times. This propensity stems from necessity entrepreneurs' desire to avoid losses (Kahnemann & Tversky, 1979). In contrast, opportunity entrepreneurs, who also adhere to the loss aversion principle of prospect theory, resist innovation adoption in extraordinary situations like the COVID-19 pandemic, as they perceive innovative avenues as potential pitfalls rather than opportunities for gain. The scarcity of resources, information, and avenues in uncertain environments frames potential opportunities as traps, which in turn prompts necessity entrepreneurs to adopt innovation compared to opportunity entrepreneurs, while side-hustling serves as a resource for necessity entrepreneurs, thereby reducing the likelihood of innovation adoption.

Our research contributes to the extant literature on entrepreneurial motivation and innovation adoption during periods of uncertainty. Our findings suggest that necessity entrepreneurs are more inclined to adopt innovation during uncertain times, and that the presence of side-hustles

can influence this behavior. These insights bear implications for policymakers and practitioners seeking to promote innovation and entrepreneurship in uncertain environments. Specifically, our findings indicate that innovation and economic growth can be stimulated by providing support to necessity-driven entrepreneurs and alleviating the resource constraints they encounter. Moreover, the outcomes of our study emphasize the importance of comprehending the potential costs and benefits, as well as the resource requirements, of engaging in a side hustle within the entrepreneurial context.

Conclusion

This study acknowledges several potential limitations that warrant consideration. Firstly, the study hinges on self-reported data from a single survey, which may be prone to social desirability bias, leading participants to overstate positive behaviors such as innovation adoption. Incorporating alternative measures, such as observational or longitudinal data, could have bolstered the study's findings. However, obtaining such data may prove challenging, as informal firms often relocate due to government or institutional pressures and may cease operations more rapidly due to their unofficial status. Consequently, scholars could contemplate longitudinal observations of well-established informal firms.

Secondly, the study did not explore other potential moderators, including age, gender, or education level. Subsequent research could examine the impact of these additional variables to better understand their influence on innovation adoption in uncertain environments.

Lastly, the study was conducted within the specific cultural and institutional context of India, potentially limiting the applicability of the findings to other settings. Replication studies across diverse cultural and institutional contexts could help ascertain the extent to which these findings are generalizable to a wider population.

Future research could delve deeper into the relationship between entrepreneurial motivation and innovation adoption, concentrating on the effects of various types of side gigs on innovation adoption. Moreover, future studies could explore the influence of other factors, such as culture, social norms, and institutional support, on the relationship between entrepreneurial motivation and innovation adoption. Furthermore, future research could investigate the impact of innovation adoption during uncertain times on the long-term success of entrepreneurial ventures. This study offers valuable insights into the roles of necessity entrepreneurship and side businesses in innovation adoption during uncertain times, serving as a foundation for further research in this area.

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