Virtual Business Networks and Knowledge Diffusion: Experimental Evidence from Liberia*

Anubhav Agarwal
Paris School of Economics

Golvine de Rochambeau
IFC & CEPR

Roberto Sormani
World Bank

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Abstract

Small business owners in low-income settings often face information frictions and limited access to professional networks. While formal business training programs have been widely studied, less is known about whether structured, low-cost virtual peer interactions can facilitate the diffusion of business knowledge and practices. We study a randomized experiment in Liberia involving 1,131 micro-entrepreneurs, where the treatment group joined small, moderated discussion groups that met weekly by phone to discuss business challenges. We find that participation in virtual discussion groups leads to significant changes in business behavior. Treated entrepreneurs adopt more innovative practices, including new marketing strategies and sales locations; exhibit higher levels of financial planning; increase their use of digital technologies such as mobile phones, mobile money, and social media for business purposes; and reorient their advice-seeking toward other business owners. A distinctive feature of the study is the availability of detailed records of discussion content. We link treatment effects to the topics most frequently discussed within groups. Outcomes that are more commonly discussed—such as marketing strategies, digital tools, and saving practices—exhibit larger treatment effects, providing descriptive evidence on peer learning mechanisms. In contrast, we find no significant average effects on short-term profits or revenues, consistent with learning-driven adjustments that may precede performance gains. We document heterogeneity, with revenue gains concentrated among entrepreneurs who plausibly faced weaker access to high-quality business networks prior to the intervention. Together, the results show that virtual peer networks can shape business practices and information flows in settings where formal institutions and networks are limited.

*Anubhav.agarwal@psemail.eu, gderochambeau@ifc.org, rsormani@worldbank.org

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1 Introduction

Small business owners operating in low-income environments often lack information on effective business strategies. While traditional business training programs have been widely promoted and studied, their impact remains inconclusive, with mixed evidence on their ability to improve firm performance (McKenzie & Woodruff, 2014; McKenzie *et al.*, 2023). These programs can be costly, rigid, and poorly suited to the specific contexts in which micro- and small-sized firms operate. A key challenge is that these programs tend to deliver standardized knowledge, which may not address the specific, immediate concerns of individual entrepreneurs.

One promising avenue is peer-to-peer learning, which leverages social connections to facilitate the exchange of practical, experience-based knowledge, answering real-time needs. By allowing discussions to evolve based on the real-time needs of participants, these networks can be more flexible and context-sensitive than formal training, creating a fertile environment for problem-solving and innovation, which can lead to more relevant and actionable business insights.

At the same time, the widespread adoption of new technologies, such as mobile phones, social media applications, and digital messaging platforms, has significantly transformed how individuals connect, communicate, and share ideas. By facilitating seamless and instantaneous connections among individuals, these technologies have enabled the rapid exchange of ideas and fostered creativity and innovation (Aghion & Howitt, 1992; Forman *et al.*, 2005; Acemoglu *et al.*, 2016). This paper explores whether virtual platforms can be harnessed to facilitate peer-to-peer learning among small business owners, especially in a context where traditional networks are weak or absent.

In a field experiment conducted in Liberia, we examine the impact of

virtual business discussion groups on business outcomes. A total of 1,131 entrepreneurs were randomly assigned to either a treatment group or a control group. The 435 entrepreneurs in the treatment group were initially invited to an in-person meeting where they were matched with other entrepreneurs resulting in groups of 4-6 members each. After this initial meeting, the groups continued to meet weekly over the phone for six weeks. These discussions, moderated by a facilitator, focused on a different topic each week, including business challenges, sales strategies, savings techniques, income diversification, and business growth. When a business issue was raised, moderators facilitated group brainstorming sessions, encouraging participants to share their experiences and propose solutions, but they did not steer the conversation in any particular direction. The group composition remained consistent throughout the intervention to promote trust and encourage open sharing of information.

The entrepreneurs showed a strong interest in participating. Attendance at the first in-person meeting was 48%, and those who attended this initial meeting were likely to stay engaged. Conditional on attending the first meeting, the median participant attended five out of the six meetings.

Moderators systematically documented the group discussions, providing us with rich data to analyze participant engagement and the content of their exchanges. Although this data is available only for the treatment group by design, it offers valuable insights into the topics discussed and the level of interaction among participants. Specifically, we observe that participants actively shared specific operational strategies they had put in place, including marketing and customer retention techniques and savings management practices. Access to the detailed content of the business discussions allows us to directly map the causally identified treatment effects to the business strategies discussed during the meetings.

Both before and five to six months after the intervention, entrepreneurs

from treatment and control groups completed a comprehensive survey. The survey assessed a wide range of outcomes, including business performance, management practices, personal and household finances, social networks, digital adoption, and self-motivation. The results indicate that the intervention had a positive and significant impact on participating businesses. Entrepreneurs in the treatment group were significantly more likely to adopt business practices such as new marketing strategies, or new sales locations. They also started developing business plans, visiting competitors, and offering special deals to new customers. Additionally, participants were more digitally active, with greater ownership and use of mobile phones, particularly for business, greater ownership of mobile money accounts, and greater use of social media for business activities. Lastly, the intervention strengthened participants' networks, making them more inclined to seek business advice from fellow entrepreneurs rather than relying on friends and family.

While we do not find significant average effects on short-term profits or revenues, this pattern is consistent with an intervention that primarily affects information, practices, and experimentation over a relatively short horizon. We nonetheless document meaningful heterogeneity in treatment impacts that helps interpret these null average effects. In particular, revenue gains are concentrated among entrepreneurs who plausibly faced more limited access to high-quality business networks prior to the intervention. Two dimensions are especially salient. First, entrepreneurs who were highly exposed to conflict during the Liberian civil war–an experience associated with persistent disruptions to human capital accumulation and social networks–are significantly more likely to experience revenue increases.[1] Second, entrepreneurs who entered the labor force at an early age also exhibit larger revenue responses. Together, these patterns suggest that structured peer-

[1]Liberia experienced two civil wars between 1989 and 2003, characterized by widespread violence, destruction, and displacement.

to-peer interactions are particularly valuable for entrepreneurs whose prior opportunities for learning and network formation were more constrained, even when average profit effects have yet to materialize.

The availability of detailed content from around 250 business discussions allows us to supplement the interpretation of our regression estimates of treatment effects, an approach we integrate throughout the paper. First, we systematically analyze discussion content to document the main topics covered in each week of the intervention. Second, for each outcome of interest, we examine whether the corresponding topic was discussed within groups and report the share of groups in which it arose. Finally, we conduct an analysis that links discussion content to observed treatment effects. Outcomes exhibiting larger treatment effects—out of a total of 22 measures—correspond to topics that were discussed more frequently within groups.

The effect of digital technologies on knowledge diffusion has been extensively studied, particularly in developing economies where such technologies can help overcome traditional market barriers. Recent empirical work has focused on documenting how digital technologies, particularly mobile phones and social media, can reduce information frictions and transaction costs (Jensen, 2007; Jack & Suri, 2014), which can be particularly high for small businesses. In the context of developing economies, several studies have shown that digital technology adoption can improve market access, reduce price dispersion, and enhance business practices (Aker, 2010; Hjort & Poulsen, 2019). However, the literature also highlights significant disparities in the use of technology, with many small businesses facing barriers such as limited digital literacy, uncertain returns, and network externalities that may slow initial adoption (Foster & Rosenzweig, 2010). These barriers underscore the importance of digital platforms that provide a low-cost and scalable opportunity for social learning and have

an important role to play for small businesses.

Business discussion groups have emerged as an effective mechanism for social learning and peer effects, and encourage knowledge dissemination and business practices adoption. Field experiments have shown that bringing entrepreneurs together for structured discussions can lead to significant improvements in business practices and performance (Vega-Redondo *et al.*, 2024). Cai & Szeidl (2018) demonstrate that regular meetings among mid-size business owners in China facilitated valuable knowledge transfers and increased firm revenue. Similarly, regular group meetings between randomly matched micro-entrepreneurs and a mentor (on top of a cash grant) in Uganda seem to yield positive benefits for refugee men (Baseler *et al.*, 2025). The mechanism through which firm-to-firm interactions can operate in these contexts appears to be multifaceted: they both encourage information diffusion and technology adoption (Beaman *et al.*, 2021; Hardy & McCasland, 2021) and increase opportunities for collaborations (Asiedu *et al.*, 2023).[2] Our paper provides some of the first experimental evidence on how virtual platforms can extend the reach and impact of business networks among micro-entrepreneurs, showing they can effectively facilitate knowledge transfer without requiring costly in-person meetings. In addition, the detailed data on discussion content provides unique insight into the mechanisms through which peer learning occurs in business discussion groups.

This paper contributes to the literature on learning and information diffusion by showing that peer learning among entrepreneurs can be modular, virtual, and low-cost rather than relying on sustained face-to-face interactions or one-to-one mentorship. The intervention we study consists of short and structured discussion sessions focused on concrete business

[2](Asiedu *et al.*, 2023) shows that virtual pairwise discussions can be effective in improving business collaborations and innovation adoption among women entrepreneurs in Ghana. Our paper is different in that we encourage group discussions, in groups larger than pairs, and that we do not focus on promoting collaboration between businesses but rather information sharing on business-related topics.

topics, delivered mainly through phone calls and without the provision of expert advice. Despite its simplicity, this format generates large and systematic changes in business practices, digital technology use, and the composition of entrepreneurs' advice networks. A distinctive feature of the study is the availability of detailed records of discussion content, which allows us to directly link treatment effects to the information exchanged within groups. Outcomes that are more frequently discussed exhibit larger treatment effects, providing rare descriptive insight into how peer learning operates. This highlights the potential of scalable, low-cost platforms to facilitate knowledge diffusion in environments where traditional networks and formal training are limited.

The remainder of the paper is organized as follows. Section 2 describes the experimental design, sample selection, and implementation of the virtual discussion groups. Section 3 presents the data and provides descriptive evidence on participation, discussion content, and take-up. Section 4 reports the main empirical results, including treatment effects on business practices, digital technology use, social networks, and financial outcomes, as well as heterogeneity analyses. Section 5 uses detailed records of discussion content to examine how treatment effects relate to the topics discussed within groups. Section 6 concludes and discusses implications for peer learning and business support programs.

2 Experimental design

2.1 Sample Selection

All participants in the business discussion groups were applicants to the Liberian Support for Small Business Program (SSB). The SSB was part of Liberia's COVID-19 and food crisis response, supported by the World Bank, AFD, and SIDA. Implemented from Sept 2022 to June 2023, the SSB pro-

gram provided a one-week business training and a $900 cash grant in three installments to 1,036 randomly selected beneficiaries among about 3,037 applicants in Greater Monrovia, targeting informal micro-entrepreneurs.[3] The sample for the discussion groups described in this paper was selected among SSB applicants, including grant recipients and non-recipients, following a selection criteria detailed below.

The program implementation timeline is shown in Figure 1. The baseline survey, which also served as the baseline survey for the evaluation of the SSB grant, was conducted in June and July 2022. The SSB program was then implemented from September 2022 to February 2023. A pilot phase for the business discussion groups was then conducted in March of 2023, and the implementation of the business discussion groups followed in May and June of 2023. The endline survey was conducted in November and December of 2023, which was five to six months after the program implementation.

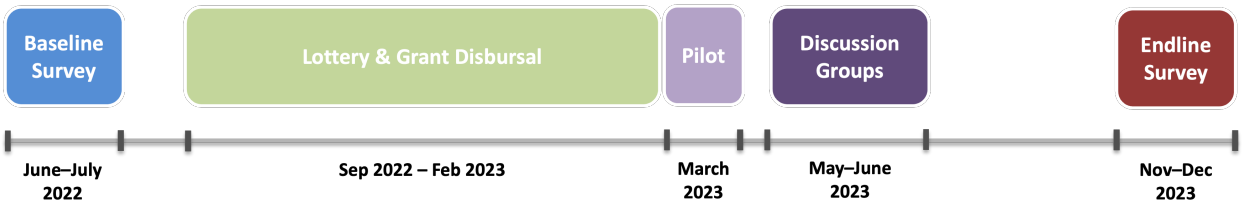


FIGURE 1: PROJECT TIMELINE

The selection of business discussion group participants among SSB applicants was done in two stages. At first, six out of the fourteen communities were randomly selected to participate in the intervention. In these communities, the following set of restrictions was applied to select the sample of participants. First, since pilot activities had been undertaken in some of these communities, all the participants who had been offered to partic-

[3]The eligibility criteria for applying to the SSB program included belonging to one of the pre-determined communities in the greater Monrovia area, being a small business entrepreneur, and being over 18 years of age. Eligibility criteria were checked by a designated community council.

ipate in the pilot phase were removed from the sample. Second, feedback from the pilot indicated that discussions worked best if participants were in similar sectors, so selection was limited to the two most common sectors in the sample, "Trades and Retail of Foods and Drinks" and "Clothing and Shoes". This ensured that the sector composition of the discussion groups was not too heterogeneous. Third, within each community, 50 individuals were randomly selected, stratified on business revenue (below vs. above median), SSB grant winning status and sector of activity.[4]

Feedback from the pilot also indicated that a first in-person meeting made participants much more likely to engage in virtual business discussion groups and share valuable information about their business. The research team thus decided to organize a first in-person meeting in each of the selected communities, to form groups and kick-off the discussions. In the six selected communities, 153 participants out of the 300 invited attended the in-person meeting. This turnout rate, while encouraging, was short of our target of 200. The research team therefore decided to extend the intervention by selecting two additional communities to participate in the business discussion groups.[5] The same sector restrictions were applied on these communities as on the other six. Around 70 participants in each of these newly selected communities were randomly chosen and invited, and around 30 participants came to their community's in-person meeting. As a result, the final sample is composed of 1,131 entrepreneurs from the eight communities in the eligible sectors. Out of these, 435 were invited (the "treatment group") and 212 showed up to the first in-person meeting (the "treated group").[6]

[4]The budget allocated to the project allowed the organization of discussion groups for about 200 participants. Initial calculations based on the pilot allowed us to determine we should invite about 50 individuals per community to reach the target.

[5]While the first communities were randomly selected, these two additional communities were selected based on convenience for the field implementation team–close to the previously selected communities.

[6]In the rest of the paper, participants who show up to at least one meeting–the in-person meeting–are considered as treated.

Within each of the eight communities, participants in the treatment group were invited to an initial in-person meeting, held at a convenient location within their respective communities. Upon arrival to their community's in-person meeting, participants were randomly assigned to one of six groups, and each group was assigned a moderator. This design ensured that all participants within a group operate their business in the same community. However, each community is very large and encompasses multiple market areas, which ensured sufficient geographic dispersion of participants to minimize preexisting business relationships and minimize the risk of direct market competition among participants operating in the same sector. This design choice aimed to facilitate open knowledge sharing while minimizing strategic concerns about information disclosure to competitors.

To incentivize attendance at this first meeting, transportation expenses were covered and lunch was provided. During the in-person meeting, a moderator guided the group discussions, posing questions and encouraging participants to share information about their business challenges. Groups continued to meet weekly for the next five weeks virtually, through conference calls, with the same moderator facilitating the discussions. Importantly, the composition of the groups did not change throughout the intervention, including the moderator, which promoted trust within the group and encouraged participants to share their experiences and propose solutions. Participants who attended all sessions received a small incentive of USD 1.

Each group meeting focused on a different business topic. In the first in-person meeting, some time was spent introducing how the business discussion groups would work and went through logistics for attending the subsequent conference calls. After this short introduction, participants joined their groups and their assigned moderator for an hour-long in-person group discussion. In this first meeting participants were asked to present them-

selves and their business, and discuss the challenges they faced and ideas on how to overcome them.

In all following weeks, participants met virtually, through conference calls. The second week was dedicated to sharing innovative business strategies and tactics that the participants used to sell their goods. The third week focused on saving strategies. The fourth week focused on income diversification. In the fifth week, the participants discussed how they found motivation and inspiration as a small business owner and how they managed stress. In the sixth and final week, participants reflected on what they had learnt over the past weeks as well as avenues for business growth. Topics for each meeting were decided by the research team in coordination with a business specialist.

The moderators were trained by the same business specialist to enhance their skills in facilitating group discussions.[7] The role of the moderator was limited to floating the topic of the meeting, encouraging each of the participants to speak up and taking short notes on everyone's interventions. Moderators were specifically asked to not share their own views or give any business advice to the participants.

2.2 Sample Description

The sample includes 1,131 entrepreneurs and is predominantly female, with women comprising over 80 percent of participants. The average age is 37, about one-third are single, and average household size is 4.5. Because the study was conducted in urban Monrovia, literacy and formal education rates—approximately 60 percent and 70 percent, respectively—are somewhat higher than national averages for this age group but remain low in absolute terms (UNESCO Institute for Statistics).[8] Firms are very small,

[7] See the appendix for the training syllabus

[8] Differences in definitions and the lack of recent data limit direct comparability with UNESCO statistics; however, available evidence indicates that the sample remains poor and only marginally more educated

typically operated solely by the owner with no additional employees. Average weekly revenue is USD 40, and average weekly profit is USD 14.

3 Treatment Implementation

3.1 Treatment Take-up

Table 1 presents summary statistics on take-up of business discussion groups. Upon being randomly selected to participate, participants were contacted and asked whether they were interested in joining the intervention. Out of the 435 invited participants, 280 said they were interested.[9] The first meeting, in-person, took place at a centrally located venue within each of the eight selected communities. These meetings were attended by a total of 212 participants, representing an overall take-up rate of about 48%. Within each community, all participants who showed up on the day of in-person meeting were randomly assigned to one of six groups. While the big majority of groups had five to six members, in two communities, low participation resulted in a few groups having only three or four members. Of the 8 communities, 6 had 6 groups each while 2 had 5 groups each, thereby bringing the overall number of groups to 46. The average attrition rate over the following weeks was about 25 percent with little variation across the weeks and the median participant attended 5 out of the 6 meetings, suggesting that absences were spread across different participants rather than reflecting systematic dropout.

than the average Liberian entrepreneur.

[9] During the baseline survey, which took place a little less than a year before participants were invited to the business discussion groups, SSB applicants had already been asked if they would be interested in such groups. The pilot showed that there was no correlation between participants' stated interest during the baseline survey and their current willingness to participate, so this information was not used to filter out participants during the implementation of the program. The non-correlation between stated interest a year earlier and actual participation during the program is shown in Appendix Table A.1.

TABLE 1: SUMMARY STATISTICS ON TREATMENT TAKE-UP

	# of obs	Prop. of sample
In sample	1131	1.000
Invited to participate	435	0.384
Consented to participate	280	0.247
Attended in-person meeting	212	0.187
Attended second meeting	158	0.139
Attended third meeting	161	0.142
Attended fourth meeting	157	0.138
Attended fifth meeting	158	0.139
Attended sixth meeting	164	0.145

3.2 Participant Recall and Perceived Impact of Treatment

In the survey conducted five to six months after the intervention, participants in the business discussion groups were asked to recall the topics they discussed during the sessions. Importantly, participants were not prompted with a predefined list; instead, enumerators recorded the topics mentioned by the respondents using a multiple-selection format. For each topic recalled, participants were then asked whether they found it useful. Table 2 summarizes the frequency of topic recollection and perceived usefulness. The results indicate that the topic on finances, which included saving strategies, was the most frequently recalled topic, with three-quarters of participants mentioning it, and it was also rated as the most useful. Additionally, more than half of the participants recalled discussing growth and sales strategies, as well as business challenges.[10]

[10]One topic, motivation and inspiration, was unintentionally omitted from the enumerator's list of options; instead, enumerators had the option to select "creating partnerships for business growth" which is a topic that often came up in the growth-focused session.

TABLE 2: SUMMARY STATISTICS ON MEMORY OF DISCUSSION TOPICS

	# of obs	Prop. of treatment
Invited to participate	435	1.000
Remembers being invited	216	0.496
Remembers having participated	183	0.420
Remembers discussing challenges	102	0.557
Discussing challenges was useful	47	0.256
Remembers discussing sales	100	0.546
Discussing sales was useful	59	0.322
Remembers discussing finances	140	0.765
Discussing finances was useful	119	0.650
Remembers discussing income	49	0.267
Discussing income was useful	23	0.125
Remembers discussing partners	62	0.338
Discussing partners was useful	20	0.109
Remembers discussing growth	99	0.540
Discussing growth was useful	64	0.349

Notes : Business challenges, sales, finances, income streams, partnerships , and growth strategies correspond to the topics of each of the six weeks of meetings, in this order. At endline, all participants are asked what topics they remember discussing in the meetings, and the enumerator selects each of the topics mentioned by the respondent. For each topic that the respondent remembers discussing, he/she is asked whether he/she found that topic useful. One topic, motivation and inspiration, was unintentionally omitted from the enumerator's list of options; instead, enumerators had the option to select "creating partnerships for business growth". This table excludes the 21 entrepreneurs who report that they remember having participated in the Business Discussion Groups, while they truly never participated.

Participants in the discussion groups were also asked how many sessions they attended, their perception of the impact of the groups on their business, and whether they would recommend the program to others. In addition, they were asked about two types of connections formed through the program: the number of acquaintances[11] they maintained contact with after the intervention, and among these, the number they consulted for business advice. Table 3 provides summary statistics for these variables. The results indicate that participants found the business discussion groups to be highly beneficial for their businesses and expressed strong likelihood of recommending the program. While most respondents reported

[11] Acquaintances are defined as individuals outside the respondent's family circle who visit or are visited by the respondent regularly.

not maintaining contact with individuals they had met through the intervention, 40 respondents did report staying in touch with at least one person from the sessions, and 16 indicated they sought business advice from these contacts.

TABLE 3: SUMMARY STATISTICS ON SELF-REPORTED TREATMENT EFFECT

	# of obs	Mean	Min	Max	Median
Sessions attended (self-rep)	182	3.58	1	8	4
Impact on business (1 to 3)	183	2.83	1	3	3
Would recommend (0 to 10)	183	8.76	0	10	10
# of acquaintances from treatment	182	0.30	0	5	0
# of advisors from treatment	183	0.13	0	4	0

Notes : The number of sessions attended is self-reported. Impact scale of 1 to 3 corresponds to not at all useful (1), to very useful (3). Recommendation scale of 0 to 10 corresponds to not likely (0) to very likely (10). This table excludes the 21 entrepreneurs who report that they remember having participated in the Business Discussion Groups, while they truly did not.

3.3 Content of Discussions

All weekly group discussions were recorded, and moderators were instructed to take structured notes for each meeting. Due to enumerator errors, some notes were not properly recorded or saved electronically. As a result, the analysis relies on notes from 251 of the 276 scheduled meetings (46 groups observed over six weekly sessions), corresponding to a missingness rate of approximately 9 percent. The missing notes appear to be missing at random, such that the available notes can be viewed as a random sample of all group discussions.[12]

Moderators recorded all meetings and were asked to provide a written summary of the discussion after each meeting. This allows us to analyze precisely the content of the discussions and to get a good overview of the specific topics discussed. In this section, we provide a brief overview of the

[12]While discussion notes are available for the vast majority of meetings, we are unable to link individual discussions to specific groups. Consequently, discussion content cannot be matched to particular participants.

content of the discussions for each topic. A deeper and more systematic analysis of the content of the business discussion groups is provided in the following section, in alignment with the specific outputs measured in the endline survey.

The first meeting invited the participants to discuss the challenges they faced in their businesses and ideas on how to overcome them. Challenges discussed were very diverse and included the depreciation of the Liberian dollar against the U.S. dollar, risks of selling goods on credit, high competition, seasonal nature of the business, electricity shortages and bad road connectivity. The participants sometimes offered suggestions such as opening up a new income stream when one's primary business is seasonal in nature.

The second week was dedicated to sharing business strategies and tactics that the participants used to help sell their goods. Main tactics included ensuring product variety and quality (keeping the business site clean, making food taste good, etc.), good customer relations (talking politely, giving discounts or selling on credit), advertisement (using a megaphone or saving a customers' number to call them up later), choosing the selling location strategically, and comparing one's price with the competitors' prices.

The third week focused on saving strategies. The discussions mainly revolved around the pros and cons of different saving options: bank, mobile money, saving groups (locally called *susus*), or cash (typically in a "cash box", at home). For instance, here is what one participant said in favor of saving groups: *I use daily/short term susu and yearly club as a means of saving. "I prefer these means of saving because it makes it binding upon me to ensure that I don't tamper with my principle or use my profits anyhow. With deadline dates set to make payments into these different susus and clubs, it's more like a target that I have to keep pursuing and with that, I am able to keep a positive and stabilize financial attitude that keeps my business money [safe] and growing even-*

tually." In addition, some groups discussed whether one should save from the principal or from the profits.

The fourth week focused on income diversification. Participants discussed the various income streams that they had and how they managed them (for instance, bike taxi service in the morning and selling minutes and data in the evening). The challenges of having multiple income streams were also discussed: insufficient capital to start a new business and the risk involved in doing so, the difficulties of managing multiple businesses simultaneously, and the possible necessity of relying on someone who may be dishonest.

In the fifth week, the participants discussed how they found motivation and inspiration as a small business owner and how they managed stress. The extra income, financial independence, respect from friends and family, and female empowerment came up as the main sources of motivation. Furthermore, the participants shared their experiences about times when they felt like giving up (COVID, harassment by city police, customers who bought goods on credit refusing to pay back, etc.) and how they managed to keep going.

In the final week, participants reflected on what they had learned over the past weeks as well as avenues for business growth. The pros and cons of registering a small business came up as one of the talking points. The participants also talked about the changes that they planned to implement or had already implemented in their business strategies. The sessions on sales strategies, saving strategies and business diversification were often mentioned as having a big impact. Below are examples of what a couple of participants said, quoted verbatim:

"I never used to give things out for sell-pay[13]*, but I learned from this meeting from a fellow colleague that customers can be trusted depending on the relation-*

[13]"Sell-pay" means selling on credit.

ship and I started giving goods out for sell-pay which has boosted my business to another level. Now my customers wait for me to bring goods before buying as they don't wanna buy from anyone else because of the relationship we have built over the time."

"I learned a lot from my friends during these six weeks. Firstly, I learned about having another source of income and I've already tried it and it's working for me. Before I started this meeting I was selling only flour but after one of the meetings I decided to apply what I learned so I start frying kala and it's going so well. I also learned how to manage my money and avoid spending on things that will break the business to collapse. Now whenever I come from buying my business I can sit and calculate all my expenses and then decide on how much I will sell the goods and how much profit I will get."

4 Empirical Results

4.1 Attrition

Of the 1,131 entrepreneurs in the sample, 1,039 completed the endline survey, implying an attrition rate of approximately 8 percent. The 92 non-respondents include five entrepreneurs who died or migrated between survey waves. Attrition is balanced across treatment arms: 404 of 435 treated entrepreneurs responded at endline (7.2 percent attrition), compared with 635 of 696 control entrepreneurs (8.8 percent attrition). Appendix Table A.2 shows that endline respondents and non-respondents are balanced on baseline characteristics.

4.2 Sample Balance

Table 4 reports balance between treatment and control groups, conditional on endline response. Most baseline characteristics are well balanced, with

small and statistically insignificant differences. One exception is business revenue, which motivates the inclusion of a control for baseline revenueâdiscretized as above or below the medianâin all specifications.

TABLE 4: BALANCE TABLE, CONDITIONAL ON ANSWERING THE ENDLINE SURVEY

	(1)		(2)		(1)-(2)	
	Not invited to discussion groups		Invited to discussion groups		Pairwise t-test	
Variable	N	Mean/(SD)	N	Mean/(SD)	N	P-value
Female	635	0.808	404	0.795	1039	0.599
		(0.394)		(0.405)		
Age	635	36.910	404	37.163	1039	0.736
		(11.922)		(11.671)		
Single	635	0.372	404	0.358	1039	0.649
		(0.484)		(0.479)		
No. of hh members	635	4.526	403	4.553	1038	0.860
		(2.464)		(2.389)		
Literate	635	0.608	403	0.620	1038	0.688
		(0.489)		(0.486)		
Has formal education	635	0.704	403	0.734	1038	0.288
		(0.457)		(0.442)		
Age at first employment	635	21.246	404	21.584	1039	0.369
		(5.836)		(6.051)		
Poverty score (intake)	635	29.222	404	30.857	1039	0.087*
		(14.842)		(15.204)		
Risk aversion index	635	3.562	404	3.439	1039	0.064*
		(0.995)		(1.111)		
No. of businesses owned in past 5 years	635	1.405	403	1.397	1038	0.852
		(0.659)		(0.632)		
Has an active business	635	0.891	403	0.878	1038	0.523
		(0.311)		(0.327)		
Business motivation index	635	0.948	404	0.937	1039	0.169
		(0.120)		(0.132)		
Business support activities index	635	0.669	404	0.678	1039	0.590
		(0.288)		(0.269)		
Business challenges index	625	5.199	399	5.241	1024	0.740
		(2.006)		(2.010)		
Total revenues	635	43.682	403	36.352	1038	0.015**
		(51.104)		(40.788)		
Total cost	635	27.701	403	24.629	1038	0.287
		(46.966)		(42.437)		
Profits	635	15.980	403	11.723	1038	0.128
		(46.590)		(39.187)		

Notes : All variables are measured at baseline, with the sole exception of poverty score. The business motivation index combines respondents' level of agreement to 6 statements on their reasons for running a business. The higher the index, the higher the level of motivation to run a business. The business support activities index combines how often respondents undertake 9 different activities such as advertising, offering discounts, etc. to support their business. The business challenges index averages how severely (measured on a 10-point scale) respondents face 7 different challenges such as access to finance, corruption, etc. The higher the index, the higher the severity of the challenges faced. Total revenues, total costs and profits have been computed by summing over all current businesses and winsorizing at the 5% level. The reference period for all three is the past week. The sample in this table is conditional on answering the endline survey.

4.3 Estimation Strategy

As described in Section 2, participants in the business discussion groups were drawn from a subsample of applicants to a government program that offered training and cash grants to selected firms. As a result, some entrepreneurs in our study participated in the discussion groups and also received a grant. Of the 1,131 entrepreneurs in the sample, 387 were grant recipients. Among the 435 entrepreneurs randomized into the discussion group intervention, 148 received grants, and among the 212 entrepreneurs who ultimately participated in the discussion groups, 74 were grant recipients. These figures imply that grant recipients were no more likely than non-recipients to participate in the discussion groups.

For expositional simplicity, the analysis that follows focuses on the effect of the business discussion groups alone, although the full specification includes indicators for receipt of the cash grant and an interaction between the two treatments. We find no evidence of complementarity between the interventions: the marginal effect of the discussion groups for entrepreneurs who also received the training and cash grant is not statistically significant. Full results, including the interaction estimates, are reported in Appendix Section A.2.

We estimate the effect of business discussion groups with the following specification:

$$y_{ij} = \alpha + \delta BDG_i(1 - T_{ij}) + \lambda(1 - BDG_i)T_{ij} + \gamma BDG_i T_{ij} + X_{ij}\beta + \epsilon_{ij}$$

where y_{ij} is the outcome of firm i in market j, BDG_i is a dummy that takes the value 1 if firm i is invited to participate in business discussion groups. T_{ij} is the cash grant treatment status ($T_{ij} = 1$ if firm i won the cash lottery, and $T_{ij} = 0$ if firm i did not), and X_{ij} is a vector of controls. α is the intercept, δ captures the effect of being invited to the business discussion

groups on firms that did not win the lottery. λ captures the effect of winning the grant lottery, on businesses who were not invited to the business discussion groups. γ captures the combined effect of being invited to the business discussion groups and winning the grant lottery.

Since not all businesses who were invited to participate in the business discussion groups actually participated, we also estimate the following specification, which uncovers the treatment-on-the-treated estimate:

$$y_{ij} = \alpha + \delta\widehat{BDG_i}(1 - T_{ij}) + \gamma\widehat{BDG_i}T_{ij} + \lambda(1 - \widehat{BDG_i})T_{ij} + X_{ij}\beta + \epsilon_{ij}$$

where $\widehat{BDG_i}$ is a dummy that takes the value 1 when firm i participates in the discussion groups, and is instrumented by BDG_i, a dummy that take the value 1 when firm i is invited to participate. Under some assumptions, the coefficient δ now captures the effect of participating in the intervention, on individuals that did not receive the cash grant.

Tables in the main text report only estimates of the coefficient of interest, δ. Estimates of the remaining coefficients, λ and γ, are reported in Appendix Section A.2.

4.4 Treatment Effect on Innovation and Business Practices

Table 5 reports treatment effects on measures of business innovation. Columns (1) and (2) show that treated entrepreneurs are 13 percentage points more likely to have adopted at least one business innovation in the past two years, relative to a control mean of 20.9 percentâan increase of approximately 62 percent. Innovations include adopting new input suppliers, introducing new products or services, changing marketing techniques, modifying production processes, or selling in new communities. Columns (3) and (4) show that the intervention also significantly increases an innovation adoption index, constructed as a standardized sum of these compo-

nents. Appendix Table A.9 reports treatment effects on the full set of innovation outcomes. The increase in the index is driven primarily by the adoption of new selling locations and changes in marketing techniques.

The experimental estimates indicate that the business discussion groups substantially increased the adoption of innovative business practices. To confirm the mechanisms underlying the effect of the treatment, we draw on moderator summaries of each discussion session, which provide systematic information on the topics covered but are not used for inference.

Consistent with the estimated treatment effects, business innovation was a recurring theme in the discussion groups. Of the 46 groups, 36 (78 percent) discussed marketing innovations at least once during the six-week intervention. These discussions included strategies such as improving product presentation, engaging more politely with customers, advertising with megaphones, and offering discounts. Similarly, 39 percent of groups discussed selling products in new geographic locations. These topics align closely with the components of the innovation index that exhibit the largest treatment effects, suggesting that peer-to-peer exchanges focused on practical, immediately implementable strategies. The following excerpt illustrates the nature of these discussions: *"I take the goods to different locations according to their market days, and it helps me a lot because people always buy whenever I visit a particular market site in the rural area."*

Participants in the business discussion groups also exhibit higher levels of financial planning. Columns (5) and (6) of Table 5 show a significant increase in a financial planning index, constructed as a standardized sum of indicators capturing knowledge and use of business plans, accounting records, and calculations of sales, losses, and profits. Disaggregated results indicate that this effect is driven primarily by increased knowledge of what a business plan is and a higher likelihood of having written one (Appendix Table A.10).

Finally, treated entrepreneurs display higher scores on a market intelligence index, although the estimated effect is smaller in magnitude and not statistically significant (columns (7) and (8) of Table 5). This index aggregates measures of competitor visits, customer feedback, discussions with suppliers about sector trends or price negotiation, and advertising activity. Examining the components separately reveals limited treatment effects, with the exception that treated participants are significantly more likely to use special offers to attract customers (Appendix Tables A.11 and A.12). Consistent with this pattern, 63 percent of discussion groups discussed the use of special offers–typically involving discounts, selling on credit, or delivery–during the intervention.

TABLE 5: AVERAGE IMPACT OF DISCUSSION GROUPS ON BUSINESS PRACTICES

	Innovation Adoption (any)		Innovation Adoption (index)		Financial Planning (index)		Market Intelligence (index)	
	Intent-to-Treat							
Randomized in BDG only	0.049*	0.067***	0.17**	0.21***	0.16**	0.18**	0.075	0.077
	(0.03)	(0.03)	(0.07)	(0.07)	(0.08)	(0.07)	(0.08)	(0.08)
	Treatment-on-the-Treated							
Participated in BDG only	0.096*	0.13***	0.33**	0.41***	0.31**	0.36**	0.15	0.15
	(0.05)	(0.05)	(0.14)	(0.13)	(0.15)	(0.15)	(0.15)	(0.15)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.209	0.209	-0.070	-0.070	-0.004	-0.004	-0.017	-0.017
Standard dev.	0.407	0.407	0.961	0.961	0.973	0.973	0.970	0.970
Observations	2168	2168	2168	2168	2168	2168	2168	2168

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). The outcome in columns (1) and (2) is a dummy that takes the value 1 if the interviewee has adopted at least one innovation in the past two years. The outcomes in columns (3) and (4) is a standardized sum of the same variables on innovation adoption. Outcomes on columns (5) and (6), and columns (7) and (8) are, respectively, standardized sums of questions about financial planning and market intelligence. The number of observations is the sum of baseline and endline observations.

4.5 Treatment Effect on Digitalization

Table 6 reports treatment effects on access to and use of mobile phones. Participants in the business discussion groups are 21 percentage points more

likely to live in a household that owns a mobile phone, relative to a control mean of 45 percentâan increase of 46 percent. They are also 16 percentage points more likely to be able to use a mobile phone, compared with a control mean of 36.2 percent. In addition, treated entrepreneurs spend more than three times as much time using their phones for business purposes as those in the control group. Notably, the endline survey was conducted approximately five to six months after the start of the intervention (and about four months after the final discussion session) and phone use was measured over the week preceding the survey. This timing suggests that the observed increase in phone usage is not solely a direct result of participating in the virtual discussion groups. At least 15 percent of discussion groups discussed how using mobile phones can be helpful for business purposes, most commonly in the context of contacting customers when new goods arrived.

Finally, among respondents who report saving, treated entrepreneurs are more likely to own a mobile money account. While 87 percent of savers in the control group report having a mobile money account, this share rises to 97 percent among treated savers, approaching full adoption.[14] Mobile money was frequently discussed during the group sessions, with at least 70 percent of groups mentioning its use. These discussions typically emphasized the perceived safety of mobile money and the ease of withdrawing funds.

[14]The question on mobile money account ownership was inadvertently asked only of respondents who reported saving; as a result, ownership is observed only among this subgroup.

TABLE 6: AVERAGE IMPACT OF DISCUSSION GROUPS ON PHONE USAGE

	Household owns a cellphone		Can use a cellphone		Use of phone for business (hours)		Has mobile money account	
	Intent-to-Treat							
Randomized in BDG only	0.11***	0.11***	0.079**	0.080**	0.95*	1.00*	0.056*	0.062**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.53)	(0.53)	(0.03)	(0.03)
	Treatment-on-the-Treated							
Participated in BDG only	0.21***	0.21***	0.15**	0.16**	1.85*	1.94*	0.094*	0.10**
	(0.08)	(0.08)	(0.07)	(0.07)	(1.04)	(1.03)	(0.05)	(0.05)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.450	0.450	0.362	0.362	0.921	0.921	0.870	0.870
Standard dev.	0.498	0.498	0.481	0.481	5.662	5.662	0.337	0.337
Observations	2168	2168	2168	2168	1038	1038	734	734

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Columns (3) and (4) refer to whether the respondent has the possibility to use a mobile phone (irrespective of the household owning a mobile phone). The first four columns are based on the full study sample, combining baseline and endline observations. Columns (5) and (6) report treatment effects on the number of hours the respondent spent using their phone for business in the week preceding the survey. The sample gets less than halved because this question was only asked at endline and because of survey attrition at endline. Columns (7) and (8) report the treatment effect on a dummy for owning an active mobile money account. This question was inadvertently only asked to the respondents who reported they were able to save, hence the drop in sample size.

Table 7 reports treatment effects on social media use. Participation in the business discussion groups does not significantly affect overall social media adoption. However, conditional on using social media, treated entrepreneurs are more than three times as likely to use these platforms for calls and business-related purposes. Although these effects are modest in absolute terms, they are large relative to the low baseline rates of social media use for calls or business in the control group.

TABLE 7: AVERAGE IMPACT OF DISCUSSION GROUPS ON SOCIAL MEDIA USAGE

	Social media user (Y/N)		Purpose for using social media: Calls		Purpose for using social media: Messages		Purpose for using social media: Business	
	Intent-to-Treat							
Randomized in BDG only	0.021	0.019	0.024*	0.023*	-0.00037	-0.000018	0.037**	0.038**
	(0.04)	(0.04)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
	Treatment-on-the-Treated							
Participated in BDG only	0.041	0.038	0.046*	0.045*	-0.00072	-0.0000055	0.072**	0.074**
	(0.08)	(0.08)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.446	0.446	0.027	0.027	0.036	0.036	0.032	0.032
Standard dev.	0.497	0.497	0.161	0.161	0.186	0.186	0.176	0.176
Observations	2168	2168	2168	2168	2168	2168	2168	2168

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Respondents are asked whether they use social media, and which platform. For each platform they are then asked what they use the social media platform for. Survey options are calls, messages, voice messages, group messages, social cohesion, entertainment, education, and business. Responses were then aggregated by respondent, over all platforms used. The number of observations in the sum of baseline and endline observations.

4.6 Treatment Effect of Discussion Groups on Social Networks

Table 8 reports treatment effects on participants' social networks. Participation in the business discussion groups does not affect the total number of acquaintancesâdefined as individuals outside the immediate household with whom respondents interact frequently, either through visits or being visited (columns (1)â(4)). Treated entrepreneurs report a larger number of acquaintances who are business owners, although this difference is not statistically significant (columns (5)â(6)). In contrast, the treatment has a large and statistically significant effect on the composition of social networks: the proportion of acquaintances who are business owners increases substantially among treated participants (columns (7)â(8)). This indicates that treated entrepreneurs are more likely to interact in person with other business owners, even though the overall size of their networks remains unchanged. Consistent with this pattern, treated participants are signifi-

cantly less likely to seek business advice from friends or family members (columns (9)â(10)).

Discussion group content aligns with these findings. Nearly 48 percent of groups discussed the importance of building contacts with other business owners, often emphasizing that partnerships can help firms grow faster, increase returns, and sustain motivation.

TABLE 8: AVERAGE IMPACT OF DISCUSSION GROUPS ON SOCIAL NETWORKS

	Has acquaintances		Number of acquaintances		Number of acquaintances business owners		Share of acquaintances business owners		Asked friends or family for business advice (Y/N)	
	Intent-to-Treat									
Randomized in BDG only	-0.018	-0.021	0.0075	-0.012	0.089	0.081	0.099***	0.10***	-0.075**	-0.065*
	(0.04)	(0.04)	(0.19)	(0.19)	(0.11)	(0.11)	(0.04)	(0.04)	(0.04)	(0.04)
	Treatment-on-the-Treated									
Participated in BDG only	-0.035	-0.041	0.015	-0.024	0.17	0.16	0.20***	0.20***	-0.15**	-0.13*
	(0.07)	(0.07)	(0.36)	(0.36)	(0.22)	(0.22)	(0.07)	(0.07)	(0.07)	(0.07)
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.725	0.725	1.890	1.890	1.125	1.125	0.630	0.630	0.675	0.675
Standard dev.	0.447	0.447	2.118	2.118	1.406	1.406	0.398	0.398	0.469	0.469
Observations	1037	1037	1037	1037	1037	1037	746	746	2168	2168

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Acquaintances are defined as people outside their immediate household whom they visit frequently or who visit them. The first 6 columns are based on the full sample, but only counting endline observations. Columns (7) and (8) exclude respondents who report 0 acquaintances, for whom the share of business owners amongst acquaintances therefore cannot be computed. Columns (9) and (10) are also based on the full sample, but summing both baseline and endline observations.

4.7 Treatment Effect of Discussion Groups on Business Profits and Savings

Table 9 reports average treatment effects on revenues, costs, profits, and personal savings measured in the week preceding the endline survey. On average, treated entrepreneurs report slightly lower revenues and higher costs, though these differences are not statistically significant. One possible interpretation is that treated entrepreneurs were experimenting with new marketing techniques, products, services, or sales locations. Treated

participants also report lower business profits on average; while the estimated effect is sizable, it is not statistically significant. We similarly find no significant average treatment effects on personal savings.

TABLE 9: AVERAGE IMPACT OF DISCUSSION GROUPS ON BUSINESS PROFITS

	Business Revenues (USD)		Business Costs (USD)		Business Profits (USD)		Personal Savings (USD)	
	Intent-to-Treat							
Randomized in BDG only	-2.30	2.0e-15	2.97	4.74	-5.26	-4.74	-0.11	0.25
	(5.49)	(.)	(4.94)	(4.13)	(4.98)	(4.13)	(7.70)	(7.33)
	Treatment-on-the-Treated							
Participated in BDG only	-4.49	1.0e-14***	5.80	9.20	-10.3	-9.20	-0.20	0.42
	(10.75)	(0.00)	(9.69)	(8.06)	(9.74)	(8.06)	(15.03)	(14.25)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	48.661	48.661	34.017	34.017	14.644	14.644	70.137	70.137
Standard dev.	64.739	64.739	59.225	59.225	58.488	58.488	91.847	91.847
Observations	2168	2168	2168	2168	2168	2168	2109	2109

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Variables on revenues, costs, and profits, are asked separately for all the businesses owned by the respondent, and then aggregated over all the respondent's businesses. These questions refer to the past week. Personal savings are asked separately from questions on businesses. This question refers to the past three months. The sample size for personal savings is smaller as some respondents refused to respond or did not know the answer. All outcomes in this table are winsorized at the five percent level. The number of observations is the sum of baseline and endline observations.

Table 10 reports treatment effects on saving behavior among entrepreneurs who report saving. Treated participants are approximately 13 percentage points less likely to save in cash, relative to a control mean of 20 percent. While estimates for other saving modalities–including savings groups, mobile money, and bank accounts–are positive, they are not statistically significant. This pattern is consistent with themes raised in the discussion groups, where participants frequently emphasized the risks of holding savings in cash, including the need to keep cash out of reach as a commitment device.

TABLE 10: AVERAGE IMPACT OF DISCUSSION GROUPS ON SAVINGS

	Savings (Y/N)		Typically saves in saving group		Typically saves in mobile money		Typically saves in cash		Typically saves in bank account	
	Intent-to-Treat									
Randomized in BDG only	-0.031	-0.026	0.0043	0.0044	0.036	0.032	-0.086**	-0.080**	0.014	0.014
	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)
	Treatment-on-the-Treated									
Participated in BDG only	-0.061	-0.050	0.0071	0.0074	0.060	0.053	-0.14**	-0.13**	0.023	0.023
	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.06)	(0.06)	(0.05)	(0.05)
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.663	0.663	0.456	0.456	0.312	0.312	0.207	0.207	0.092	0.092
Standard dev.	0.473	0.473	0.499	0.499	0.464	0.464	0.405	0.405	0.290	0.290
Observations	2167	2167	734	734	734	734	734	734	734	734

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Savings refer to the period of the last three months. Columns (1) and (2) are based on the full study sample, summing both baseline and endline observations. Questions on where the respondent typically saves were only asked at endline, and (inadvertently) only to respondents who indicated having saved in the past three months, hence the smaller number of observations for columns (3)-(10).

4.8 Heterogeneity of treatment effects

Table 11 examines heterogeneity in treatment effects along selected group- and individual-level characteristics.[15]

Columns (1) and (2) show that smaller discussion groups and more sector-homogeneous groups exhibit larger treatment effects on innovation adoption and business network outcomes.[16] Because treatment is interacted with the heterogeneity indicators, the reported coefficients capture differential effects across groups; when the heterogeneity variable is binary, treatment effects for each subgroup are given by the relevant linear combinations.[17] Smaller group size and sector homogeneity may have facilitated more intensive interactions and the formation of stronger peer rela-

[15]For brevity, the table reports a subset of the heterogeneity analyses conducted; additional results are available upon request.

[16]Group homogeneity is defined as a binary indicator equal to one if the share of group members operating in the same sector–either food and drink retail or clothing and footwear–lies between one-fourth and three-fourths.

[17]Binary heterogeneity variables ensure support across treatment arms.

tionships that persisted beyond the intervention period. These differences, however, do not translate into statistically significant effects on revenues or savings.

We also examine other group-level characteristics, including the share of men in the group, average education, and the share of grant recipients. Treatment effects are modestly–but not statistically significantly–larger in groups with a higher share of men (although men never constitute more than 50 percent of any group), lower average education, and fewer grant recipients.

Turning to individual-level heterogeneity (columns (3) and (4)), entrepreneurs who started working early in life and those who were highly exposed to conflict during the Liberian civil war are more likely to adopt innovative practices and to interact with other business owners, although these effects are not statistically significant.[18] For both groups, these patterns are associated with significantly higher revenues, and for early labor market entrants, significantly higher savings. These findings are consistent with the idea that entrepreneurs with limited prior access to high-quality business networks stand to benefit disproportionately from structured peer-to-peer interactions.

Finally, we explore heterogeneity by gender, age, education, marital status, and household size. While some of these characteristics are associated with significant effects for specific outcomes, none consistently moderates the treatment effects across the main outcomes of interest.

Given the limited sample size and the exploratory nature of the heterogeneity analysis, the results in this section should be interpreted with caution. The estimates are not adjusted for multiple hypothesis testing and are intended to highlight suggestive patterns rather than provide definitive evidence on subgroup-specific treatment effects. Nonetheless, the het-

[18] Liberia experienced two civil wars between 1989 and 2003, marked by widespread violence, destruction, and displacement, with persistent effects on human capital accumulation and social networks.

erogeneity patterns we document are consistent with the proposed mechanisms of peer learning and network formation and help clarify which types of entrepreneurs and group structures may benefit most from the intervention.

TABLE 11: HETEROGENEITY IN TREATMENT EFFECT BY KEY VARIABLES

	Group size	Non homoge -nous group	Age started working	Exposure to war
PANEL A: INNOVATION INDEX				
Participated in BDG	3.13	0.56**	0.33	0.19
	(2.69)	(0.23)	(0.21)	(0.22)
Participated in BDG ∗ Heterogeneity	-0.56	-0.30	0.12	0.26
	(0.53)	(0.24)	(0.25)	(0.25)
Control Mean	-0.070	-0.070	-0.070	-0.070
Observations	2167	2167	2167	2041
PANEL B: BUSINESS NETWORKS				
Participated in BDG	2.85*	0.30**	0.16	0.12
	(1.62)	(0.13)	(0.12)	(0.11)
Participated in BDG ∗ Heterogeneity	-0.54*	-0.20	0.05	0.11
	(0.32)	(0.13)	(0.14)	(0.14)
Control Mean	0.630	0.630	0.630	0.630
Observations	745	745	745	697
PANEL C: REVENUES				
Participated in BDG	-2.48	8.05	27.28**	-19.59
	(169.49)	(14.71)	(13.34)	(13.92)
Participated in BDG ∗ Heterogeneity	1.74	-4.07	-33.10**	39.61**
	(33.29)	(15.11)	(15.59)	(16.06)
Control Mean	48.661	48.661	48.661	48.661
Observations	2167	2167	2167	2041
PANEL D: SAVINGS				
Participated in BDG	-224.75	-1.59	42.75**	3.09
	(267.08)	(23.20)	(20.85)	(22.09)
Participated in BDG ∗ Heterogeneity	47.74	19.84	-54.10**	5.37
	(52.44)	(23.83)	(24.52)	(25.30)
Control Mean	70.137	70.137	70.137	70.137
Observations	2108	2108	2108	1983

Notes : Standard errors are in parentheses and are robust. All regressions are 2SLS regressions with controls. 'Non-homogeneous group' is a dummy variable =1 if the share of the minority sector is at least a quarter. 'Age started working' is a dummy variable =1 if the respondent belongs to the top two terciles of the distribution of age at which someone starts working. 'Exposure to war' is a dummy =1 if at the time of war, the respondent was located in an area with an above median exposure to war.

5 Linking Discussion Content to Outcome Patterns

In this section, we analyze the content of discussions recorded by moderators and examine how it relates to observed treatment effects.[19] Importantly, discussion content is recorded during the implementation of the intervention and is measured several months prior to the outcome data, which allows us to relate treatment effects to pre-outcome variation in discussion topics.

The analysis is carried out as follows. For each of 22 key outcomes, we use a large language model (LLM) to classify whether the corresponding topic was discussed by a group at any point during the six-week intervention. The exact prompt, classification procedure, and validation steps are described in Appendix A.3. The classification is blinded to outcome data, in the sense that whether a topic is coded as having been discussed is determined independently of the estimated treatment effect for the corresponding outcome. Table 12 reports summary statistics on the number of groups that discussed each topic, based on a combination of automated classification and human review.

[19] As noted earlier, discussion notes are available for the majority of meetings (91 percent); however, because discussions cannot be linked to specific groups, discussion content cannot be matched to individual participants.

TABLE 12: SUMMARY STATISTICS ON NUMBER OF GROUPS THAT DISCUSSED A GIVEN TOPIC

Outcome	# of groups that discussed it
Buying inputs from new suppliers	4
Selling new products	40
Using new marketing techniques	36
Using new production processes	10
Selling at new location	18
Writing a business plan	0
Keeping accounting books	12
Calculating sales, profits and losses	15
Visiting competitors to check prices	13
Visiting competitors to check products	7
Asking customers their preferences	20
Asking former customers why they stopped buying	4
Asking suppliers about trending products	0
Using a special offer to attract customers	29
Doing advertisement	15
Negotiating lower prices with suppliers	3
Comparing different suppliers	0
Using cellphone for business	7
Using social media for business	0
Using a mobile money for business	32
Creating contacts with other business owners	22
Who to ask for business advice	4

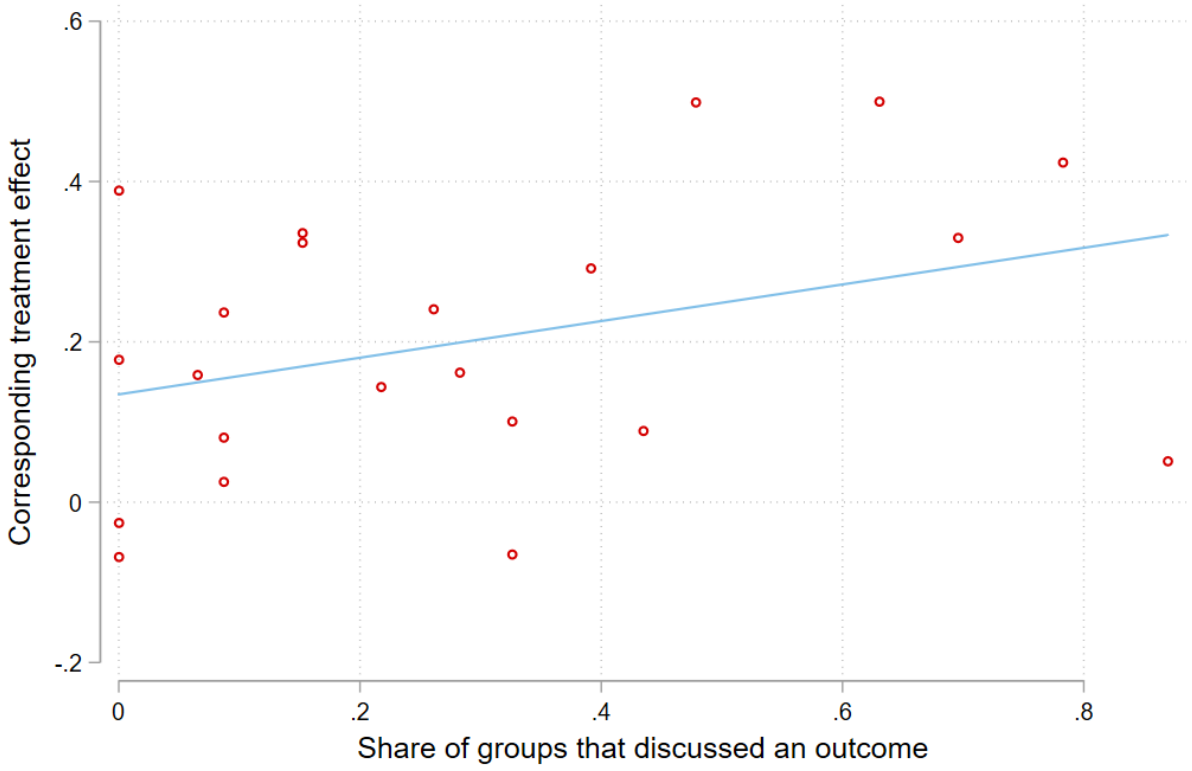
Notes : Table based on text analysis of group meeting notes done using an AI-based algorithm. In cases where the AI-generated probability of a group having discussed a given topic was below 0.5, human judgment was used to determine if the group did indeed discuss that topic. Total number of groups across all communities was 46.

In a next step, we standardize each of the 22 outcome variables with respect to the control group at endline to facilitate comparability across outcomes. We then plot, for each outcome, the share of discussion groups that addressed the corresponding topic (x-axis) against the standardized treatment effect on that outcome (y-axis). Figure 2 presents this relationship, with each point representing one outcome variable. For example, the point (0.78, 0.42) corresponds to the outcome "new marketing techniques": 78 percent of groups discussed marketing strategies, and the estimated treatment effect on adoption of new marketing techniques at endline is 0.42

standard deviations. The correlation between discussion frequency and treatment effects is 0.35 and is marginally statistically significant at the 10 percent level (p-value = 0.1055).

Overall, outcomes corresponding to more frequently discussed topics tend to exhibit larger treatment effects, consistent with the intervention's proposed theory of change. This pattern is difficult to reconcile with explanations based solely on generic survey response effects, such as a pure Hawthorne effect, and instead suggests that the specific content of peer interactions plays an important role in shaping observed outcomes.

FIGURE 2: FREQUENCY OF DISCUSSION TOPICS AND TREATMENT EFFECTS



Notes: This figure plots the share of groups that discussed a given topic against the treatment effect on the corresponding outcome variable (standardized). There are 22 points in total, each representing a key outcome variable. The correlation is 0.35 with a p-value of 0.1055.

6 Conclusion

This paper studies whether virtual peer-to-peer interactions can improve business practices and outcomes among micro-entrepreneurs in a low-income setting. Using a randomized evaluation in Liberia, we examine the effects of weekly phone-based discussion groups among small business owners, an intervention designed to facilitate information exchange in contexts where access to formal training and business networks is limited. We find that participation in these discussion groups leads to meaningful changes in business behavior, particularly in the adoption of innovative practices, financial planning, digital technology use, and the composition of entrepreneurs' business networks. While we do not find statistically significant average effects on short-term profits or revenues, we document substantial heterogeneity in impacts. Revenue gains are concentrated among entrepreneurs that plausibly faced weaker access to high-quality business networks prior to the intervention.

A distinctive feature of the study is the availability of detailed discussion content, which we use to shed light on mechanisms without altering identification. Analysis of moderator notes reveals that the topics most frequently discussedâsuch as marketing strategies, selling in new locations, mobile phone use, and saving practicesâclosely align with the outcomes exhibiting the largest treatment effects. A descriptive mediation analysis further shows a positive association between the frequency with which a topic was discussed and the magnitude of the corresponding treatment effect, providing suggestive support for the intervention's theory of change.

Our results have important implications for business development programs in developing economies. More broadly, the results highlight the potential of leveraging the relatively low cost and scalability of virtual platforms to facilitate context-specific learning and network formation among

small business owners. Future research could explore the longer-term impacts of such interventions and examine how the structure of discussion groups shapes the topics and discussions to optimize their effectiveness.

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A Appendix

A.1 Moderators' Training Syllabus

- Session 1: Icebreaker Activity
- Session 2: Introduction / Project Background
  - Introduction - Give an overview of the project and the objectives as well as the role they will pay.
- Session 3: Small Business Basics
  - Understanding how micro enterprises function - In this session we will break down the business basics of micro enterprises and how they function. This will help give the moderators a better understanding of the business position of the small group participants.
  - The Value Chain - In this session we will go through the value chain from vegetable production to sale. This will provide context to the specific business that the small group participants are involved in and will shed light on the experiences of the participants.
- Session 4: Moderating Small Groups
  - Introduction to the small groups - overview of the small groups, their purpose and their goals as well as an introduction to the rules of the small group discussions.
  - Roles and Responsibilities - In this session we will go through the moderator's roles and responsibilities, moderator's authority and characteristics of effective moderation.

- Communication Skills - This session will cover effective communication strategies, conflict resolution and de-escalation techniques, and best practices with communicating in small groups.
- Group Management - This session will cover, understanding group dynamics, managing group norms and culture, encouraging participation, and facilitation.
- Technical Training - This session will go through how to use the platform and it features, using moderation tools, and troubleshooting when there are technical issues.
- Group Exercises - In this session we will do some practical group exercises.

A.2 Additional Tables

Business Discussion Groups, Descriptive Statistics

TABLE A.1: STATED INTEREST AND ACTUAL PARTICIPATION

	Participated in Discussion Groups	
Expressed Interest in Participating	-0.0525	-0.0566
	(0.0571)	(0.0573)
Controls	NO	YES
Control Mean	0.487	0.487
Observations	433	433

Notes : The sample in this table is the set of individuals who were invited to participate in the Business Group Discussions. The number of observations is 433 instead of 435 because of the 2 individuals who did not answer the question on interest in participation at baseline.

Attrition

TABLE A.2: BALANCE TABLE OF BASELINE VARIABLES BETWEEN ENDLINE RESPONDENTS AND NON-RESPONDENTS

	(1)		(2)		(1)-(2)	
	Did not respond at endline		Responded at endline		Pairwise t-test	
Variable	N	Mean/(SD)	N	Mean/(SD)	N	P-value
Female	92	0.804	1039	0.803	1131	0.970
		(0.399)		(0.398)		
Age	92	37.450	1039	37.008	1131	0.735
		(13.735)		(11.820)		
Single	92	0.387	1039	0.366	1131	0.697
		(0.487)		(0.482)		
No. of hh members	91	4.374	1038	4.537	1129	0.543
		(2.606)		(2.434)		
Literate	91	0.615	1038	0.613	1129	0.960
		(0.489)		(0.487)		
Has formal education	91	0.659	1038	0.716	1129	0.255
		(0.477)		(0.451)		
Age at first employment	92	20.307	1039	21.377	1131	0.095*
		(5.453)		(5.920)		
Poverty score (intake)	92	31.599	1039	29.857	1131	0.290
		(16.571)		(14.998)		
Risk aversion index	92	3.614	1039	3.514	1131	0.376
		(0.958)		(1.043)		
No. of businesses owned in past 5 years	91	1.418	1038	1.402	1129	0.823
		(0.634)		(0.648)		
Has an active business	91	0.868	1038	0.886	1129	0.603
		(0.340)		(0.318)		
Business motivation index	92	0.951	1039	0.944	1131	0.579
		(0.132)		(0.124)		
Business support activities index	92	0.618	1039	0.672	1131	0.080*
		(0.307)		(0.281)		
Business challenges index	89	5.104	1024	5.215	1113	0.616
		(1.902)		(2.007)		
Total revenues	91	36.477	1038	40.836	1129	0.394
		(37.855)		(47.480)		
Total cost	91	24.729	1038	26.508	1129	0.717
		(41.564)		(45.266)		
Profits	91	11.749	1038	14.327	1129	0.587
		(38.185)		(43.894)		

Notes : All variables are measured at baseline, with the sole exception of poverty score. The business motivation index combines respondents' level of agreement to 6 statements on their reasons for running a business. The higher the index, the higher the level of motivation to run a business. The business support activities index combines how often respondents undertake 9 different activities such as advertising, offering discounts, etc. to support their business. The business challenges index averages how severely (measured on a 10-point scale) respondents face 7 different challenges such as access to finance, corruption, etc. The higher the index, the higher the severity of the challenges faced. Total revenues, total costs and profits have been computed by summing over all current businesses and winsorizing at the 5% level. The reference period for all three is the past week. This table is based on the full study sample.

Full Regression Tables

Estimation Strategy

This section presents the full output of our empirical specification which is being reproduced here as a reminder:

$$y_{ij} = \alpha + \delta BDG_i(1 - T_{ij}) + \gamma BDG_i T_{ij} + \lambda(1 - BDG_i)T_{ij} + X_{ij}\beta + \epsilon_{ij}$$

and

$$y_{ij} = \alpha + \delta\widehat{BDG_i}(1 - T_{ij}) + \gamma\widehat{BDG_i}T_{ij} + \lambda(1 - \widehat{BDG_i})T_{ij} + X_{ij}\beta + \epsilon_{ij}$$

Each regression table in this section also includes three additional lines at the bottom of the table for the three pairwise coefficient equivalence tests: the test for $\delta = \gamma$, for $\delta = \lambda$ and for $\gamma = \lambda$.

Treatment Effect on Innovation and Business Practices

TABLE A.3: AVERAGE IMPACT OF DISCUSSION GROUPS ON BUSINESS PRACTICES

	Innovation Adoption (any)		Innovation Adoption (index)		Financial Planning (index)		Market Intelligence (index)	
	Intent-to-Treat							
Randomized in BDG only	0.049*	0.067***	0.17**	0.21***	0.16**	0.18**	0.075	0.077
	(0.03)	(0.03)	(0.07)	(0.07)	(0.08)	(0.07)	(0.08)	(0.08)
Won Lottery only	0.14***	0.12***	0.50***	0.43***	1.18***	1.18***	0.14*	0.11
	(0.03)	(0.03)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Randomized in BDG and Won Lottery	0.15***	0.11***	0.42***	0.30***	1.21***	1.18***	0.20**	0.18*
	(0.03)	(0.03)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)
Pval BDG=Both	0.004	0.251	0.010	0.378	0.000	0.000	0.232	0.332
Pval Grant=Both	0.775	0.751	0.392	0.163	0.767	0.992	0.602	0.534
Pval BDG=Grant	0.003	0.097	0.000	0.010	0.000	0.000	0.450	0.685
	Treatment-on-the-Treated							
Participated in BDG only	0.096*	0.13***	0.33**	0.41***	0.31**	0.36**	0.15	0.15
	(0.05)	(0.05)	(0.14)	(0.13)	(0.15)	(0.15)	(0.15)	(0.15)
Won Lottery only	0.14***	0.12***	0.50***	0.43***	1.18***	1.18***	0.14*	0.12
	(0.03)	(0.03)	(0.08)	(0.08)	(0.08)	(0.09)	(0.08)	(0.08)
Participated in BDG and Won Lottery	0.29***	0.21***	0.80***	0.57***	2.33***	2.28***	0.38**	0.35*
	(0.06)	(0.06)	(0.18)	(0.17)	(0.19)	(0.19)	(0.18)	(0.19)
Pval BDG=Both	0.004	0.248	0.012	0.374	0.000	0.000	0.242	0.331
Pval Grant=Both	0.015	0.128	0.079	0.372	0.000	0.000	0.181	0.191
Pval BDG=Grant	0.356	0.802	0.191	0.878	0.000	0.000	0.966	0.807
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.209	0.209	-0.070	-0.070	-0.004	-0.004	-0.017	-0.017
Standard dev.	0.407	0.407	0.961	0.961	0.973	0.973	0.970	0.970
Observations	2168	2168	2168	2168	2168	2168	2168	2168

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). The outcome in columns (1) and (2) is a dummy that takes the value 1 if the interviewee has adopted at least one "innovation" in the past two years. The outcomes in columns (3) and (4) is a standardized sum of the same variables on innovation adoption. Outcomes on columns (5) and (6), and columns (7) and (8) are, respectively, standardized sums of questions about financial planning and market intelligence. The reported p-values are from chi-2 tests for equality of regression coefficients. The number of observations in the sum of baseline and endline observations.

Treatment Effect on Digitalization

TABLE A.4: AVERAGE IMPACT OF DISCUSSION GROUPS ON PHONE USAGE

	Household owns a cellphone		Can use a cellphone		Use of phone for business (hours)		Has mobile money account	
	Intent-to-Treat							
Randomized in BDG only	0.11***	0.11***	0.079**	0.080**	0.95*	1.00*	0.056*	0.062**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.53)	(0.53)	(0.03)	(0.03)
Won Lottery only	-0.022	-0.044	-0.043	-0.051	0.80	0.50	0.12***	0.10***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.56)	(0.64)	(0.03)	(0.03)
Randomized in BDG and Won Lottery	-0.034	-0.054	-0.0015	-0.0091	0.78	0.48	0.11***	0.090**
	(0.05)	(0.05)	(0.05)	(0.05)	(0.66)	(0.73)	(0.03)	(0.04)
Pval BDG=Both	0.007	0.003	0.108	0.088	0.814	0.508	0.149	0.473
Pval Grant=Both	0.829	0.855	0.421	0.420	0.985	0.982	0.680	0.699
Pval BDG=Grant	0.004	0.002	0.005	0.004	0.804	0.475	0.038	0.250
	Treatment-on-the-Treated							
Participated in BDG only	0.21***	0.21***	0.15**	0.16**	1.85*	1.94*	0.094*	0.10**
	(0.08)	(0.08)	(0.07)	(0.07)	(1.04)	(1.03)	(0.05)	(0.05)
Won Lottery only	-0.022	-0.043	-0.043	-0.050	0.80	0.53	0.12***	0.10***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.56)	(0.65)	(0.03)	(0.03)
Participated in BDG and Won Lottery	-0.065	-0.100	-0.0029	-0.015	1.50	0.99	0.20***	0.17**
	(0.09)	(0.10)	(0.09)	(0.09)	(1.27)	(1.41)	(0.06)	(0.07)
Pval BDG=Both	0.007	0.003	0.104	0.089	0.795	0.526	0.101	0.346
Pval Grant=Both	0.635	0.533	0.644	0.692	0.565	0.713	0.169	0.259
Pval BDG=Grant	0.001	0.001	0.005	0.004	0.282	0.169	0.562	0.970
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.450	0.450	0.362	0.362	0.921	0.921	0.870	0.870
Standard dev.	0.498	0.498	0.481	0.481	5.662	5.662	0.337	0.337
Observations	2168	2168	2168	2168	1038	1038	734	734

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). The first four columns are based on the full study sample, combining baseline and endline observations. Columns (5) and (6) report treatment effects on the number of hours the respondent spent using their phone for business in the week preceding the survey. The sample gets less than halved because this question was only asked at endline and because of survey attrition at endline. Columns (7) and (8) report the treatment effect on a dummy for owning an active mobile money account. This question was inadvertently only asked to the respondents who reported they were able to save, hence the drop in sample size. The reported p-values are from chi-2 tests for equality of regression coefficients.

TABLE A.5: AVERAGE IMPACT OF DISCUSSION GROUPS ON SOCIAL MEDIA USAGE

	Social media user (Y/N)		Purpose for using social media: Calls		Purpose for using social media: Messages		Purpose for using social media: Business	
	Intent-to-Treat							
Randomized in BDG only	0.021	0.019	0.024*	0.023*	-0.00037	-0.000018	0.037**	0.038**
	(0.04)	(0.04)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Won Lottery only	0.066	0.074*	0.019	0.017	-0.0086	-0.0040	0.051***	0.049***
	(0.04)	(0.04)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Randomized in BDG and Won Lottery	-0.051	-0.036	0.028*	0.028	-0.018	-0.013	0.025	0.023
	(0.05)	(0.05)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Pval BDG=Both	0.168	0.306	0.799	0.769	0.388	0.530	0.586	0.507
Pval Grant=Both	0.029	0.039	0.600	0.532	0.659	0.658	0.242	0.244
Pval BDG=Grant	0.314	0.247	0.742	0.713	0.639	0.829	0.447	0.580
	Treatment-on-the-Treated							
Participated in BDG only	0.041	0.038	0.046*	0.045*	-0.00072	-0.0000055	0.072**	0.074**
	(0.08)	(0.08)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Won Lottery only	0.066	0.074*	0.019	0.017	-0.0086	-0.0040	0.051***	0.049***
	(0.04)	(0.04)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Participated in BDG and Won Lottery	-0.098	-0.068	0.054*	0.055*	-0.034	-0.025	0.049	0.046
	(0.09)	(0.10)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Pval BDG=Both	0.168	0.305	0.820	0.765	0.392	0.530	0.564	0.510
Pval Grant=Both	0.069	0.115	0.250	0.224	0.466	0.545	0.955	0.937
Pval BDG=Grant	0.723	0.616	0.265	0.277	0.779	0.888	0.465	0.402
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.446	0.446	0.027	0.027	0.036	0.036	0.032	0.032
Standard dev.	0.497	0.497	0.161	0.161	0.186	0.186	0.176	0.176
Observations	2168	2168	2168	2168	2168	2168	2168	2168

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Respondents are asked whether they use social media, and which platform. For each platform they are then asked what they use the social media platform for. Survey options are calls, messages, voice messages, group messages, social cohesion, entertainment, education, and business. Responses were then aggregated by respondent, over all platforms used. The reported p-values are from chi-2 tests for equality of regression coefficients. The number of observations in the sum of baseline and endline observations.

Treatment Effect of Discussion Groups on Social Networks

TABLE A.6: AVERAGE IMPACT OF DISCUSSION GROUPS ON SOCIAL NETWORKS

	Has acquaintances		Number of acquaintances		Number of acquaintances business owners		Share of acquaintances business owners		Asked friends or family for business advice (Y/N)	
	Intent-to-Treat									
Randomized in BDG only	-0.018	-0.021	0.0075	-0.012	0.089	0.081	0.099***	0.10***	-0.075**	-0.065*
	(0.04)	(0.04)	(0.19)	(0.19)	(0.11)	(0.11)	(0.04)	(0.04)	(0.04)	(0.04)
Won Lottery only	-0.042	-0.053	-0.052	-0.085	0.051	0.082	0.053	0.057	0.0040	0.0065
	(0.04)	(0.04)	(0.20)	(0.23)	(0.12)	(0.14)	(0.04)	(0.04)	(0.04)	(0.04)
Randomized in BDG and Won Lottery	-0.090**	-0.096*	-0.30	-0.30	-0.11	-0.072	0.057	0.055	0.062	0.054
	(0.04)	(0.05)	(0.23)	(0.26)	(0.14)	(0.15)	(0.05)	(0.05)	(0.05)	(0.05)
Pval BDG=Both	0.123	0.153	0.221	0.295	0.182	0.356	0.394	0.412	0.005	0.018
Pval Grant=Both	0.323	0.376	0.339	0.398	0.295	0.317	0.934	0.971	0.252	0.334
Pval BDG=Grant	0.548	0.497	0.784	0.769	0.768	0.994	0.268	0.367	0.065	0.107
	Treatment-on-the-Treated									
Participated in BDG only	-0.035	-0.041	0.015	-0.024	0.17	0.16	0.20***	0.20***	-0.15**	-0.13*
	(0.07)	(0.07)	(0.36)	(0.36)	(0.22)	(0.22)	(0.07)	(0.07)	(0.07)	(0.07)
Won Lottery only	-0.042	-0.054	-0.052	-0.085	0.051	0.085	0.053	0.061	0.0040	0.0058
	(0.04)	(0.04)	(0.20)	(0.23)	(0.12)	(0.14)	(0.04)	(0.04)	(0.04)	(0.04)
Participated in BDG and Won Lottery	-0.17**	-0.19*	-0.57	-0.58	-0.21	-0.13	0.11	0.12	0.12	0.10
	(0.09)	(0.10)	(0.45)	(0.50)	(0.27)	(0.30)	(0.09)	(0.10)	(0.09)	(0.09)
Pval BDG=Both	0.127	0.147	0.222	0.290	0.180	0.359	0.398	0.468	0.005	0.018
Pval Grant=Both	0.108	0.117	0.228	0.264	0.311	0.416	0.506	0.546	0.178	0.253
Pval BDG=Grant	0.909	0.852	0.848	0.864	0.550	0.735	0.035	0.058	0.029	0.053
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.725	0.725	1.890	1.890	1.125	1.125	0.630	0.630	0.675	0.675
Standard dev.	0.447	0.447	2.118	2.118	1.406	1.406	0.398	0.398	0.469	0.469
Observations	1037	1037	1037	1037	1037	1037	746	746	2168	2168

Notes : Standard errors are in parentheses and are robust.Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). The first 6 columns are based on the full sample, but only counting endline observations. Columns (7) and (8) exclude respondents who report 0 acquaintances, for whom the share of business owners amongst acquaintances therefore cannot be computed. Columns (9) and (10) are also based on the full sample, but summing both baseline and endline observations. The reported p-values are from chi-2 tests for equality of regression coefficients.

Treatment Effect of Discussion Groups on Business Profits and Savings

TABLE A.7: AVERAGE IMPACT OF DISCUSSION GROUPS ON BUSINESS PROFITS

	Business Revenues (USD)		Business Costs (USD)		Business Profits (USD)		Personal Savings (USD)	
	Intent-to-Treat							
Randomized in BDG only	-2.30	2.0e-15	2.97	4.74	-5.26	-4.74	-0.11	0.25
	(5.49)	(.)	(4.94)	(4.13)	(4.98)	(4.13)	(7.70)	(7.33)
Won Lottery only	23.1***	-4.7e-15	18.2***	4.71	4.85	-4.71	78.1***	70.2***
	(5.79)	(.)	(5.21)	(4.63)	(5.25)	(4.63)	(8.19)	(8.29)
Randomized in BDG and Won Lottery	19.3***	-3.5e-15	29.2***	16.7***	-9.87	-16.7***	37.9***	31.4***
	(6.81)	(.)	(6.13)	(5.35)	(6.18)	(5.35)	(9.62)	(9.58)
Pval BDG=Both	0.003	.	0.000	0.037	0.485	0.037	0.000	0.002
Pval Grant=Both	0.618	.	0.104	0.034	0.031	0.034	0.000	0.000
Pval BDG=Grant	0.000	.	0.008	0.995	0.079	0.995	0.000	0.000
	Treatment-on-the-Treated							
Participated in BDG only	-4.49	1.0e-14***	5.80	9.20	-10.3	-9.20	-0.20	0.42
	(10.75)	(0.00)	(9.69)	(8.06)	(9.74)	(8.06)	(15.03)	(14.25)
Won Lottery only	23.1***	-1.8e-14***	18.2***	4.77	4.85	-4.77	78.1***	70.3***
	(5.80)	(0.00)	(5.22)	(4.65)	(5.25)	(4.65)	(8.21)	(8.34)
Participated in BDG and Won Lottery	37.1***	4.6e-16	56.0***	32.3***	-18.9	-32.3***	73.1***	60.8***
	(13.08)	(0.00)	(11.79)	(10.34)	(11.86)	(10.34)	(18.60)	(18.64)
Pval BDG=Both	0.003	0.000	0.000	0.036	0.498	0.036	0.000	0.002
Pval Grant=Both	0.268	0.000	0.001	0.004	0.038	0.004	0.780	0.584
Pval BDG=Grant	0.007	0.000	0.175	0.569	0.100	0.569	0.000	0.000
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	48.661	48.661	34.017	34.017	14.644	14.644	70.137	70.137
Standard dev.	64.739	64.739	59.225	59.225	58.488	58.488	91.847	91.847
Observations	2168	2168	2168	2168	2168	2168	2109	2109

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Variables on revenues, costs, and profits, are asked separately for all the businesses owned by the respondent, and then aggregated over all the respondent's businesses. These questions refer to the past week. Personal savings are asked separately from questions on businesses. This question refers to the past three months. The sample size for personal savings is smaller as some respondents refused to respond or did not know the answer. All outcomes in this tables are winsorized at the five percent level. The reported p-values are from chi-2 tests for equality of regression coefficients. The number of observations is the sum of baseline and endline observations.

TABLE A.8: AVERAGE IMPACT OF DISCUSSION GROUPS ON SAVINGS

	Savings (Y/N)		Typically saves in saving group		Typically saves in mobile money		Typically saves in cash		Typically saves in bank account	
	Intent-to-Treat									
Randomized in BDG only	-0.031	-0.026	0.0043	0.0044	0.036	0.032	-0.086**	-0.080**	0.014	0.014
	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)
Won Lottery only	0.24***	0.18***	0.033	0.0052	-0.014	0.039	-0.12***	-0.13***	0.064**	0.060*
	(0.04)	(0.04)	(0.05)	(0.06)	(0.04)	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)
Randomized in BDG and Won Lottery	0.22***	0.17***	-0.034	-0.052	0.14***	0.19***	-0.12***	-0.14***	0.045	0.042
	(0.04)	(0.05)	(0.06)	(0.06)	(0.05)	(0.06)	(0.04)	(0.05)	(0.03)	(0.04)
Pval BDG=Both	0.000	0.000	0.526	0.410	0.070	0.012	0.514	0.234	0.413	0.512
Pval Grant=Both	0.795	0.841	0.251	0.326	0.005	0.005	0.988	0.826	0.591	0.622
Pval BDG=Grant	0.000	0.000	0.597	0.990	0.301	0.909	0.471	0.270	0.132	0.238
	Treatment-on-the-Treated									
Participated in BDG only	-0.061	-0.050	0.0071	0.0074	0.060	0.053	-0.14**	-0.13**	0.023	0.023
	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.06)	(0.06)	(0.05)	(0.05)
Won Lottery only	0.24***	0.18***	0.033	0.0053	-0.014	0.039	-0.12***	-0.13***	0.064**	0.060*
	(0.04)	(0.04)	(0.05)	(0.06)	(0.04)	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)
Participated in BDG and Won Lottery	0.43***	0.33***	-0.063	-0.096	0.25***	0.35***	-0.21***	-0.27***	0.082	0.078
	(0.09)	(0.09)	(0.10)	(0.12)	(0.09)	(0.10)	(0.08)	(0.09)	(0.06)	(0.07)
Pval BDG=Both	0.000	0.000	0.514	0.395	0.051	0.008	0.394	0.153	0.378	0.470
Pval Grant=Both	0.021	0.070	0.317	0.305	0.002	0.001	0.179	0.081	0.757	0.768
Pval BDG=Grant	0.000	0.000	0.745	0.980	0.294	0.856	0.641	0.991	0.404	0.487
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.663	0.663	0.456	0.456	0.312	0.312	0.207	0.207	0.092	0.092
Standard dev.	0.473	0.473	0.499	0.499	0.464	0.464	0.405	0.405	0.290	0.290
Observations	2167	2167	734	734	734	734	734	734	734	734

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Savings refer to the period of the last three months. Columns (1) and (2) are based on the full study sample, summing both baseline and endline observations. Questions on where the respondent typically saves were only asked at endline, and (inadvertently) only to respondents who indicated having saved in the past three months, hence the smaller number of observations for columns (3)-(10). The reported p-values are from chi-2 tests for equality of regression coefficients.

Treatment Effect of Discussion Groups on Each Component of Innovation, Financial Planning and Market Intelligence Indices

TABLE A.9: AVERAGE IMPACT OF DISCUSSION GROUPS ON VARIOUS COMPONENTS OF INNOVATION INDEX

	New Suppliers		New Products		New Marketing Techniques		New Production Technology		New Communities	
	Intent-to-Treat									
Randomized in BDG only	0.0053	0.016	-0.0019	0.010	0.086***	0.093***	0.015	0.022	0.053**	0.058***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Won Lottery only	0.081***	0.074***	0.16***	0.14***	0.11***	0.093***	0.071***	0.058***	0.049**	0.039
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
Randomized in BDG and Won Lottery	0.078**	0.057*	0.14***	0.11***	0.12***	0.099***	0.041*	0.020	0.025	0.0099
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)
Pval BDG=Both	0.031	0.227	0.000	0.004	0.279	0.836	0.269	0.936	0.348	0.107
Pval Grant=Both	0.921	0.628	0.574	0.310	0.773	0.851	0.211	0.113	0.419	0.327
Pval BDG=Grant	0.009	0.055	0.000	0.000	0.367	0.980	0.006	0.091	0.904	0.464
	Treatment-on-the-Treated									
Participated in BDG only	0.010	0.031	-0.0038	0.019	0.17***	0.18***	0.030	0.042	0.10**	0.11***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)
Won Lottery only	0.081***	0.074***	0.16***	0.14***	0.11***	0.095***	0.071***	0.058***	0.049**	0.040
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
Participated in BDG and Won Lottery	0.15**	0.11*	0.27***	0.20***	0.23***	0.19***	0.079*	0.039	0.048	0.021
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.04)	(0.04)	(0.05)	(0.05)
Pval BDG=Both	0.032	0.226	0.000	0.004	0.307	0.826	0.277	0.939	0.336	0.110
Pval Grant=Both	0.242	0.522	0.054	0.241	0.028	0.063	0.853	0.639	0.983	0.710
Pval BDG=Grant	0.129	0.356	0.000	0.007	0.187	0.046	0.201	0.635	0.190	0.071
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.113	0.113	0.094	0.094	0.085	0.085	0.038	0.038	0.073	0.073
Standard dev.	0.316	0.316	0.293	0.293	0.278	0.278	0.192	0.192	0.260	0.260
Observations	2168	2168	2168	2168	2168	2168	2168	2168	2168	2168

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Variables are binary and magnitudes can therefore be interpreted as probabilities. The reported p-values are from chi-2 tests for equality of regression coefficients. The number of observations in the sum of baseline and endline observations.

TABLE A.10: AVERAGE IMPACT OF DISCUSSION GROUPS ON VARIOUS COMPONENTS OF FINANCIAL PLANNING INDEX

	Knows Business Plan		Has Written Business Plan		Keeps Accounting Books		Calculates Sales, Profits or Losses	
	Intent-to-Treat							
Randomized in BDG only	0.11***	0.11***	0.035	0.039	0.047	0.054	0.0036	0.020
	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.02)	(0.02)
Won Lottery only	0.33***	0.35***	0.45***	0.46***	0.47***	0.46***	0.098***	0.084***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
Randomized in BDG and Won Lottery	0.35***	0.36***	0.46***	0.47***	0.42***	0.41***	0.14***	0.10***
	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)	(0.03)	(0.03)
Pval BDG=Both	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
Pval Grant=Both	0.778	0.807	0.736	0.792	0.347	0.295	0.227	0.523
Pval BDG=Grant	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.020
	Treatment-on-the-Treated							
Participated in BDG only	0.21***	0.21***	0.069	0.075	0.092	0.11	0.0070	0.038
	(0.07)	(0.07)	(0.06)	(0.06)	(0.07)	(0.07)	(0.05)	(0.04)
Won Lottery only	0.33***	0.35***	0.45***	0.46***	0.47***	0.46***	0.098***	0.084***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
Participated in BDG and Won Lottery	0.67***	0.69***	0.89***	0.90***	0.81***	0.79***	0.26***	0.20***
	(0.09)	(0.09)	(0.07)	(0.08)	(0.09)	(0.09)	(0.06)	(0.06)
Pval BDG=Both	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
Pval Grant=Both	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.029
Pval BDG=Grant	0.069	0.050	0.000	0.000	0.000	0.000	0.043	0.278
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	0.419	0.419	0.159	0.159	0.324	0.324	0.893	0.893
Standard dev.	0.494	0.494	0.366	0.366	0.468	0.468	0.309	0.309
Observations	2168	2168	2168	2168	2168	2168	2168	2168

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Variables are binary and magnitudes can therefore be interpreted as probabilities. The reported p-values are from chi-2 tests for equality of regression coefficients. The number of observations in the sum of baseline and endline observations.

TABLE A.11: AVERAGE IMPACT OF DISCUSSION GROUPS ON VARIOUS COMPONENTS OF MARKET INTELLIGENCE INDEX

	Visited Competitors To See Prices		Visited Competitors To See Products		Asked Customers Their Preferences		Asked Former Customers Reasons for Stopping		Asked Suppliers Successful Products	
	Intent-to-Treat									
Randomized in BDG only	0.075	0.076	0.16*	0.16*	0.017	0.026	-0.0027	-0.0024	-0.028	-0.024
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.08)	(0.08)	(0.09)	(0.09)
Won Lottery only	0.049	0.029	0.14	0.15	0.13	0.091	0.016	-0.0041	0.10	0.076
	(0.10)	(0.10)	(0.09)	(0.10)	(0.09)	(0.10)	(0.09)	(0.10)	(0.10)	(0.10)
Randomized in BDG and Won Lottery	0.17	0.16	0.15	0.15	0.22**	0.18	-0.086	-0.100	0.26**	0.24**
	(0.11)	(0.12)	(0.11)	(0.11)	(0.11)	(0.12)	(0.11)	(0.11)	(0.11)	(0.12)
Pval BDG=Both	0.411	0.504	0.920	0.955	0.087	0.202	0.457	0.408	0.020	0.039
Pval Grant=Both	0.316	0.290	0.986	0.955	0.445	0.448	0.380	0.410	0.225	0.195
Pval BDG=Grant	0.807	0.668	0.892	0.899	0.288	0.551	0.852	0.987	0.217	0.372
	Treatment-on-the-Treated									
Participated in BDG only	0.14	0.15	0.31*	0.31*	0.033	0.050	-0.0053	-0.0045	-0.054	-0.047
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.16)	(0.16)	(0.18)	(0.18)
Won Lottery only	0.049	0.030	0.14	0.15	0.13	0.092	0.016	-0.0042	0.10	0.076
	(0.10)	(0.10)	(0.09)	(0.10)	(0.10)	(0.10)	(0.09)	(0.10)	(0.10)	(0.10)
Participated in BDG and Won Lottery	0.33	0.31	0.28	0.30	0.43**	0.36	-0.17	-0.19	0.49**	0.46**
	(0.22)	(0.23)	(0.21)	(0.22)	(0.22)	(0.23)	(0.20)	(0.21)	(0.22)	(0.23)
Pval BDG=Both	0.412	0.493	0.918	0.978	0.088	0.199	0.458	0.405	0.021	0.039
Pval Grant=Both	0.172	0.183	0.497	0.457	0.150	0.206	0.353	0.343	0.068	0.076
Pval BDG=Grant	0.564	0.486	0.317	0.329	0.567	0.803	0.893	0.999	0.351	0.472
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	2.493	2.493	2.417	2.417	2.465	2.465	2.713	2.713	2.387	2.387
Standard dev.	1.144	1.144	1.121	1.121	1.147	1.147	1.075	1.075	1.169	1.169
Observations	2131	2131	2132	2132	2135	2135	2134	2134	2128	2128

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Each variables takes 4 possible values- Never, Once, Mostly and Always, coded 1, 2, 3 and 4 respectively. The number of observations combines both baseline and endline observations. It is slightly lower than in the previous tables because market intelligence questions were only asked to respondents who already had a business at baseline. The reported p-values are from chi-2 tests for equality of regression coefficients.

TABLE A.12: AVERAGE IMPACT OF DISCUSSION GROUPS ON VARIOUS COMPONENTS OF MARKET INTELLIGENCE INDEX (CONTINUED)

	Used Special Offer To Attract Customers		Did Advertisement		Negotiated Lower Prices With Supplier		Compared Prices/Quality From Diff. Suppliers	
	Intent-to-Treat							
Randomized in BDG only	0.26***	0.27***	-0.040	-0.047	0.078	0.079	-0.037	-0.041
	(0.09)	(0.09)	(0.10)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)
Won Lottery only	0.15*	0.14	0.20*	0.16	0.058	0.062	0.091	0.071
	(0.09)	(0.10)	(0.11)	(0.11)	(0.09)	(0.10)	(0.09)	(0.09)
Randomized in BDG and Won Lottery	0.048	0.032	0.25**	0.24*	0.13	0.14	0.16	0.15
	(0.11)	(0.11)	(0.12)	(0.13)	(0.11)	(0.11)	(0.10)	(0.11)
Pval BDG=Both	0.064	0.051	0.028	0.041	0.631	0.607	0.081	0.100
Pval Grant=Both	0.385	0.376	0.685	0.573	0.528	0.510	0.571	0.493
Pval BDG=Grant	0.273	0.222	0.042	0.092	0.844	0.877	0.183	0.274
	Treatment-on-the-Treated							
Participated in BDG only	0.50***	0.51***	-0.078	-0.090	0.15	0.15	-0.072	-0.080
	(0.17)	(0.17)	(0.19)	(0.19)	(0.17)	(0.17)	(0.16)	(0.16)
Won Lottery only	0.15*	0.14	0.20*	0.16	0.058	0.063	0.091	0.070
	(0.09)	(0.10)	(0.11)	(0.11)	(0.09)	(0.10)	(0.09)	(0.09)
Participated in BDG and Won Lottery	0.093	0.070	0.49**	0.46*	0.26	0.28	0.30	0.29
	(0.21)	(0.22)	(0.24)	(0.25)	(0.21)	(0.22)	(0.20)	(0.21)
Pval BDG=Both	0.063	0.054	0.028	0.040	0.635	0.597	0.081	0.100
Pval Grant=Both	0.767	0.727	0.210	0.204	0.324	0.302	0.277	0.269
Pval BDG=Grant	0.026	0.021	0.136	0.180	0.564	0.590	0.286	0.336
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Control Mean	2.460	2.460	2.221	2.221	2.898	2.898	3.077	3.077
Standard dev.	1.105	1.105	1.269	1.269	1.116	1.116	1.065	1.065
Observations	2123	2123	2124	2124	2134	2134	2132	2132

Notes : Standard errors are in parentheses and are robust. Controls are measured at baseline and include a category for business revenue, sector dummies, and whether participants attended the lottery (when invited). Each variables takes 4 possible values- Never, Once, Mostly and Always, coded 1, 2, 3 and 4 respectively. The number of observations combines both baseline and endline observations. It is slightly lower than in the previous tables because market intelligence questions were only asked to respondents who already had a business at baseline. The reported p-values are from chi-2 tests for equality of regression coefficients.

A.3 Mediation Analysis

The text of the group meeting notes was analyzed using OpenAI's model gpt-4o. In practice, a python script was created to send calls to OpenAI's API. For each BDG, the meeting notes across all six weeks were put together and gpt-4o was asked if the BDG discussed specific topics related to business innovation, digitalization and networking. In particular, the following prompt was used:

```
For each group, tell whether members discussed
1) Buying inputs for business from new suppliers
2) Selling new goods or services
3) Using new marketing techniques (i.e. techniques that allow
   businesses to find customers)
4) Using new ways of producing the same goods or services (as an
   example, this could include modifying the recipe of a dish, or
   how a food product is conserved, etc.)
5) Selling goods or services at a new place or new geographical
   location where the business was not selling thus far
6) Any other type of business innovation that does not fall into any
    of the 5 aforementioned categories
7) Writing a business plan
8) Keeping accounting books
9) Calculating sales, profits and losses
10) Any other means of financial planning that does not belong to
   the previous 3 categories
11) Visting competitors to check their prices
12) Visiting competitors to check their products
13) Asking customers their preferences
14) Asking former customers why they stopped buying
15) Asking suppliers about the successful or trending products at
   the moment
16) Using a special offer (like discount or something similar) to
   attract customers
17) Doing advertisement about one's business (using megaphone,
   calling customers or other similar means of advertising)
18) Negotiating lower prices with suppliers
19) Comparing price-quality ratio from different suppliers
```

```
20) Any other means of doing market research that does not belong to
    the 9 previous categories
21) Using cellphone for business (could include calling customers or
    other similar uses of cellphone for business)
22) Using social media for business (could include advertising your
   business on social media and other similar uses)
23) Using a mobile money account for business (could include saving
   on a mobile money account and other similar uses)
24) Any other digital means for business purposes that does not
   belong to any of the previous 3 categories
25) Creating contacts with other business owners (to get motivation,
    new business ideas, build partnerships, and other similar
   reasons)
26) Who to ask for business advice (whether one should seek advice
   for friends, family, other business owners or someone else)
27) Any other means of business networking that does not belong to
   the previous 2 categories


Text: "{text}"

For each of the 27 topics mentioned above, decide whether it is
   likely (1) or unlikely (0) that the group members discussed it.
For each binary variable, please generate another text variable that
    mentions the exact part of the discussion that helped you make
   your inference.
These 27 text variables should systematically report the relevant
   text whenever the corresponding dummy is 1, and be empty
   otherwise.
Respond only with a JSON object with the following structure (exact
   keys). Do not add any commentary, explanations, or extra fields.
{{
  "new_suppliers": 0 or 1,
  "new_suppliers_text": "...",
  "new_goods": 0 or 1,
  "new_goods_text": "...",
  "new_marketing": 0 or 1,
  "new_marketing_text": "...",
```

```
"new_technology": 0 or 1,
"new_technology_text": "...",
"new_markets": 0 or 1,
"new_markets_text": "...",
"other_innovation": 0 or 1,
"other_innovation_text": "...",
"business_plan": 0 or 1,
"business_plan_text": "...",
"accounting": 0 or 1,
"accounting_text": "...",
"financial_calc": 0 or 1,
"financial_calc_text": "...",
"other_financial": 0 or 1,
"other_financial_text": "...",
"visit_price": 0 or 1,
"visit_price_text": "...",
"visit_products": 0 or 1,
"visit_products_text": "...",
"ask_customers": 0 or 1,
"ask_customers_text": "...",
"ask_ex_customers": 0 or 1,
"ask_ex_customers_text": "...",
"ask_suppliers": 0 or 1,
"ask_suppliers_text": "...",
"special_offer": 0 or 1,
"special_offer_text": "...",
"advertising": 0 or 1,
"advertising_text": "...",
"negotiate_prices": 0 or 1,
"negotiate_prices_text": "...",
"compare_suppliers": 0 or 1,
"compare_suppliers_text": "...",
"other_market_research": 0 or 1,
"other_market_research_text": "...",
"cellphone": 0 or 1,
"cellphone_text": "...",
"social_media": 0 or 1,
"social_media_text": "...",
```

```
  "mobile_money": 0 or 1,
  "mobile_money_text": "...",
  "other_digitalization": 0 or 1,
  "other_digitalization_text": "...",
  "business_contacts": 0 or 1,
  "business_contacts_text": "...",
  "business_advisors": 0 or 1,
  "business_advisors_text": "...",
  "other_networking": 0 or 1,
  "other_networking_text": "..."
}}
```

The python script with the aforementioned prompt thus generated a table with dummies indicating whether or not a group discussed a particular topic, as well as corresponding text variables mentioning the part of the text that gpt-4o used to make its inference.

In a next step, the same python script was re-run ten times over to generate a probability instead of a binary output (as there may be sampling error in AI-generated output). For probabilities of 0.5 and above (i.e. when the LLM determines that a group discussed a topic in at least 5 of the 10 iterations), we assume that the topic was indeed discussed by that group. The threshold of 0.5 was determined empirically, verifying by hand some of the discussion notes and LLM outputs. In cases where the probability is below 0.5 but still positive, we use human judgment (based on the text extracts outputted by ChatGPT) to determine whether or not a group discussed a given topic.